BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
September 30, 1970

EXAMINER HEARING

IN THE MATTER OF:

Application of Union Texas Petroleum Corporation for a unit agreement, Lea County, New Mexico.

Case No. 4429

and

Application of Union Texas Petroleum Corporation of a waterflood project, Lea County, New Mexico.

Case No. 4430

BEFORE: Daniel S. Nutter, Examiner

TRANSCRIPT OF HEARING

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MR. NUTTER: The Hearing will come to Order, please. We will call the next case No. 4429.

MR. HATCH: Case No. 4429, the Application of Union Texas Petroleum Corporation for a unit agreement, Lea County, New Mexico.

MR. NUTTER: And we will also call Case No. 4430.

MR. HATCH: Case No. 4430, the Application of Union Texas Petroleum Corporation for a waterflood project, Lea County, New Mexico.

MR. HINKLE: Clarence Hinkle, of Hinkle, Bondurant, Cox and Eaton, appearing on behalf of Union Texas.

We would like to move that these two cases be consolidated for the purpose of taking testimony.

MR. NUTTER: Cases 4429 and 4430 will be consolidated for Hearing purposes.

MR. HINKLE: We have two witnesses that we would like to have sworn.

(Whereupon, the witnesses were sworn.)

MR. HINKLE: We have one Exhibit which has been marked as Exhibit No. 1 and under one cover there are a number of parts, lettered from "A" to "K". Then, there is one other Exhibit which is not included under

the cover which we have marked Exhibit 1-L.

HOWARD PERDUE

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

DIRECT EXAMINATION

BY MR. HINKLE:

Q State your name, your residence and by whom you are employed?

A I am Howard Perdue. I live in Midland, Texas. I am District Petroleum Engineer for Union Texas Petroleum.

Q Have you previously testified before the Oil Conservation Commission?

A Yes, I have.

Q And your qualifications as a Petroleum Engineer are a matter of record with the Commission?

A Yes.

Q Are you familiar with the Applications which have been filed by Union Texas in these two cases?

A Yes, sir, I am familiar with them.

Q Have you made a study of this proposed unit area for the Langlie-Jal Unit Area?

A Yes, sir, I have.

Q What is Union Texas seeking to accomplish by Case No. 4429?

A Union Texas is seeking to accomplish the approval of the Unit Agreement for the Langlie-Jal Unit Area comprising 3748 acres, consisting of Federal, State and fee lands in Townships 24 and 25 South, Range 37 East, in the Langlie-Mattix Pool, Lea County, New Mexico.

Q Have you prepared or has there been prepared under your direction certain Exhibits for introduction in this case?

A Yes, they are included under Exhibit 1.

Q Refer to Exhibit 1-A and explain what this is and what it shows.

A Exhibit 1-A is a general plat of the area in which the proposed Langlie-Jal Unit is located. It also shows other unit areas in the immediate vicinity and all of the wells which have been drilled within the proposed unit area and within a radius of approximately two miles thereof, as well as the ownership of the acreage within and in the vicinity of the proposed unit area.

Q What zone or formations does Union Texas

propose to unitize?

A We propose to unitize the lower portion of the Jal-Mat in the Langlie-Mattix Pools which this consists of the Seven Rivers and Queen formations.

Q Now, refer to Exhibit 1-F and explain what that shows?

A Exhibit 1-F is a structural plat contoured at intervals of 50 feet on the top of the Langlie-Mattix producing zone. This plat also shows all of the wells which have been drilled within the proposed unit area, among which are certain wells indicated to be gas wells which are producing from the Jal-Mat Gas Pool and will not be a part of the unitized intervals. The gas wells are indicated by the usual symbol.

Q Does this indicate continuity of the producing zone and the zone which you intend to unitize throughout the proposed unit area?

A Yes, sir. This plat along with -- I will refer to Exhibit 1-D, if I might -- which is a two-well cross-section indicating that the overal productive interval is generally continuous throughout the unit area.

Q Are you familiar with the proposed unit agreement, copies of which have been filed with the

Application of these Cases?

A Yes, sir.

Q Is this substantially the same form of unit as heretofore approved by the Commission where both Federal, State and fee lands are involved?

A Yes, sir, it is.

Q Has this area been heretofore designated by the U.S.G.S. as an area suitable and proper for unitization?

A Yes.

Q For the purpose of carrying on waterflood projects?

A Yes. The Application for designation of the unit area was approved by the U. S. Geological Survey and the Unit Agreement was approved subject to some modifications. These modifications were made and the Agreement has since been approved, re-approved, by the U.S.G.S.

Q Has the Unit Agreement and the area also been approved by the Commissioner of Public Lands?

A The Agreement including the U.S.G.S. modifications was reviewed with representatives of the State Land Commissioner and was approved.

Q Are all of the wells within the proposed unit area in the category of stripped wells at the present time?

A Yes, sir. The average production per well is approximately 3 barrels per day.

Q Does the Unit Agreement contain a participating formula?

A Yes.

Q Has this formula been agreed to by all of the working interest owners within the unit area?

A Yes, it has. Actually, 97.35 percent of the working interest owners have ratified the Unit Agreement. Also 93.23 percent of the royalty interest have indicated approval and this would include both the State land royalty and the Federal royalty. There is only one tract that the working interest owner has not ratified, and I will refer again to Exhibit 1-A, and this is the little 40-acre tract outlined up in the northeast corner of the unit. We expect this tract to be negotiated into the unit very soon.

Q Who is that tract owned by?

A Continental is the operator of that tract.

MR. NUTTER: That is the only tract in which

the working interest has not either ratified the unit or indicated that he would ratify, is this correct?

THE WITNESS: Actually, Mr. Examiner, we have 100 percent ratification of all other tracts.

MR. NUTTER: Who have actually ratified?

THE WITNESS: 100 percent of all other tracts in the unit. This is working interest.

MR. NUTTER: Yes.

BY MR. HINKLE:

Q Do you want to state what the participating formula is or would you rather leave that for Mr. Wells?

A I will be happy to. The participation is based on 50 percent ultimate tract primary production, 35 percent usable wells and 15 percent tract acreage.

Q In the event of approval of the Unit Agreement by the Oil Conservation Commission, in your opinion, would the Agreement be in the interest of conservation, prevention of waste and tend to protect correlative rights?

A Yes, sir. We feel that by approval of this project that several million barrels of oil will be recovered that would otherwise stay in the ground.

Q And the primary purpose of the unit is a

waterflood project, is it not?

A Yes, it is.

Q In your opinion will the waterflood project promote the greatest recovery of unitized substances?

A We definitely feel that it will. It is the best scheme for additional recovery.

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

A I believe that's all the testimony I have.

MR. HINKLE: We would like to offer into evidence -- well, I will wait on this because we will refer to this again with the other witness.

That's all I have on direct.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Perdue, you mentioned that the Jal-Mat gas well in the unit is not committed to the unit. Now, I was noticing from the Unit Agreement that the unitized formation is from the top of the Seven Rivers down through the base of the Queen, so I suppose all of these gas wells which are not unitized would be producing from above the top of the Seven Rivers?

A Yes, sir, this is true. I believe we can

refer to Exhibit 1-D again, or I believe 1-C might be a better one.

As you are aware, the Jal-Mat zone includes both Yates and a portion of the Seven Rivers, and the Langlie-Mattix includes the lower portion of the Seven Rivers and the Queen. Well, we are unitizing the Seven Rivers and the Queen as a unitized interval, so the gas wells are all completed above the unitized interval.

Q Above the top of the Seven Rivers?

A Yes, sir.

MR. NUTTER: The other witness will testify as to the injection wells?

MR. HINKLE: That's right.

MR. NUTTER: Are there any further questions of Mr. Perdue?

You may be excused.

(Witness dismissed.)

DONALD B. WELLS

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

DIRECT EXAMINATION

BY MR. HINKLE:

Q State your name, where you reside, and by

whom you are employed?

A My name is Donald B. Wells. I live in Midland, Texas, and I am a Petroleum Engineer for Union Texas Petroleum in the Midland District Office.

Q Have you previously testified before the Oil Conservation Commission?

A No, sir, I have not.

Q State briefly your educational background as a Petroleum Engineer, and your experience.

A I graduated from Texas Tech in 1960 with a Bachelor of Science degree in Petroleum Engineering. At that time I went to work for Haliburton Company and worked for three years in southeastern New Mexico in various capacities. When I left Haliburton, I went to work for British-American Oil Producing Company as a Production Engineer and worked for a B.A. for three years. At the time they were taken over by Gulf, I went to work for Sinclair where I worked for three years as a Reservoir Engineer, advancing to Senior Reservoir Engineer. Then, approximately a year ago, I went to work for Union Texas Petroleum Company as a Petroleum Engineer. Part of my responsibility is included in engineering activities on wells in southeast New Mexico

of which this unit is a part.

Q Have you made a study of the Langlie-Jal proposed unit area?

A Yes, sir, I have.

Q And of the wells that have been drilled?

A Yes, sir.

Q Production history and all?

A Yes, sir.

Q Are you familiar with the Application of Union Texas in Case 4430?

A Yes, sir.

Q What is Union Texas seeking to accomplish with this Application?

A Union Texas Petroleum is the largest interest owner in the unit and as an operator, seeks approval to install a waterflood project in a portion of the Langlie-Mattix Pool in Lea County, New Mexico in order to inject water into the Queen and Seven Rivers formation for the purpose of recovering oil reserves which would otherwise be left in the ground.

Q Can you give a brief history of the Langlie-Mattix producing area which will be included in the unit area?

A Yes, sir. Interest in Pritchard Oil Corporation which is now Union Texas Petroleum drilled and completed the first well which was a discovery well in August of 1935. The Langlie No. 1 initially produced 70 barrels of oil per day after being shot from 3400 3450 feet. To open all possible pay, the Langlie No. 1 was drilled until water was encountered at 312 feet Sub-C which was the original oil and water contact. This well, like many subsequent field wells had the oil stream set in the Seven Rivers above the field gas-oil contact at approximately 100 feet Sub-C and was bothered by I. G. water. In 1937, actual field development started. By late 1939, the drilling activity was over and in 1952 when the field bottom-hole pressure was approximately 800 pounds per square inch, a lively in-field drilling program was begun. These wells were fracture stimulated and had large initial producing rates and experienced rapid decline in productivity. In-field drilling was economically disappointing. In 1941, a gas re-pressuring project was commenced. This project included 13 wells and part of Sections 5, 8 and 9. This project maintained a constant rate of production during a portion of the active

life by virtue of the removal of G.O.R. penalties. However, gas-oil ratios became too large and the project was abandoned. El Paso Natural Gas took over the operation of the project and found that re-pressuring had not occurred. Reservoir void each day would indicate the injection and withdrawals were practically the same. Producing performance of these wells is comparable to other Queen producing areas.

In 1940, the peak producing rate was 36 barrels of oil per day per well. Currently the average oil weight of the 23 wells that still produce is approximately 3 barrels per day.

The Queen Sand is in a late stage of depletion, approximately 96 percent. Accumulative production to July 1st, 1970 from the qualified tracts in the unit area was 4,448,699 barrels. We estimate this as approximately 11 percent of the oil in place. The oil was produced by solution gas drive.

Q Refer to Exhibit 1- and explain that to the Commission.

A Exhibit 1-B is a plat showing the outline of the proposed unit area, and it is also the outline of our proposed project. This plat also shows all wells

which have been drilled within the proposed unit area or project area within a radius of 2 miles, as well as ownership of the acreage surrounding the unit. Proposed injection wells are shown by triangles. The legend also shows the location of the Jal-Mat Gas Wells as well as oil wells producing from the Langlie-Mattix and Jal-Mat Pools. The numbers within the unit area are the same as shown on Exhibit A and B of the Unit Agreement.

Q Do you have anything further with respect to 1-B?

A No, sir.

Q Refer to 1-J and explain what that shows?

A Exhibit 1-J is a table showing all of our proposed injection wells. All together, we have 46 wells listed of which 34 are presently completed in the interval and will be converted to injection wells. It will be necessary to deepen some of these wells or work them over in one manner or another as indicated on the table. It is also contemplated that 12 new wells will be drilled and used for injection purposes.

The wells that will be drilled are shown on this table by one asterisk on the location at which they will be drilled.

Q Now, refer to Exhibits 1-C, D and E and the logs which are shown on Exhibit 1 and explain these.

A All right, sir. Exhibit 1-C is a typical log. It is of a well within the unit area and on it are shown the tops of various producing formations and the proposed unitized interval.

Exhibit 1-D as has been previously testified or mentioned is a two-well cross-section showing that the zones are continuous throughout the unit area.

Exhibit 1-E which consists of 9 logs of wells or the logs of the injection wells which we have logs of. These wells were drilled back in about 1935 and not many of them were logged, so we don't have --

Q (Interrupting) These are all of the logs, these 9 logs are all that are available?

A Yes, sir. The well that we have as Exhibit 1-C is also an injection well, so actually we have logs of 10 wells that will be injection wells.

We plan to log all the wells that we drill and will file them as we drill them.

Q Now, refer to Exhibit 1-G, H and I and tell us what they show?

A These three exhibits are diagrammatic sketches

of our proposed injection wells. Exhibit 1-G is a single completion. On it we show that we have our surface casing cemented to the surface. Our oil stream or the deep stream is also on wells that will be drilled will be cemented to the surface. We will perforate the unitized inverval from -- the gross interval will be approximately 3300 to 3600 with selected intervals within that interval.

We plan to inject water through cement lined tubing and below a packer in the annulus between tubing and the casing where we plan to load the hole with inhibited fluid. We will have a guage at the surface.

Q You will use cement lined tubing in all of the injection wells?

A Yes, sir. Exhibit 1-H and 1-I are the only two wells that we propose to have a dual injection-producing wells. These are two wells which are not -- well, they are currently completed in the Jal-Mat Gas Pool and the operator has elected to keep these completions. On H-C we also have cement lined tubing and will be injecting through that below a packer.

Q From what source do you expect to obtain water for injection purposes?

A We plan to purchase our water from Skelly's Jal water system. This water is kept in reef water and produced Seven Rivers water. I have a water analysis of that.

Q And that is what?

A Exhibit 1-L.

Q The one that is loose?

A Yes. These water analyses were supplied by Skelly and it shows that the water is non-potable. This water has been used in other waterflood projects in the area.

Q You contemplate inaugurating the waterflood by putting all of the injection wells in at the same time or just a portion of them?

A No, sir, we plan to drill all of the wells -- if you notice on one of the plats, 1-B or 1-C, there are some undrilled locations within the unit area -- we plan to drill these wells and develope every five-spot. Of course, some of these wells will be injection wells, and we have a number of replacement wells to drill. These will all be drilled and injection into every well will start essentially at the same time.

Q In other words, you contemplate starting the

injection of water in all 46 wells at approximately the same time?

A Yes, sir.

Q What do you anticipate will be the initial rate of injection?

A Approximately 500 barrels per day per well.

Q What would that aggregate?

A 23,000 barrels a day.

Q Have you made a study or calculation as to the ultimate recovery by this waterflood project?

A Yes, sir, we anticipate that the secondary recovery will be approximately equal to primary or 4½ million barrels additional oil.

Q Over what period of time do you anticipate this will take place?

A Approximately 9 years.

Q Now, the unit plan calls for initial plan of operation. Are you prepared to present this plan?

A Yes, sir, that is presented as Exhibit 1-K. On this we state that our proposed pattern is an 80-acre five-spot. We propose to drill replacement wells for these Jal-Mat gas wells that aren't being included in the unit. We will complete every five-spot pattern

in the unitarea and core and log all of these wells to obtain as much data as possible. After our development is complete, we will start our injection at approximately 500 barrels per day per well. We will inject through cement lined tubing below a packer.

Q Would you like to obtain a project allowable as provided by Rule 701 of the Commission?

A Yes, sir, we would.

Q Would it be desirable in the Order of approving the waterflood project to provide that you could obtain administrative approval in case there is any changes in the injection wells or operations?

A Yes, sir. At the time we get the Continental tract included in the Agreement, that would save us having another Hearing to convert it to injection. It will be an injection well when it is included.

MR. HINKLE: We would like to offer in evidence Exhibits 1-A through L.

MR.NUTTER: Applicant's Exhibits 1-A through 1-L will be admitted into evidence.

(Whereupon, Applicant's Exhibits No. 1-A through 1-L were offered and admitted in evidence.)

MR. HINKLE: That's all we have.

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Wells, you mentioned Exhibits G and H there as being a schematic diagram of the two wells. Are those the only two wells that will be dual completions?

A The only two injection wells.

Q That's what I mean, injection wells?

A Yes, sir.

Q All the others will be single completions and Exhibit G -- I said G and H, but I meant H and I -- and Exhibit G is a typical single-zone injection well, then?

A Yes, sir.

Q And this is the manner in which all the wells will be equipped?

A Yes.

Q Now, referring to Exhibit No. 1-J, Mr. Wells, which is a tabulation of all of the casing and cementing data on the 46 injection wells. Just a quick inspection indicates that there are about six wells, being the Pan American-Langley No. 2, the Texaco-Fristo B-1, the Skelly State M-2, the Thornton-Humble State L-2, the Union Wells No. 1 and the West States Wells B-5 No. 2;

those six wells are the only ones which have less than 200 feet or less than essentially 300 feet of surface casing in them. Now, each one of these appears to have an intermediate casing string. So could we state that in each instance of these injection wells that you have essentially 300 feet of surface pipe or an intermediate casing string?

A Yes, sir.

Q So that you've got at least 300 feet of pipe going through the fresh water sand in the area?

A Yes, sir.

Q Let's check the cement now. On the Pan American-Langlie No. 2, the surface pipe and the intermediate has been circulated to the surface?

A Yes, sir, the little "C" in parenthesis there indicates that that is calculated volume. I couldn't find any temperature surveys indicated. Our records are so sketchy in these old wells that it had to be calculated instead of actual.

Q But the volume of cement that was used was sufficient to come to the surface?

A Yes, sir.

Q Did you use a 100 percent factor?

A No, sir, I used about an 80.

Q 80 percent factor?

A Yes, sir.

Q Then the Skelly State M-2 has cement circulated on the 16-inch and it comes to about 900 feet on the 8 and 5, is this correct?

A Yes, sir. In that particular one, the 16-inch, we did have an indication in the record that that was circulated. Anywhere it doesn't have a "C" that was in the record that it did circulate. The "C" means calculated.

Q Then on the Texaco-Fristo B No. 1, ycu have cement to the surface on the big string and 850 feet on the intermediate?

A Yes, sir.

Q Likewise, on the Thornton you have cement circulated on the big string and to 925 on the intermediate?

A That's right.

Q Union Texas Wells has cement circulated on the big string and 776 on the intermediate?

A Yes, sir.

Q And the West States No. 2 has cement circulated

on the big string and to 300 feet on the intermediate?

A Yes.

Q Now, in each instance, with the exception of two wells, you will be loading the annulus with inhibited fluid and injecting down cement-lined tubing?

A That is proposed, yes, sir. We have had an indication that there are some of these wells that are completed in the Jal gas now. It is in our Agreement that they will either furnish us a well bore or we will make into such condition that we can adequately protect this. Some of these will involve squeezing off the Jal-Mat gas which will be the occasion on some of these wells. Right now, the two that I have indicated are the only two that we think will be dual completions.

Q The others that have perforations in the upper formations, say, in the Yates, those perforations would be squeezed?

A Yes, sir.

Q So that you can't load that annulus with inhibited fluid?

A Yes, sir. If not, if something comes up when we get ready to convert and if this operator elects to go ahead and keep that well, they will be completed as

we have shown here on H and I.

Q Can you tell me on Exhibit 1-J which of these two wells will be dual completed?

A Yes, sir, the Exhibit 1-I is the Skelly Sherrill No. 3 Well which is the second one listed there under Skelly. It has 9 and 5/8 casing set at 1192, cemented with 250 sacks of cement which circulated and then 7-inch at 3401 cemented with 250 sacks of cement and the top cement calculated at 1740. The Exhibit 1-H is the Pan American-Langlie A, No. 2 which is the only well listed there.

Q Fortunately, that is the one that has the short string of surface and that fortunately is one that had the cement circulated on the intermediate?

A Yes, sir.

Q So you do have a string of pipe which is cement circulated all the way to the surface on that one?

A Yes, sir.

Q Do you have any anticipated pressures at this time, Mr. Wells?

A It should be approximately 1000 pounds. We have had some indication from Amerada's flood which

is an offset which we plan to cooperate with. It will increase slightly, but we want to keep it below 1400 pounds. This is indicated as an approximate fracture pressure. It varies considerably over the area.

Q Is this the injection pressure at the well head?

A Yes.

Q What volume of water is expected to be required to achieve fill-up here?

A I am sorry. I will have to look that up.

Q How about in the sense of time; what length of time is expected?

A About two years.

Q About two years?

A Approximately that.

Q At this rate of 500 barrels?

A Yes.

MR. NUTTER: Are there further questions of Mr. Wells?

You may be excused.

(Witness dismissed.)

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

MR. HINKLE: That's all.

MR. NUTTER: Does anyone have anything they wish to offer in Case No. 4429 or 4430?

We will take the case under advisement and we will call Case No. 4173.

STATE OF NEW MEXICO)
) SS.
COUNTY OF SANTA FE)

I, RICHARD L. NYE, Court Reporter, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me, and the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

RICHARD L. NYE, Court Reporter

My commission expires April 8, 1971.

I do hereby certify that the foregoing is
a complete record of the proceedings in
the Examiner hearing of Case No. 4429-30
heard by me on 9/30, 1970.

New Mexico Oil Conservation Commission