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BEFORE THE  
NEW MEXICO OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
January 4, 1967

IN THE MATTER OF:

Application of Standard Oil Company of  
Texas for a unit agreement, Lea  
County, New Mexico.

Case No. 3506

IN THE MATTER OF:

Application of Standard Oil Company  
of Texas for a waterflood expansion,  
Lea County, New Mexico.

Case No. 3507

BEFORE:

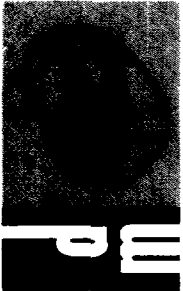
Daniel S. Nutter, Examiner

Transcript of Hearing

MR. NUTTER: We will call Case 3506.

MR. HATCH: Case 3506: Application of Standard Oil  
Company of Texas for a unit agreement, Lea County, New Mexico.

MR. KELLAHIN: Jason Kellahin, Kellahin & Fox, Santa Fe,  
appearing for the Applicant. Case 3506 is an application for  
approval of the Maljamar-Grayburg Unit and Case 3507



pertains to an expansion of the existing waterflood in its present area. For that reason, I would like to move at this time that the two cases be consolidated for purposes of testimony and that separate orders be entered.

MR. NUTTER: We will call next, Case 3507.

MR. HATCH: Case 3507: Application of Standard Oil Company of Texas for a waterflood expansion, Lea County, New Mexico.

MR. NUTTER: Case 3506 and 3507 will be consolidated for purposes of testimony.

MR. KELLAHIN: In this case we will have two witnesses. We would like to have them stand and be sworn.

(Witnesses sworn)

MR. KELLAHIN: I would like to call as our first witness P.I. Youngkin.

MR. NUTTER: What are the initials?

MR. KELLAHIN: P.I.

P. I. YOUNGKIN, called as a witness, having been first duly sworn on oath, was examined and testified as follows:

DIRECT EXAMINATION

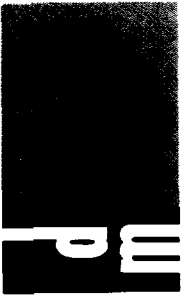
BY MR. KELLAHIN:

Q Would you state your name, please?

A P.I. Youngkin.

Q By whom are you employed and in what position?

A I am employed by Standard Oil Company of Texas as Senior Unitization Engineer.



Q Where are you located?

A Houston, Texas.

Q Have you ever testified before the Oil Conservation Commission before?

A No, I haven't.

Q For the benefit of the Examiner, would you outline briefly your education and experience as an engineer?

A I graduated from the University of Texas with a B.S. Degree in Petroleum Engineering in 1949. Immediately upon graduation I was employed by Standard of Texas. I have been employed in various petroleum engineering capacities since that time. The last seven and a half years or so I have been doing unitization work.

Q You are now handling unitization work in the office in Houston?

A Yes, sir.

Q In connection with your work in Houston, did you have anything to do with the development of the Maljamar-Grayburg Unit?

A Yes, sir, I was responsible for the coordination of the various activities that go into unitizing a field.

MR. KELLAHIN: Are the witness's qualifications acceptable?

MR. NUTTER: Yes, they are.

(Whereupon, Standard's Exhibit 1 marked for identification.)

Q Referring to what has been marked as Standard's Exhibit No. 1, would you identify that exhibit, please?

A Exhibit No. 1 is the Unit Agreement and the purpose of this Unit Agreement is to enable institution and conservation of secondary recovery operations, conserve natural resources, prevent waste and secure the other benefits obtainable through development and operation in the proposed unitized area. This unit area is shown on Exhibit A and further described in Exhibit B of this Unit Agreement and contains some 3,441 acres. This acreage is comprised of Federal, State, and Fee lands in Township 17, Range 32 East, in Lea County, New Mexico.

Q Would you give us the amount of Federal, State, and Fee land involved in the unit?

A Yes, sir, there are a total of thirty-six tracts in the unit area comprising 3,441 acres, eighteen of which contain -- 2,481 acres is Federal acreage. There are two State tracts comprising eighty acres and sixteen tracts comprising a total of 880 acres.

Q Is the Unit Agreement in a form that has heretofore been approved by this Commission?

A Yes, sir.



Q It's what you might call a standard or normal form of Unit Agreement?

A Yes, sir.

Q Does it have provision for subsequent joinder?

A Yes, it does.

Q Has everyone in the area been given an opportunity to join in the unit?

A Yes, sir.

Q Has the unit been submitted to the New Mexico State Land Office?

A The preliminary agreement I understand has been and we have received preliminary approval and I believe, coincident with this, the State Land Office has been furnished a copy. It's our intention to secure final approval upon approval by the Oil Conservation Commission.

Q Has it been submitted to the U.S.G.S.?

A The preliminary agreements have been submitted to the U.S.G.S.

Q Have the final copies been designated by the U.S.G.S.?

A Yes, sir.

Q What percentage has been assigned of the owners?

A We have 92.7 per cent of the working interest ownership committed to this unit and 94.6 per cent of the royalty interests committed to this unit.



Q In referring to the royalty interests, that is on the assumption that the U.S.G.S. and the State Land Office approve the agreement?

A Yes, sir.

Q In that event you would have what per cent of commitment?

A 94.6.

Q Do you anticipate that you will get 100% of the working interests signing?

A No, sir, we have one tract designated as Tract Three, I believe, which is operated by Cima Capitan, and they have declined to participate in the unit. However, they did indicate that they would cooperate with us.

Q Exhibit No. 1 is the Unit Agreement to which you have referred?

A Yes, sir.

MR. KELLAHIN: I would like to offer Exhibit 1.

MR. NUTTER: Applicant's Exhibit No. 1 will be admitted in evidence.

(Whereupon, Applicant's Exhibit No. 1 admitted in evidence)

MR. KELLAHIN: That's all I have on direct examination.

BY MR. NUTTER:

Q Cima Capitan has declined to join the unit. Do you know if they have plans to waterflood their acreage?

A No, sir, I don't know what their plans are at this time. They did indicate that they would cooperate to the fullest possible extent.

Q They are a waterflood company and I just wondered if they had indicated to you that they would waterflood and if you had entered into line agreements with them?

A Not as of this time.

Q That's the only tract that you know of that won't be committed?

A That is true.

Q It's a 160-acre tract?

A That is true.

MR. NUTTER: Are there any further questions of Mr. Youngkin? You may be excused.

MR. KELLAHIN: We will call as our next witness Mr. Jerry Webb.

(Witness sworn)

JERRY WEBB, called as a witness, having been first duly sworn on oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

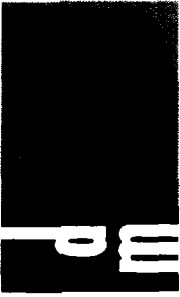
A Jerry Webb.

Q By whom are you employed and in what position?

A Standard Oil Company of Texas as Petroleum Engineer.

Q Where are you located?

A Snyder.



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Q Does the area involved in the Maljamar-Grayburg Unit come under your supervision?

A Yes, sir, it does. I am the production engineer in charge.

Q Have you ever testified before the Oil Conservation Commission of New Mexico before?

A No, sir.

Q For the benefit of the Examiner, would you briefly outline your education and experience?

A I graduated from the University of Houston in 1959 with a B.S. in Petroleum Engineering, employed by a subsidiary of Standard of California in Colorado at that time; transferred to Oklahoma with Standard of Texas and finally into Snyder for the last two years.

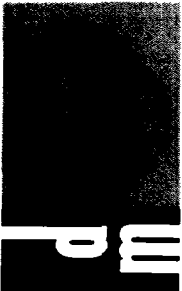
MR. KELLAHIN: Are the witness's qualifications acceptable?

MR. NUTTER: Yes, they are.

(Whereupon, Applicant's Exhibit No. 2 marked for identification)

Q Referring to what has been marked Exhibit No. 2, would you identify that exhibit and discuss the information shown on it?

A Yes, sir, this is the plat of the proposed Maljamar-Grayburg Unit. The gray line outlines the proposed unit. As





Mr. Youngkin testified, there is 3,441 acres consisting of forty acres Phillips tract, Cima Capitan's tract and 3,240 acres purchased by Standard of Texas from Leonard Nichols in 1965.

Q Shown on the plat are certain well symbols. What are the significance of those symbols?

A The circles colored blue are present injection wells and the triangles are proposed injection wells we are asking approval.

Q This area has already been approved or at least, a portion of it for waterflood, water injection, is that correct?

A Yes, sir.

Q Are you familiar with the history of that?

A Yes, sir. In 1962 Mr. Leonard Nichols established two pilot spots in Section Three and then he later expanded that into Section Four and Section Ten. He expanded it three times. In early 1966 Standard requested approval and received approval to expand five more wells and this was in April of '66.

Q It's now proposed to expand the waterflood project further, is that correct?

A Yes, sir. We wish to expand it by converting thirteen of the indicated wells to water injection.



Q This will be in addition to those that are already being used for injection purposes?

A Yes, sir, this will give us a total of thirty-four injection wells.

Q In connection with the application it was requested that the Commission establish an administrative procedure for the additional injection wells, whether such wells have received the response by offset wells having received the response or not. Do you consider this a necessary provision in any order entered by the Commission at this time?

A Yes, sir. We could save a lot of time and money with an administrative approval for any expansion that we have.

Q Would you anticipate that there would be expansion of the type involved there which would not come under the provisions of Rule 701 which requires that the well receive a response or be offset by a well having received a response?

A Yes, sir, it is possible.

Q You would want that provision in the order?

A Yes, sir.

(Whereupon, Applicant's  
Exhibit No. 3 marked for  
identification)

Q Now, referring to what has been marked as Exhibit No. 3, would you identify that exhibit?

A Exhibit No. 3 is a data sheet describing the formation



in Maljamar-Grayburg area and the Grayburg Formation, average depth, 4.050 feet on an anticlinal stratigraphic structure, well count in the area, we have fifty-nine producing wells, twenty-one injection wells, and nine under-developed forty-acre units. We currently have three sources of injection water. Source number one, fresh water from a Standard of Texas-operated water well in Section One. Our second source, we purchased water from the Double Eagle Corporation of New Mexico in Section Four. Source three, we are currently injecting 800 barrels of produced water a day in five injection wells. The water analysis of these three sources are included in the data sheet. On the third page, we have twelve wells that will be added to the project area by this proposed expansion along with their current producing rates.

Q A while ago you said, I believe, thirteen wells will be added. Is it twelve?

A This would be twelve wells that would be brought into the waterflood project area.

Q The other wells are within the area now, is that correct?

A Yes, sir, our current injection rate is 4,800 barrels a day and we anticipate a maximum of plus or minus 8,000 barrels a day. Project injection is 300 to 2,700 pounds and

this should remain the same after expansion. Through November 1, 1966, we have injected 4,500,000 barrels into the Grayburg area.

(Whereupon, Applicant's Exhibit 4 marked for identification)

Q Now, referring to what has been marked as Exhibit No. 4, would you identify it by exhibit?

A Yes, sir, Exhibit No. 4 are logs of various times on the thirteen proposed injection wells. We propose to flood the Grayburg formation. A tight log in the area would show red beds from 300 to 1,000 feet, anhydrite from 1,000 plus or minus 1200 feet, salt from 1,200 to 2,400 feet, anhydrite and shales from 3,700 feet, which is approximately the top of the Grayburg. Surface casing in the area, a large percentage of the wells are laying in the surface, is laying in the red beds. We have some few wells with 1,000 feet more or less, and surface pipes land in the anhydrite, maximum depth of fresh water in the area, the Caprock crosses it. Our portion of the Maljamar Field, Caprock in this area is Ogallala. We have fresh water at approximately 300 feet on the Caprock. Below the Caprock we would have a maximum of 150 feet. There is no Ogallala present under the Caprock in this area and we see no danger to the fresh water resources.



Q Are there any fresh water resources in this immediate area?

A Yes, sir, on the Caprock there are several source wells.

Q But other than that, there would be no water that could be contaminated, is that correct?

A No, sir.

Q In your opinion, is there any danger of contamination of the fresh water?

A No, sir.

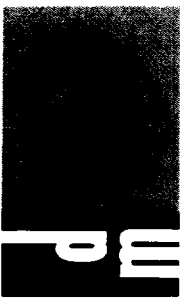
(Whereupon, Applicant's Exhibit 5 marked for identification.)

Q Referring to what has been marked as Exhibit Number 5, would you identify that exhibit, please?

A Yes, sir, these are thirteen diagrammatic sketches of our proposed completion procedures on the proposed wells. We would prefer to start injecting fresh water down the casing in these wells, run radioactive profile surveys after we have established a steady, stayed condition in the wells; then view all wells to provide us with a good profile, make sure we flood the entire Grayburg Formation.

Q Will you use tubing in the event that you use other than fresh water?

A Yes, sir.



Q Is that the system that is presently being used?

A Yes, sir, the five wells we are using are projecting through tubing.

Q Will the expansion of the project include the injection of additional produced salt water?

A Yes, sir, and as more produced water becomes available we will reinject it.

Q Will salt water be injected down the casing?

A No, sir.

Q Will you use coupons to detect any probability of corrosion in the casing or tubing?

A We have installed in our water-handling system what is called a corrater, which measures the corrosivity of the water passing the probe that sticks into the gathering line. We have calibrated this corrater against coupon tests and the corrater has read consistently higher than coupon tests.

Q You consider the use of the corrater -- how do you spell that, please?

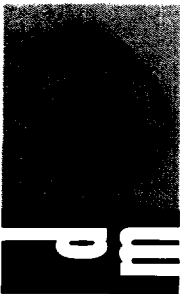
A C-o-r-r-a-t-e-r.

Q You consider the use of that instrument as satisfactory as compared to the use of coupons?

A Yes, sir.

Q It gives adequate protection?

A Yes, sir.



Q Has this been discussed with the Oil Conservation Commission?

A Mr. Ramey looked at the corratser setup in May of this year. Since that time, we ran the coupon calibration of the corratser.

Q Now, which of the thirteen wells will be used for salt water injection?

A If the salt water is available, we will start with the Jackson Federal and Atlantic Federal Number One. They are the two most northeast wells of the Exhibit Number 2.

Q As shown by the diagrammatic sketches, will the cement and casing program be adequate to confine the injection water, whether it be salt or fresh water, to the Grayburg Formation?

A Yes, sir, we will also be running profile surveys to determine the way the water will be split up into zones we are flooding and the by-product of these profile surveys will show us channeling or any other undesirable condition, that we will correct.

Q How often will these profile surveys be run?

A Every six to eight months.

Q What pressure rate did you say you anticipated?

A There should be no change, probably 2,700 pounds maximum.

Q Not in excess of 3,000?

A No, sir.

Q What is the condition of the casing in these wells?

A Today we have repaired one casing string. We ran a smaller string in a larger string in an injection well.

Q The profile survey will show up casing leaks?

A Yes, sir.

Q In your opinion, will the running of profile surveys be adequate to determine whether any leakage is occurring in the future operation of these wells?

A Yes, sir.

(Whereupon, Applicant's  
Exhibit 6 marked for  
identification)

Q Referring to what has been marked as Exhibit Number 6 --

A Exhibit Number 6 is a production curve showing Standard of Texas production experience since we took over in March of 1965. This does not, by the way, include Cima Capitan's production.

Q Now, does that graph show any indication of a response from the water injection program that has been followed up to date?

A Yes, sir, if you will notice in May of 1965 we achieved a response, quite a good response in fact. We have



run into producing troubles that are, the declines are masking further response as shown in the later portion of the curve and we are working hard to correct those troubles.

Q In your opinion, will the flooding of this area or the expansion of that present waterflood result in the production of oil that would not otherwise be produced?

A Yes, sir.

Q To that extent, would it be in the interest of preventing waste?

A Yes, sir.

Q Under the terms of the Unit Agreement and the terms of the waterflood, will the correlative rights of all the parties involved be protected?

A Yes, sir.

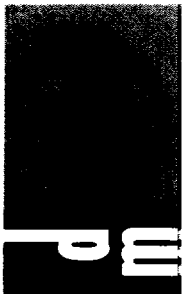
Q And will the correlative rights, in your opinion, of Cima Capitan be adversely affected by your operations?

A No, sir.

Q As a matter of fact, they would be helped?

A Yes, sir.

MR. KELLAHIN: If the Examiner please, we have a copy of a letter directed to the Commission from Mr. Frank E. Irby, Office of the New Mexico State Engineer stating they have no objection to the granting of approval to this application, provided the conditions of approval are sufficient



to give the same protection as those included in Order WHX 150 and in the Commission's letter of March 11, 1966, which pertains to Order 3035 in Case 3668. Other than the fact that we would like to use the electronics we advise in lieu of use of coupons Standard of Texas has no objection to the conditions laid down by the Office of the State Engineer.

MR. NUTTER: It seems to me that I recall some correspondence or discussions with your office regarding this corrater or whatever you call that thing, for detecting corrosion. This was authorized to be used in lieu of the coupon tests, which were specified in that letter you had.

MR. KELLAHIN: That's the reason I would like to point out the exception we had. We would be happy to discuss it with the State Engineer, if you want any information.

MR. NUTTER: I think the purpose of Mr. Ramey's visit to your lease was to determine whether this was an adequate substitute for the coupons?

A Yes, sir, as far as I understand.

MR. NUTTER: Your experience to date is that this instrument is more reliable than coupons?

A Yes, sir, it reads consistently higher, which is on the safe side. It's on the conservative side. It reads higher than the coupon tests we have run.

Q (By Mr. Kellahin) Were Exhibits 2 through 6 prepared

by you or under your supervision?

A Yes, sir.

MR. KELLAHIN: I would like to offer Exhibits 2 through 6.

MR. NUTTER: Exhibits 2 through 6 will be admitted in evidence.

(Whereupon, Applicant's Exhibits 2-6 admitted in evidence.)

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

BY MR. NUTTER:

Q Your Exhibit Number 3 shows that approximately 760 barrels per day of produced water is currently being reinjected. Exhibit Number 6 shows that you are presently producing almost a thousand barrels of water per day.

A Yes, sir.

Q Is it your intent to reinject all of the produced water?

A Yes, sir, we are not doing it at the present time, as you see, but if we were granted approval here, we will be consolidating batteries and will be able to get our salt water into one place.

Q Some of the water production at this time is probably isolated and can't be gathered into your injection



system, but ultimately you would reinject all produced water?

A Yes, sir.

Q Any well in which you do inject produced water will be equipped with tubing and packer?

A Yes, sir.

Q Now, this corrosion detecting device or corrosivity detecting device, is that run on the injection streams for the produced water only or also in your fresh water?

A Both fresh water streams.

Q Profile surveys are run on these wells as a matter of routine every six to eight months?

A Yes, sir.

Q Is that also true when you have tubing in the well and down the casing?

A We actually run the profile surveys for a different reason, to allocate the water that we have injected to the different wells to maintain an even flood front.

Q You have several sets of perforations in each of these wells, I notice.

A Yes, sir.

Q There is no attempt to isolate these zones with packers or anything like that?

A Yes, sir, there is. As I mentioned earlier, we want to start down the casing, then run profile surveys then we will

place a packer if necessary.

Q Then you would be injecting down the tubing into one zone and down the casing into another zone?

A Yes, sir.

Q But in any event, when you are going down the casing that's going to be fresh water? Any further questions of Mr. Webb? He may be excused.

MR. KELLAHIN: That's all we have on these cases, Mr. Nutter.

MR. HATCH: I would like to point out that the Commission does have the letter to which Mr. Kellahin referred. I won't read it into the record.

MR. NUTTER: Date of that letter?

MR. HATCH: December 23, 1966, Frank E. Irby, Chief, Water Rights Division.

MR. NUTTER: Was the letter of December 23rd the one you had reference to, Mr. Kellahin?

MR. KELLAHIN: Yes, sir.

MR. NUTTER: We will take those cases under advisement.



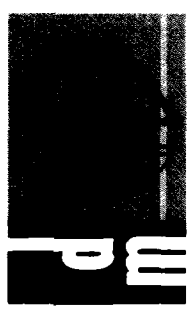
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STATE OF NEW MEXICO )  
 ) ss  
COUNTY OF BERNALILLO )

I, KAY EMBREE, 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.

*Kay Embree*  
Court Reporter



I do hereby certify that the foregoing is a complete record of the proceedings of the Examiner hearing of Case No. 3506-3517 held by me on 1-4, 1967.

*[Signature]*  
New Mexico Oil Conservation Commission