CASE 4430: Application of UNION TEXAS PETROLEUM FOR A WATERFLOOD PROJECT, LEA COUNTY, N. MEX.

Case No.

4428

Unit Agreement

Active at time

of filing. See

Unit Agreement file.

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 belowa 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 $4\frac{1}{2}$ 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, you 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.

..., Examiner
New Mexico Oil Conservation Commission

BEFORE THE OIL CONSERVATION COMMISSION
OF THE STATE OF NEW MEXICO

CASE NO. 4430
Order No. R-4051-A

IN THE MATTER OF THE APPLICATION OF
UNION TEXAS PETROLEUM CORPORATION
FOR A WATERFLOOD PROJECT, LEA COUNTY,
NEW MEXICO.

NUNC PRO TUNC ORDER

BY THE COMMISSION:

It appearing to the Commission that due to error, Order No. R-4051, dated November 2, 1970, does not correctly state the intended order of the Commission,

IT IS THEREFORE ORDERED:

(1) That the location of the Phillips Woolworth Well No. 3-4, as set forth on Page 2 of Order (1) of Order No. R-4051, is hereby corrected to read as follows:

Phillips Woolworth 3-4 - to be drilled H 6 25S 37E

rather than:

Phillips Woolworth 3-4 - to be drilled H 6 24S 37E

in order to show the true location of said well.

(2) That the correction as set forth above shall be effective nunc pro tunc as of November 2, 1970.

DONE at Santa Fe, New Mexico, on this 14th day of September, 1971.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

BRUCE KING, Chairman

ALEX J. ARMIJO, Member

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

dr/

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. 4430
Order No. R-4051

APPLICATION OF UNION TEXAS PETROLEUM
CORPORATION FOR A WATERFLOOD PROJECT,
LEA COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on September 30, 1970, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this 2nd day of November, 1970, 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, Union Texas Petroleum Corporation, seeks authority to institute a waterflood project in the Langlie-Jal Unit Area, Jalmat and Langlie-Mattix Pools, by the injection of water into the Seven Rivers and Queen formations through 46 injection wells in Townships 24 and 25 South, Range 37 East, NMPM, Lea County, New Mexico.

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

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

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

IT IS THEREFORE ORDERED:

(1) That the applicant, Union Texas Petroleum Corporation, is hereby authorized to institute a waterflood project in the Langlie-Jal Unit Area, Jalmat and Langlie-Mattix Pools, by the injection of water into the Seven Rivers and Queen formations through the following-described wells in Lea County, New Mexico:

COMPANY	LEASE AND WELL NO.		LOCATION Unit	S-T-R
Atlantic Richfield	State 24 No. 1		N	32 24S 37E
	State 157 "E" No. 2		B	32 24S 37E
	State 157 "C" No. 3	- to be drilled	P	32 24S 37E
	Burleson No. 3	- to be drilled	F	8 25S 37E
	Burleson No. 4	- to be drilled	D	8 25S 37E
Pan American	Langlie "A" No. 2	- to be dually completed	L	9 25S 37E
Phillips	Woolworth 3-4	- to be drilled	H	6 24S 37E
Reserve	Martin No. 1		H	31 24S 37E
	Martin No. 4		B	31 24S 37E
	Martin "B" No. 3	- to be drilled	F	31 24S 37E
Skelly	Sherrill No. 1		P	31 24S 37E
	Sherrill No. 3	- to be dually completed	B	6 25S 37E
	Sherrill No. 7		J	31 24S 37E
	Sherrill No. 9	- to be drilled	N	31 24S 37E
	State "M" No. 2		L	32 24S 37E
Texaco	Fristoe NCT-4 "B" No. 1		L	31 24S 37E
Texas Pacific	Wells No. 6		J	5 25S 37E
	Wells No. 7		F	6 25S 37E
	Wells No. 9		D	6 25S 37E
	Wells No. 10		J	6 25S 37E
	Wells No. 12	- to be drilled	F	5 25S 37E

(1) - Continued from Page 2 -

COMPANY	LEASE AND WELL NO.		LOCATION Unit	S-T-R
Thornton Prod.	Humble State "L" No. 2		C	32 24S 37E
Union Texas Petroleum	Jal "D" No. 2		B	8 25S 37E
	Langlie No. 1		P	8 25S 37E
	Langlie No. 3		H	8 25S 37E
	Langlie No. 6		J	8 25S 37E
	Langlie "A" No. 2		P	17 25S 37E
	Langlie "A" No. 5	- to be drilled	J	17 25S 37E
	Langlie "C" No. 1		H	17 25S 37E
	Langlie "C" No. 2		B	17 25S 37E
	Olsen Phillips No. 3		N	6 25S 37E
	Olsen Phillips No. 5		P	6 25S 37E
	Phillips No. 2		L	6 25S 37E
	State "A"-32 No. 2		F	32 24S 37E
	State "A"-32 No. 3		D	32 24S 37E
	Stuart No. 3		D	9 25S 37E
	Wells No. 1		P	5 25S 37E
	Wells No. 4		D	5 25S 37E
	Wells No. 5		B	5 25S 37E
	Wells No. 7		L	4 25S 37E
	Wells No. 10		B	4 25S 37E
	Wells No. 15	- to be drilled	N	5 25S 37E
	Wells No. 16	- to be drilled	L	5 25S 37E
Westates	Wells "B"-5 No. 2		H	5 25S 37E
	Wells "B"-4 No. 3	- to be drilled	D	4 25S 37E
	Wells No. 13	- to be drilled	F	4 25S 37E

(2) That the subject waterflood project is hereby designated the Union Texas Langlie Jal Waterflood Project and 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 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.

STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION

DAVID F. CARGO, Chairman

ALEX J. ARMIJO, Member

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

esr/

OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO
P. O. BOX 2088 - SANTA FE
87501

September 14, 1971

Re: Case No. 4430
Order No. R-4051-A
Applicant:
Union Texas Petroleum Corp.

Mr. Clarence Hinkle
Hinkle, Bondurant, Cox & Eaton
Attorneys at Law
Post Office Box 10
Roswell, New Mexico 88201

Dear Sir:

Enclosed herewith are two copies of the above-referenced Commission order recently entered in the subject case.

Very truly yours,

A. L. Porter, Jr.

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Copy of order also sent to:

Hobbs OCC x
Artesia OCC
Aztec OCC

Other State Engineer Office

OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO
P. O. BOX 2088 - SANTA FE
87501

GOVERNOR
DAVID F. CARGO
CHAIRMAN

LAND COMMISSIONER
ALEX J. ARMIJO
MEMBER

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

November 2, 1970

Mr. Clarence Hinkle
Hinkle, Bondurant, Cox & Eaton
Attorneys at Law
Post Office Box 10
Roswell, New Mexico 88201

Re: Case No. 4430
Order No. R-4051
Applicant:
Union Texas Petroleum Corp.

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.

A. L. PORTER, Jr.
Secretary-Director

ALP/ir

Copy of order also sent to:

Hobbs OCC x
Artesia OCC
Aztec OCC
State Engineer x

Other

Docket No. 22-70

DOCKET: EXAMINER HEARING - WEDNESDAY - SEPTEMBER 30, 1970

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 4416: (Continued from the September 16, 1970, Examiner Hearing)

Application of Robert L. Parker Trust for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a cooperative waterflood project in the Langlie Mattix Pool on its George L. Erwin Lease by the injection of water through its Erwin Well No. 2 located in Unit L of Section 35, Township 24 South, Range 37 East, Lea County, New Mexico.

CASE 4422: (Continued from the September 2, 1970, Examiner Hearing)

Application of Atlantic Richfield Company for amendment of Order No. R-3588, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-3588, which order authorized the disposal of produced salt water into the Yates and Seven Rivers formation in the perforated and open-hole interval from 3110 feet to 3300 feet in the Sinclair ARC Federal Well No. 1 located in Unit O of Section 9, Township 20 South, Range 33 East, West Teas Pool, Lea County, New Mexico. Applicant now seeks authority to dispose into said zones in the interval from 3010 feet to 3300 feet.

CASE 4222: (Reopened)

In the matter of Case 4222 being reopened pursuant to the provisions of Order No. R-3850, which order established 80-acre spacing units for the West Sawyer-San Andres 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 and present evidence as to whether or not the subject pool is in fact an associated reservoir.

CASE 4429: Application of Union Texas Petroleum Corporation for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Langlie-Jal Unit Area comprising 3,748 acres, more or less, of federal, state, and fee lands in Townships 24 and 25 South, Range 37 East, Langlie-Mattix Pool, Lea County, New Mexico.

CASE 4430: Application of Union Texas Petroleum Corporation of a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project in its Langlie-Jal Unit by the injection of water into the Seven Rivers and Queen formations through 46 wells in Townships 24 and 25 South, Range 37 East, Langlie-Mattix Pool, Lea County, New Mexico.

(Reopened)

CASE 4173: In the matter of Case 4173 being reopened pursuant to the provisions of Order No. R-3811-A, which order extended 80-acre spacing units and a limiting gas-oil ratio of 4000 cubic feet of gas per barrel of oil for the Hobbs-Drinkard Pool, Lea County, New Mexico, for a period of 90 days. All interested parties may appear and show cause why said pool should not be developed on 40-acre spacing, why the limiting gas-oil ratio should not revert to 2000 to one, and/or why all casing-head gas produced by wells in the pool should not be reinjected.

CASE 4420: (Continued and Readvertised)

Application of Xplor Company for the creation of a new gas pool and special rules therefor, a dual completion, and authority to commingle, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new Pennsylvanian gas pool for its Cleveland Well No. 1 located in Unit G of Section 23, Township 12 South, Range 32 East, Lea County, New Mexico, and for the promulgation of special rules therefor, including a provision for 160-acre spacing units. In the alternative, applicant seeks approval of a non-standard 160-acre gas proration unit comprising the NE/4 of said Section 23 to be dedicated to said well. Applicant also seeks authority to dually complete said well in such a manner as to produce oil from the East Caprock-Devonian Pool and gas from said Pennsylvanian formation and to commingle on the surface the liquids from said zones.

CASE 4431: Application of William A. and Edward R. Hudson for unorthodox well locations and a dual completion, Lea County, New Mexico. Applicants, in the above-styled cause, seek authority to drill a well at an unorthodox location (off pattern) 660 feet from the South line and 1980 feet from the West line of Section 15, Township 17 South, Range 32 East, Lea County, New Mexico, for the production of oil from the Baish-Wolfcamp and Maljamar-Abo Pools and to dually complete said well in the subject pools.

CASE 4432: Application of MWJ production Company for an unorthodox oil well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an exception to the rules governing the Baum-Upper Pennsylvanian Pool to permit the drilling of an oil well at an unorthodox location 2310 feet from the South line and 990 feet from the West line of Section 5, Township 14 South, Range 33 East, Lea County, New Mexico.

CASE 4433: In the matter of the hearing called by the Oil Conservation Commission upon its own motion to permit Allied Chemical Corporation to appear and show cause why said corporation should be permitted to institute its proposed waterflood project in its Milnesand (San Andres) Unit Area, Milnesand-San Andres Pool, Roosevelt County, New Mexico, by the injection of fresh water; said corporation testified in the hearing that authorized said waterflood project that produced salt water be used for waterflooding purposes.

CASE 4423: (Continued from the September 2, 1970, Examiner Hearing)

Application of Union Oil Company of California for compulsory pooling, Roosevelt County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests down to and including the San Andres formation underlying the N/2 NE/4 of Section 20, Township 8 South, Range 38 East, Bluitt-San Andres Associated Pool, Roosevelt County, New Mexico. Said acreage to be dedicated to a well to be drilled at an orthodox location in the NW/4 NE/4 of said Section 20. Also to be considered will be the cost of drilling said well, a charge for the risk involved, a provision for the allocation of actual operating costs, and the establishment of charges for supervision of said well.

CASE 4434: Application of Union Oil Company of California for the creation of a new gas pool and special pool rules, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the creation of a new gas pool for its Pipeline Federal Well No. 1 located in Section 4, Township 19 South, Range 34 East, Lea County, New Mexico. Applicant further seeks the promulgation of special rules therefor, including a provision for 640-acre spacing and proration units and fixed well location requirements.

CASE 4435: Application of Blackrock Oil Company for a dual completion and salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dually complete its Mobil Atlantic Well No. 1 located in Unit D of Section 10, Township 9 South, Range 36 East, Lea County, New Mexico, in such a manner as to produce oil from the Pennsylvanian formation through tubing and to dispose of produced salt water into the San Andres formation from 4300 feet to 5045 feet and possibly other formations between the 8 5/8-inch casing shoe at 4153 feet and the top of the cement at 9205.

CLARENCE E. HINKLE
W. E. BONDURANT, JR.
LEWIS C. COX, JR.
PAUL W. EATON, JR.
CONRAD E. COFFIELD
HAROLD L. HENSLEY, JR.
STUART D. SHANOR

C. D. MARTIN
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MIDLAND, TEXAS OFFICE
521 MIDLAND TOWER
(915) MU 3-4691

'70 SEP 9 PM 1 00

September 8, 1970

Case 4436

Oil Conservation Commission
Box 2088
Santa Fe, New Mexico 87501

Gentlemen:

We are representing Union Texas Petroleum Division of Allied Chemical Corporation. Union Texas is in the process of completing a unit agreement for the development and operation of the Langlie-Jal Unit Area, Lea County, which will embrace a total of 3,748.06 acres in Townships 24 and 25 South, Range 37 East, N.M.P.M. The primary purpose of forming the unit agreement is to inaugurate a waterflood project. The unit agreement will cover the productive interval between the top of the Seven Rivers formation and the base of the Queen formation occurring between the depths of 3,095 feet and 3,691 feet in the Skelly Oil Company Sherrel No. 7 well located 1980 feet from the south and east lines of Section 31, Township 24 South, Range 37 East. The lands embraced within the unit consist of federal, state and fee lands and Union Texas is designated as unit operator.

The proposed waterflood project will be co-extensive with the unit area and it is contemplated that there will be 46 injection wells, of which 34 will be presently producing wells which will be converted to injection wells and 12 new wells will be drilled. There is enclosed herewith a copy of Table No. 1 which has been prepared by Union Texas giving a description of the injection wells and the proposed injection interval in each well. It is contemplated that the initial injection rate will be around 500 barrels of water per day per well and it is estimated that the initial injection pressure will be around 1,000 psi. The source of water will be the Skelly Oil Company Jal water system which originates from the Capitan Reef and produced water.

DOCKET MAILED

Date 9-18-70

We are in the process of preparing separate applications for hearings before the Commission, one to be the application for approval of the unit agreement and the other the application for approval of the waterflood project. Union Texas has not yet furnished us with all the necessary information for completing these applications but expects to do so shortly. In the meantime, we would appreciate your arranging for the advertisement of these 2 cases so that they will appear on the examiner's docket for September 30, which we understand is the date set for the next examiner's hearing.

In connection with the waterflood project application, we would like for the notice to indicate that request will be made for a project allowable in accordance with Rule 701 and Union Texas would also like for the order approving the waterflood project to provide for administrative approval of any additional injection wells in the event they should become desirable or necessary in the future.

Just as soon as we receive the necessary information, we will file the formal applications for both of these cases.

Yours sincerely,

HINKLE, BONDURANT, COX & EATON

By

CEH:cs

Allied Chemical Corporation

UNION TEXAS PETROLEUM DIVISION

1300 WILCO BUILDING • MIDLAND, TEXAS 79701 AREA CODE, 915, 682-0515

November 6, 1970

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

Attention: Mr. A. L. Porter

Dear Sir:

Reference is made to your letter of November 3, 1970, concerning Commission Order No. R-4051, entered in Case No. 4430.

In the third paragraph of your letter, the maximum allowable for the project is stated to be 3822 barrels per day when the normal Southeast New Mexico Unit allowable is 42 barrels per day or less. The qualified unit area contains 3708.06 acres, more or less, which yields 93 40-acre proration units. Four of the proration units do not presently contain wells. However, all four locations will be developed in the unit operation. Two of the locations are proposed injection wells, and two will be producing wells. The producing wells will be in Unit E of Section 8, T-25-S, R-37-E and Unit E of Section 9, T-25-S, R-37-E. The injection wells, which were specified in the plan of operation, will be located in Unit D of Section 8, T-25-S, R-37-E, and Unit F of Section 4, T-25-S, R-37-E. Using the qualified unit area of 93 proration units, we calculate the maximum allowable to be 3906 barrels per day. If we are successful in negotiating Continental Oil Company's 40 acre State KQ Lease into the unit, there will be 94 proration units and a corresponding allowable of 3948 barrels per day.

Please change your records to indicate the calculated maximum allowable to be 3906 barrels per day. Should you have any questions, do not hesitate to call.

Yours truly,

UNION TEXAS PETROLEUM CORPORATION

Don B. Wells

Don B. Wells
Petroleum Engineer

DBW/wd

cc: Oil Conservation Commission - Hobbs, New Mexico

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

November 3, 1970

Mr. Clarence Hinkle
Hinkle, Bondurant, Cox & Eaton
Attorneys at Law
Post Office Box 10
Roswell, New Mexico 88201

Dear Sir:

Reference is made to Commission Order No. R-4051, entered in Case No. 4430, approving the Union Texas Langlie Jal Waterflood Project.

Injection shall be through the 46 authorized water injection wells, each of which shall be equipped with cement-lined tubing set in a packer located as near as practicable to the uppermost perforation, or in the case of open-hole completions, as near as practicable to the casing shoe. The casing-tubing annulus of all but the three dual completions shall be loaded with an inert fluid and equipped with a pressure gauge at the surface.

As to allowable, our calculations indicate that when all of the authorized injection wells have been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 3822 barrels per day when the Southeast New Mexico normal unit allowable is 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 allowable provisions of Rule 701, it behooves him to promptly notify both of the aforementioned Commission offices by letter of any change in the status of wells in the project area, i.e., when active injection commences, when additional injection or producing wells are drilled, when additional wells are acquired through purchase or unitization, when wells have received a response to water injection, etc.

OIL CONSERVATION COMMISSION
P. O. BOX 2088
SANTA FE, NEW MEXICO 87501

-2-
Mr. Clarence Hinkle
Hinkle, Bondurant, Cox & Eaton
Attorneys at Law
Roswell, New Mexico

November 3, 1970

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

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

ALP/DSN/ir

cc: OCC-Hobbs, New Mexico
U. S. Geological Survey - Hobbs
Mr. D. E. Gray, State Engineer Office, Santa Fe, N.M.

COPY

CLARENCE E. HINKLE
W. E. BONDURANT, JR.
LEWIS C. COX, JR.
PAUL W. EATON, JR.
CONRAD E. COFFIELD
HAROLD L. HENSLEY, JR.
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521 MIDLAND TOWER
(915) MU 3-4691

PM 1 10

September 15, 1970

Case 4430

Oil Conservation Commission
Box 2088
Santa Fe, New Mexico 87501

Gentlemen:

We enclose in triplicate two applications of Union Texas Petroleum Division of Allied Chemical Corporation; one being for approval of the Langlie-Jal Unit Agreement and the other for approval of a waterflood project to be co-extensive with the unit area. We have previously written you concerning these applications and the writer has talked with Mr. Dan Nutter and it is our understanding that these cases will appear on the examiner's docket for September 30.

In connection with the application for the waterflood project, Rule 701 requires that logs of the proposed injection wells be filed if available. There are to be 46 injection wells, 34 of which will be converted and an effort will be made to obtain logs of all of these wells which are available and they will be filed at a later date.

Yours very truly,

HINKLE, BONDURANT, COX & EATON

By _____

CEH:cs
Enc.

CLARENCE E. HINKLE
W. E. BONDURANT, JR.
LEWIS C. COX, JR.
PAUL W. EATON, JR.
CONRAD E. COFFIELD
HAROLD L. HENSLEY, JR.
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TELEPHONE (505) 622-6510

MIDLAND, TEXAS OFFICE
521 MIDLAND TOWER
(915) MU 3-4691

September 18, 1970

Oil Conservation Commission
Box 2088
Santa Fe, New Mexico 87501

Re: Case No. 4430

Gentlemen:

Under date of September 15, we forwarded to you the application of Union Texas Petroleum for approval of a water-flood project to be co-extensive with the proposed Langlie-Jal Unit Area, which is on the September 30 examiner's hearing docket as No. 4430. We advised that logs of the proposed injection wells would be filed as soon as available. We enclose herewith copies of the electrical logs in connection with the following producing wells which will be converted to injection wells; these are partial logs showing only the producing zones into which water will be injected:

Skelly Oil Company, Sherrill No. 7
The Texas Company Fristoe N.O.T. 4 "B" No. 1
R. Olsen Well No. 10
Sinclair Oil & Gas State "C" No. 2
Pan American Petroleum Corporation P.J. Langlie "A" No. 2
R. Olsen Phillips No. 2
R. Olsen Phillips No. 3
R. Olsen Phillips No. 5
Anderson Prichard Oil Corporation Langlie C-2
Anderson Prichard Oil Corporation Langlie No. 6

We also enclose a partial reproduced copy of the Olsen Phillips No. 4 and Skelly Sherrill No. 7 wells for the purpose of showing the correlation of the producing horizon.

The above listed logs are all of the logs which are available of the proposed 34 wells which will be converted to injection wells. The wells for which logs are not available are old wells and Union Texas has been unable to acquire logs on these wells. The enclosed logs are to be filed in connection with the above application in compliance with Rule 701.

Yours sincerely,

HINKLE, BONDURANT, COX & EATON

By Clarence E. Hinkle

CEH:cs
Enc.
cc: James L. Mackey

EXHIBIT No. 1

DATA FOR
PROPOSED LANGLIE-JAL (Queen) UNIT
WATERFLOOD PROJECT

OIL CONSERVATION COMMISSION HEARING
CASE No. 4429 & 4430

September 30, 1970

UNION TEXAS PETROLEUM
MIDLAND DISTRICT

Case Number 4429 & 4430
Date 9/30/70

G E N E R A L

OPERATOR - Union Texas Petroleum

PROJECT - Langlie-Jal Unit Waterflood

POOL - Langlie-Mattix and Jalmat

LOCATION OF PROJECT - Located in Townships 24 and 25 South, Range 37 East, approximately one mile northeast of Jal, Lea County, New Mexico.

NUMBER OF WELLS IN PROJECT - 93 wells proposed, including 27 to be drilled, either as replacement wells or to develop undrilled tracts.

UNIT AND PROJECT AREA - 3708.06 acres

OTHER WATERFLOOD PROJECTS IN POOL - Amerada Woolworth Unit, Gulf Stuart Langlie-Mattix, Continental Langlie Jack Unit, Reserve South Langlie-Jal, Mobil Humphery Queen.

G E O L O G I C A L A N D R E S E R V O I R D A T A

RESERVOIR - Seven Rivers and Queen

DEPTH - Approximately 3270 to the top of the pay zones

PRODUCTIVE ZONES - Porous sands at the base of the Jalmat and top of the Langlie-Mattix Pools.

NET PAY - The average net pay thickness is approximately 23 feet.

DESCRIPTION OF RESERVOIR ROCK - The pay section is made up of a series of alternating layers of sand and anhydrite.

STRUCTURE - The Unit lies on the west flank of a northwest-southeast trending anticline, which is on the west flank of the Central Basin Platform. Dip is to the east-southeast in the unit area.

RESERVOIR LIMITS - Lower layers of the productive Queen zone dips into water on the west and south sides of the unit area, and the upper layers contain gas in the northwest part. On the southeastern side, the sand is impermeable.

AVERAGE POROSITY OF NET PAY - 12%

Case Number_____
Date _____

P R I M A R Y O P E R A T I O N S

DATE OF FIRST PRODUCTION - August, 1935

TOTAL NUMBER OF WELLS DRILLED - 89 in Unit Area

ACCUMULATIVE PRODUCTION - 7-1-70 - 4,448,699

REMAINING PRIMARY RESERVES - 7-1-70 - 180,995

AVERAGE DAILY OIL PRODUCTION PER WELL, June, 1970 - 3.4 bbls.

ORIGINAL RESERVOIR PRESSURE - 1450 psi

OIL GRAVITY 36° API

DRIVE MECHANISM - Solution gas drive

STAGE OF DEPLETION - The project area is approximately 96% depleted of primary oil reserves.

ESTIMATED OIL RECOVERY THROUGH PRIMARY OPERATIONS

W A T E R F L O O D O P E R A T I O N S

PROPOSED PATTERN - Five spot

NUMBER OF INJECTION WELLS - 46

INITIAL INJECTION RATE - 500 BWPD per well

ESTIMATED INJECTION PRESSURE - Maximum design pressure of 2000 psia, but initial pressure expected not to exceed 1000 psia.

PLAN OF INJECTION - Inject into pay zone through cement lined tubing and below a packer.

SOURCE OF INJECTION WATER - Skelly Oil Company's Jal Water System

TYPE OF WATER - Capitan Reef water and produced water - non potable

TREATMENT OF WATER - None anticipated

ADDITIONAL OIL RECOVERY ANTICIPATED - Secondary oil is estimated to be 4,500,000 barrels, or approximately equal to the primary production.

SKELLY OIL COMPANY
SHERRILL NO. 7
K.B. Elev. 3241'
LANGLIE-MATTIX FIELD
Sec. 31, T 24 S, R 36 E
LEA COUNTY, N.M.

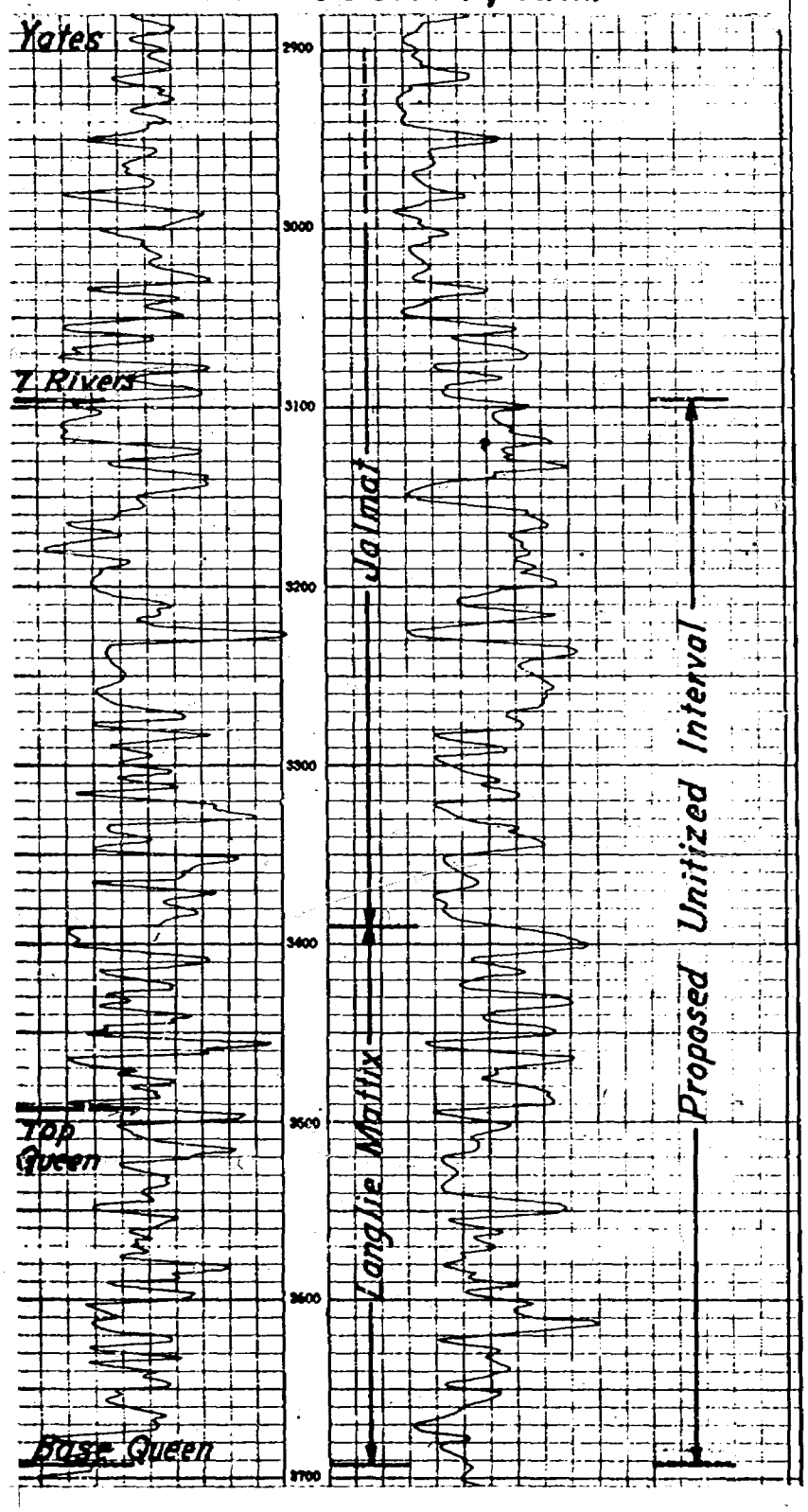


Exhibit 1-C

OLSEN
Phillips No. 4
Sec. 6-O, 25S - 37E
Elev. 3218

SKELLY
Sherrill No. 7
Sec. 31-J, 24S - 37E
Elev. 3241

PRODUCING HORIZON CORRELATION

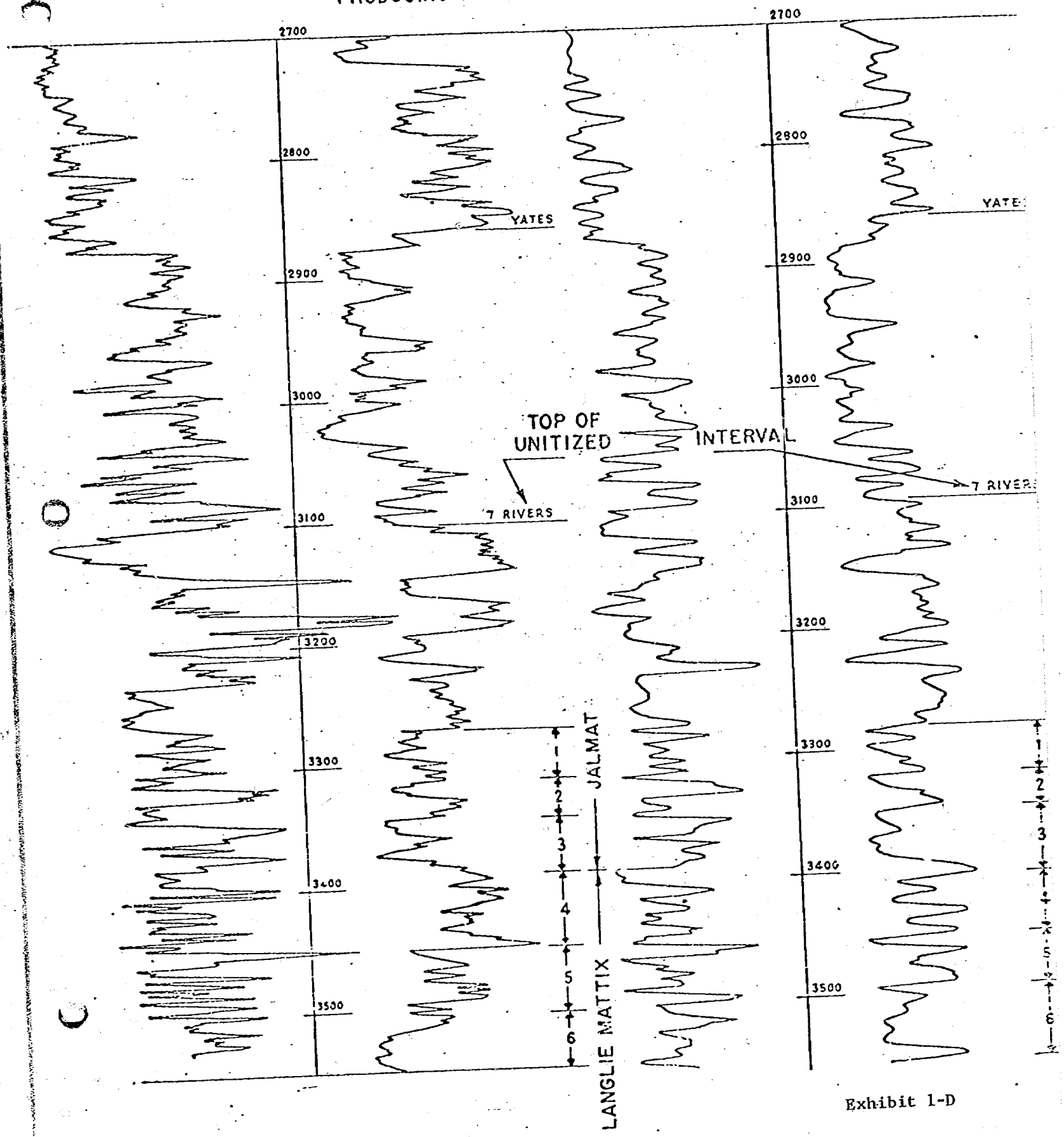


Exhibit 1-D

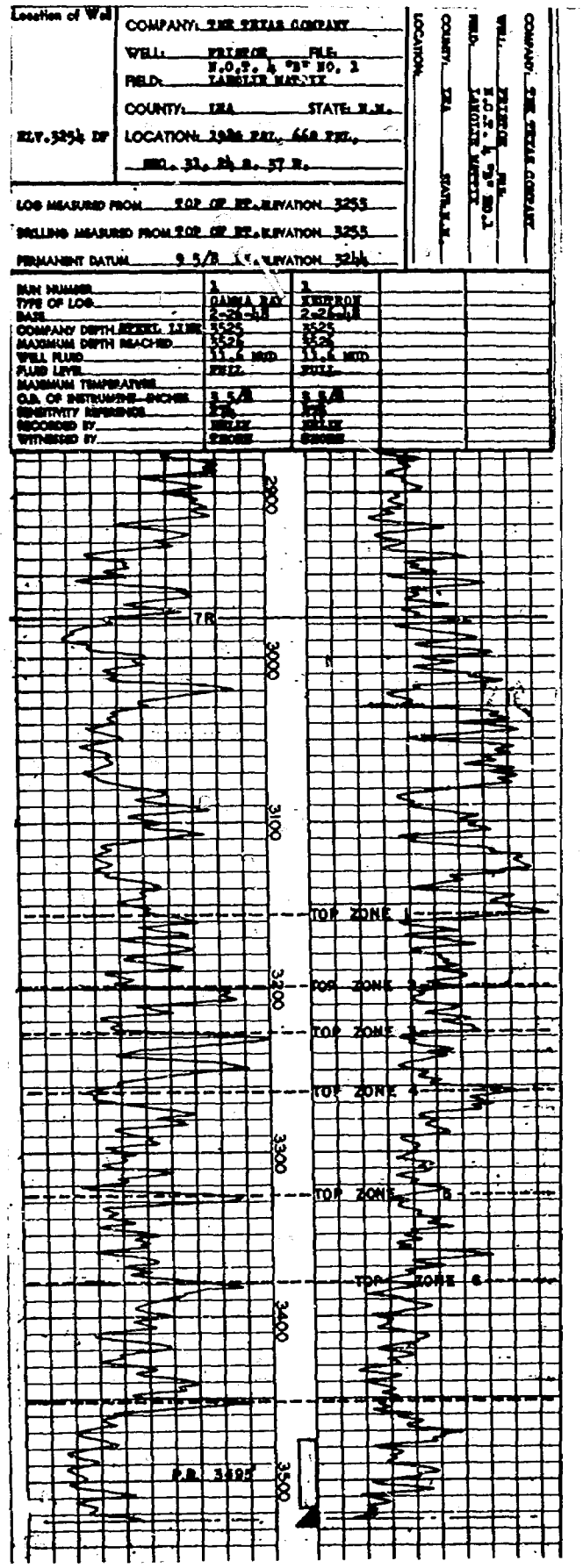

Location of Well
COMPANY: THE TEXAS COMPANY
WELL: FEDERAL FILE: N.G.P. & "B" NO. 1
FIELD: LANGLIE MATTIX
COUNTY: LEA STATE: N.M.
ELEV. 3254 DF
LOCATION: 1980 FNL, 660 FWL, SEC. 31, T. 24 S., R. 37 E.
LOG MEASURED FROM TOP OF KB, ELEVATION 3255
DRILLING MEASURED FROM TOP OF KB, ELEVATION 3255
PERMANENT DATUM G.L./S.L. ELEVATION 3254
RUN NUMBER 1 1
TYPE OF LOG GAMMA RAY NEUTRON
DATE 2-26-58 2-26-58
COMPANY DEPTH (DRILL. LOG) 3525 3525
MAXIMUM DEPTH REACHED 3525 3525
WELL FLUID 11.6 MUD 11.6 MUD
FLUID LEVEL FULL FULL
MAXIMUM TEMPERATURE
O.D. OF INSTRUMENT—INCHES 3 5/8 3 5/8
SENSITIVITY REFERENCE
RECORDED BY HELTZ HELTZ
WITNESSED BY CROSS CROSS
LOCATION
COUNTY LEA STATE N.M.
COMPANY THE TEXAS COMPANY
WELL FEDERAL FILE
FIELD N.G.P. & "B" NO. 1 LANGLIE MATTIX
2800
7R
3000
3100
TOP ZONE 1
3200
TOP ZONE 2
TOP ZONE 3
TOP ZONE 4
3300
TOP ZONE 5
TOP ZONE 6
3400
P.B. 3492
3500

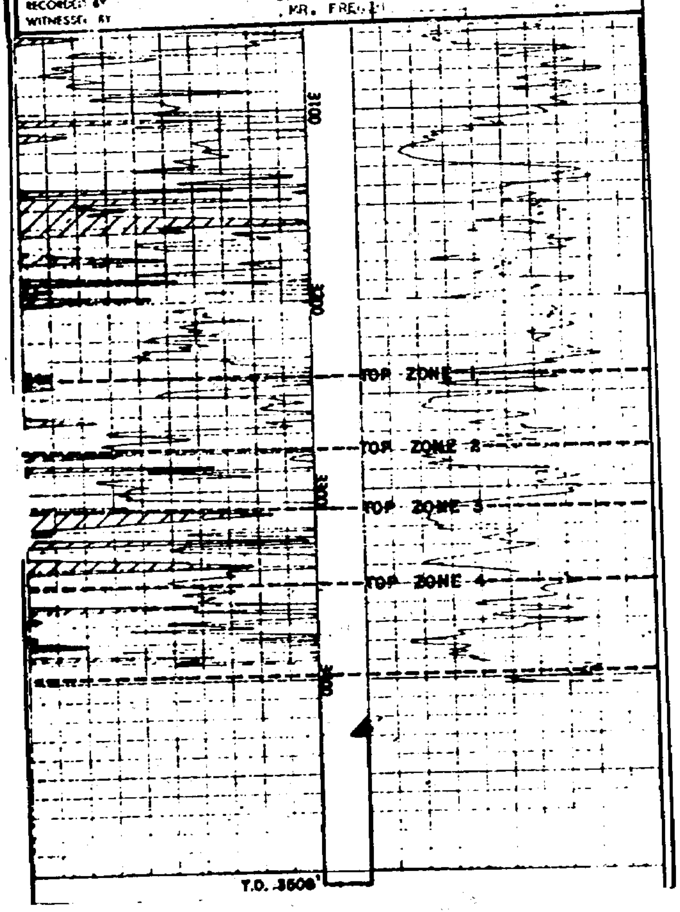
Exhibit 1-E

COMPANY:	R. OLSEN PERSONAL		LOCATION
WELL:	WELLS # 10		
FIELD:	LANGLIE-MATTIX		
COUNTY:	LEA	STATE N.MEX.	FILE NO
LOCATION:	NW/SE SEC.6, T-25-S, R-37-E.		LOG NO 6-765

COMPANY R. OLSEN PERSONAL
WELL WELLS # 10
FIELD LANGLIE-MATTIX
COUNTY LEA STATE N.MEX.
LOCATION CENTER OF NE/4 NW/4
SEC.6, T-25-S, R-37-E.

LOG MEAS. FROM	TOP ROTARY TABLE	ELEV	3254
DRLG MEAS. FROM	TOP ROTARY TABLE	ELEV	3251
PERM. DATUM:	GROUND LEVEL	ELEV.	3241

TYPE OF LOG	G/R	N/N	N/N
RUN NO.	1-NW	1-NW	2-NW
DATE	6-21-57	6-21-57	[illegible]-1-57
TOTAL DEPTH (DRILLER)	3.40	3440	3440
EFFECTIVE DEPTH (DRILLER)	3.40	3440	3440
EFFECTIVE DEPTH (WESTERN)	3407.5	3407.5	3407.5
TOP OF LOGGED INTERVAL	[illegible]	[illegible]	2840
BOTTOM OF LOGGED INTERVAL	3393.5	3405	3405
TYPE OF FLUID IN HOLE	MUD	MUD	MUD
FLUID LEVEL	FULL	FULL	FULL
SOURCE STRENGTH & TYPE		S10A3	S10A3
SOURCE SPACING		15.5	22.5
DETECTOR CLASS	SCINT.	SCINT.	SCINT.
DETECTOR TYPE	D441	06N1	06N1
DETECTOR LENGTH	4	4	4
O.D. OF INSTRUMENT IN	3 5/8	3 5/8	3 5/8
TIME CONSTANT SEC	2.0	2.0	2.0
LOGGING SPEED FT MIN	30	30	30
STATISTICAL VARIATION	RECORDED	RECORDED	RECORDED
SENSITIVITY REFERENCE	C-533	D-358	D-3 8
RECORDED BY	ROSS		
WITNESSED BY	MR. FRE[illegible]		

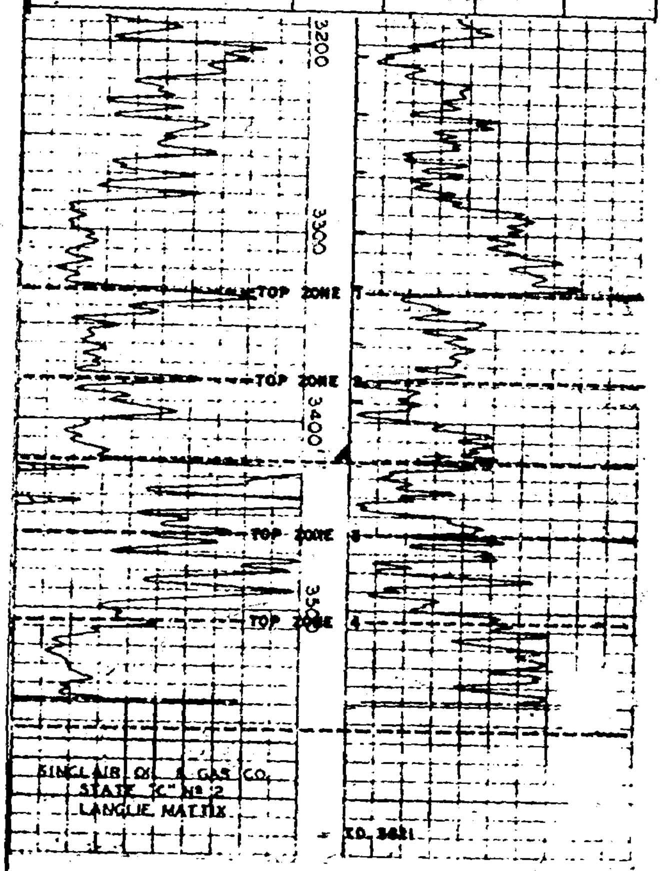


LANE WELLS RADIOACTIVITY LOG COMPANY

Location of Well		FILE NO.
3261' G.L.	COMPANY: SINCLAIR OIL & GAS CO. WELL: STATE "C" NO. 2 FIELD: LANGLIE MATTIX COUNTY: LEA STATE: N.M. LOCATION: 330' [illegible] SE 1/4 SEC. [illegible]	COMPANY: [illegible] O. & G. CO. WELL: [illegible] NO. 2 FIELD: LANGLIE MATTIX COUNTY: LEA LOCATION: STATE: N.M.

LOG MEAS. FROM	GROUND [illegible]	ELEV.	3261'
DRLG. MEAS. FROM	[illegible]	ELEV.	[illegible]
PERM. DATUM	[illegible]	ELEV.	[illegible]

TYPE OF LOG	G/R	N/R		
RUN NO.	1	1		
DATE	[illegible]	[illegible]		
TOTAL DEPTH (DRILLER) WIRE LINE	[illegible]	[illegible]		
EFFECTIVE DEPTH (DRILLER)	[illegible]	[illegible]		
TOP OF LOGGED INTERVAL	[illegible]	[illegible]		
BOTTOM OF LOGGED INTERVAL	[illegible]	[illegible]		
TYPE OF FLUID IN HOLE	[illegible]	[illegible]		
FLUID LEVEL	[illegible]	[illegible]		
MAXIMUM RECORDED TEMP.				
NEUTRON SOURCE STRENGTH & TYPE		[illegible]		
SOURCE SPACING — IN.		[illegible]		
LENGTH OF MEASURING DEVICE — IN.	[illegible]	[illegible]		
O.D. OF INSTRUMENT — IN.	[illegible] 1/2	[illegible] 1/2		
TIME CONSTANT — SECONDS	[illegible]	[illegible]		
LOGGING SPEED FT. MIN.	[illegible]			
STATISTICAL VARIATION — IN.				
SENSITIVITY REFERENCE	[illegible]	[illegible]		
RECORDED BY	[illegible]	[illegible]		
WITNESSED BY	[illegible]	[illegible]		



COMPANY: PAN AMERICAN PET. CORP.

WELL: P. J. LANGLIE "A" NO. 2

FIELD: JAL MAT

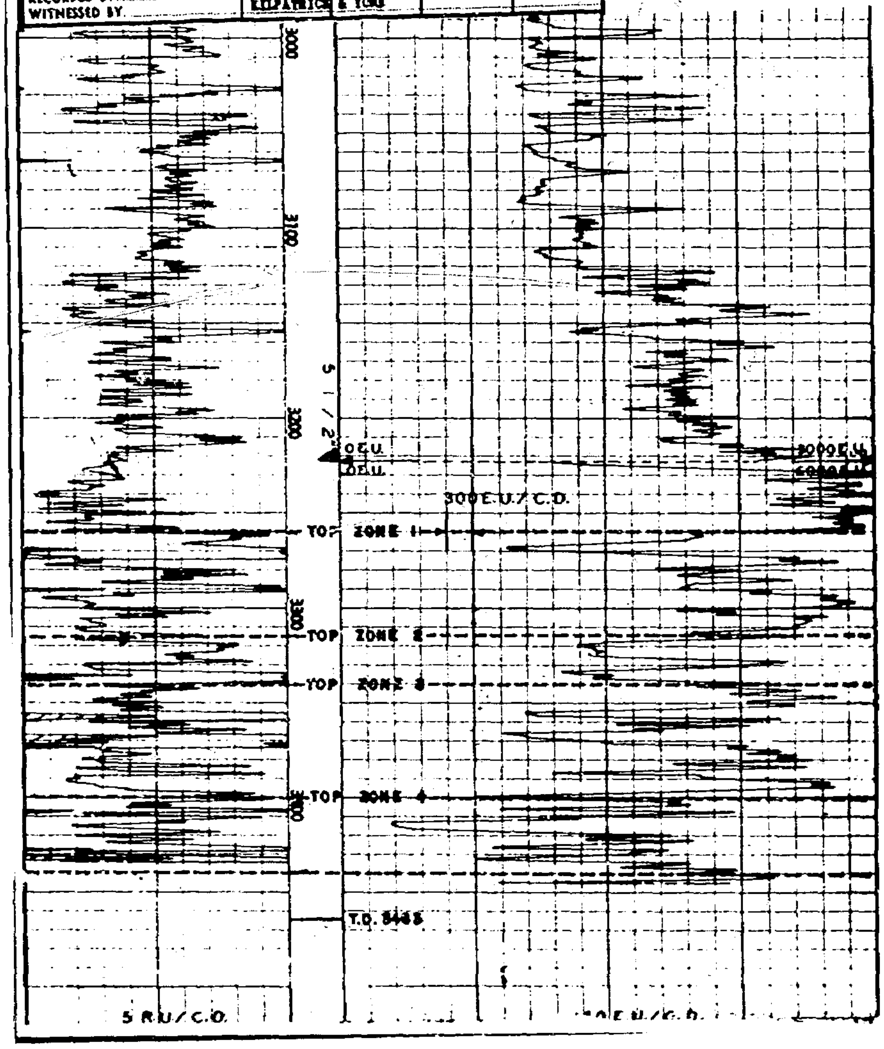
LOCATION: 1980' FSL & 660' FWL OF SEC. 9, T-25-S, R-37-E

COUNTY: LEA STATE: N MEX.

Well Location

LOG ZERO: DERRICK FLOOR ELEV. 3160
DRLG. ZERO: DERRICK FLOOR ELEV. 3160
PERM. DATUM: TOP 5 1/2" CASING ELEV. 3150

TYPE OF LOG	GAMMA RAY	N/NEUTRON		
RUN NO	ONE-OW	ONE-OW		
DATE	3-7-58	3-7-58		
TOTAL DEPTH (DRILLER) STRAIN	3463	3463		
EFFECTIVE DEPTH (DRILLER)	3463	3463		
TOP OF LOGGED INTERVAL	SURFACE	SURFACE		
BOTTOM OF LOGGED INTERVAL	3433	3445		
TYPE OF FLUID IN HOLE	WATER	WATER		
FLUID LEVEL		37'		
MAXIMUM RECORDED TEMP.				
SOURCE STRENGTH & TYPE		S1 (A3)		
SOURCE SPACING — IN.		13.5		
DETECTOR CLASS	SCINT.	SCINT.		
DETECTOR TYPE	D403	D610		
LENGTH OF MEAS. DEVICE — IN.	4	4		
O.D. OF INSTRUMENT — IN.	3 5/8	3 5/8		
TIME CONSTANT — SECONDS	2.0-0.9	2.0-0.9		
LOGGING SPEED FT./MIN.	30-60	30-60		
STATISTICAL VARIATION — IN.	RECORDED	RECORDED		
SENSITIVITY REFERENCE	G933	D368		
RECORDED BY	DUCKWORTH	DUCKWORTH		
WITNESSED BY	KILPATRICK & TORE			



LOCATION

COMPANY: R. OLSEN PERSONAL

WELL: OLSEN PHILLIPS NO. 2

FIELD: LANGLIE MATTIX

COUNTY: LEA STATE N. MEXICO

LOCATION: 660' FNL-2080' FEL SEC. 6, T25S-R37E

FILE NO.

LOG NO.

LOG MEAS. FROM 1' ABOVE ROTARY TABLE ELEV. 3223.5

DRLG. MEAS. FROM 1' ABOVE ROTARY TABLE ELEV. 3223.5

PERM. DATUM GROUND LEVEL ELEV. 3213

RUN NO.	ONE	ONE
TYPE OF LOG	G/R:	N/M
DATE	7-15-58	7-15-58
TOTAL DEPTH (OPERATOR)	3600	3600
EFFECTIVE DEPTH (OPERATOR)	3565	3565
EFFECTIVE DEPTH (WESTERN)	3562.5	3562.5
TOP OF LOGGED INTERVAL	SURF.	SURF.
BOTTOM OF LOGGED INTERVAL	3559.5	3561
TYPE OF FLUID IN HOLE	MUD	MUD
FLUID LEVEL	FULL	FULL
NEUTRON SOURCE TYPE		SIGA3
SOURCE SPACING ___ IN.		13.5
LENGTH OF DETECTOR ___ IN.	SCINT.	SCINT.
O.D. OF INSTRUMENT ___ IN.	3 5/8	3 5/8
TIME CONSTANT ___ SEC.	2.0	2.0
LOGGING SPEED ___ FT./MIN.	30-60	30-60
STATISTICAL VARIATION ___ IN		
SENSITIVITY REFERENCE	E-353	D-368
RECORDED BY	FAMBROUGH	FAMBROUGH
WITNESSED BY	MR. PERSON	

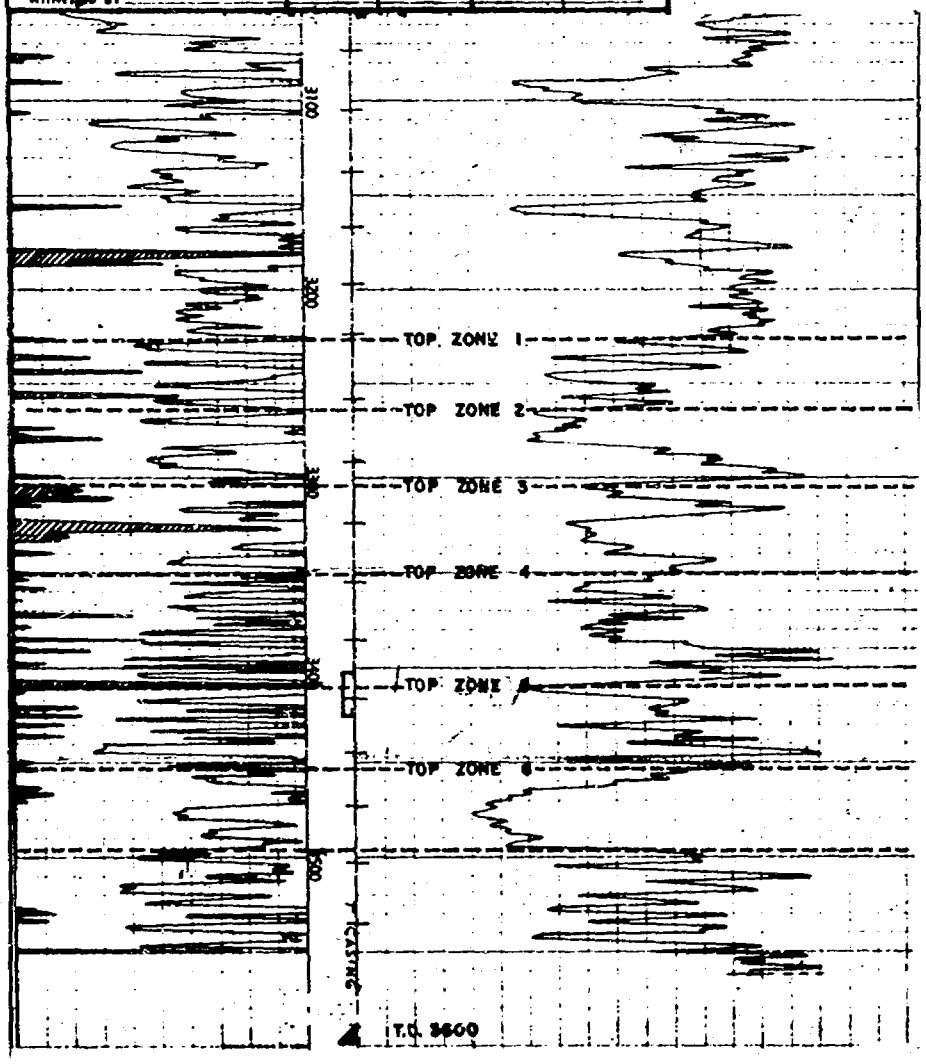
COMPANY R. OLSEN PERSONAL

WELL OLSEN PHILLIPS NO. 2

FIELD LANGLIE MATTIX

COUNTY LEA STATE N. MEXICO

LOCATION: 660' FNL-2080' FEL SEC. 6 T25S-R37E



COMPANY: R. OLSEN PERSONAL
WELL: OLSEN PHILLIPS # 2
FIELD: LANGLIE MATTIX
COUNTY: LEA STATE: NEW MEX.
LOCATION: 660' FSL & 1980' FWL,
SEC. 6, T-25-S, R-37-E

COMPANY: R. OLSEN PERSONAL
WELL: OLSEN PHILLIPS # 2
FIELD: LANGLIE MATTIX
COUNTY: LEA STATE: N. MEX.
LOCATION: 660' FSL & 1980' FWL,
SEC. 6, T-25-S, R-37-E

LOCATION

FILE NO.
LOG No. 55335

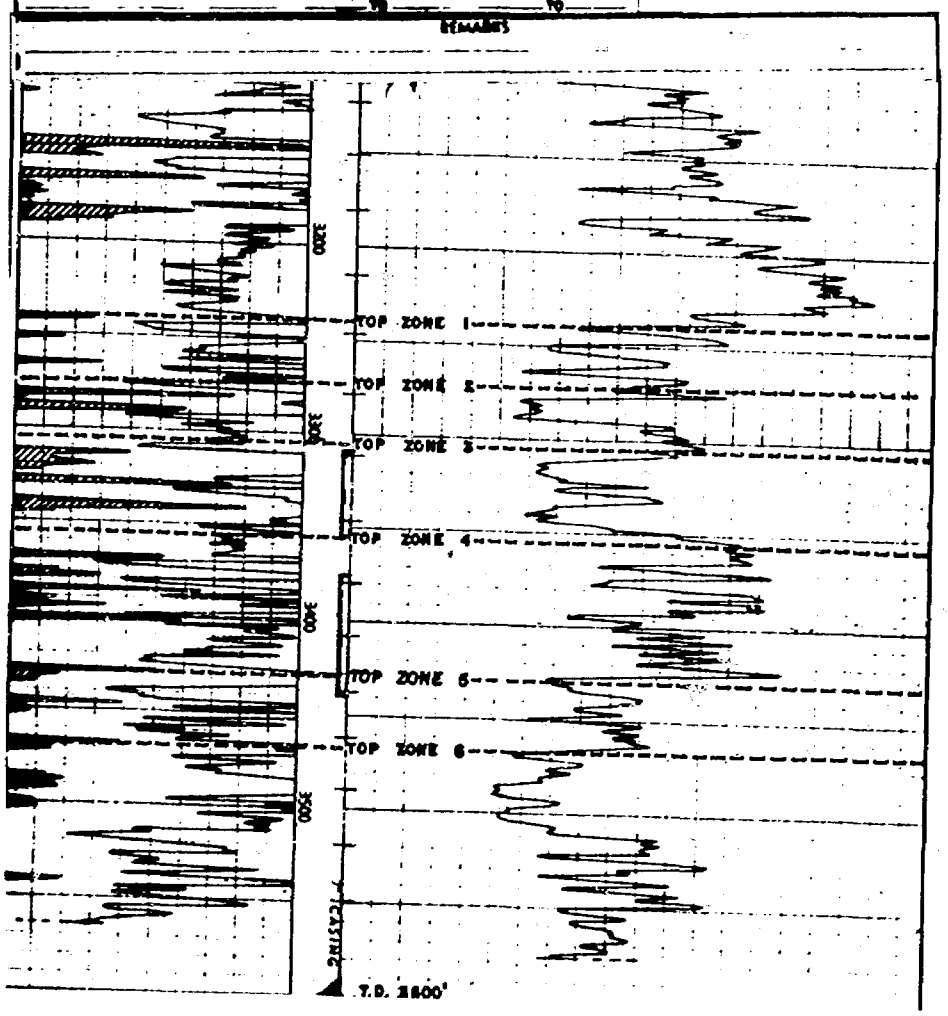
LOG MEAS. FROM 10.5' ABOVE GROUND LEVEL ELEV. 3218
DRLG MEAS. FROM ELEV.
PERM. DATUM 10.5' ABOVE GROUND LEVEL ELEV.

TYPE OF LOG	L/R	N/N
RUN NO.	1-NW	1-NW
DATE	5-16-58	5-16-58
TOTAL DEPTH (DRILLER)	3600	3600
EFFECTIVE DEPTH (DRILLER)	3550	3550
EFFECTIVE DEPTH (WESTERN)	3577.5	3577.5
TOP OF LOGGED INTERVAL	SURF.	SURF.
BOTTOM OF LOGGED INTERVAL	3574.5	3576
TYPE OF FLUID IN HOLE	OIL	OIL
FLUID LEVEL	30M	30M
SOURCE STRENGTH & TYPE		S1043
SOURCE SPACING		1-.5
DETECTOR CLASS	SCINT.	SCINT.
DETECTOR TYPE	D461	D-N1
DETECTOR LENGTH	4"	4"
O.D. OF INSTRUMENT IN.	3 5/8	3 5/8
TIME CONSTANT SEC	3.0	3.0
LOGGING SPEED FT. MIN	30-60	30-60
STATISTICAL VARIATION	RECORDED	RECORDED
SENSITIVITY REFERENCE	2-5-3	0-.5
RECORDED BY	MC/KINZEY	
WITNESSED BY	MR. FRENCH	

CASING RECORD

BIT SIZE	CASING	WT.-LB.	INTERVAL FROM WELL RECORD	INTERVAL FROM EL. LOG
			TO	TO
	10 3/4		SURF. TO 288	TO
8 3/4	7"		SURF. TO 3398	TO
			TO	TO

REMARKS



COMPANY R. OLSEN PERSONAL
WELL OLSEN PHILLIPS # 5
FIELD LANGLIE MATTIX
COUNTY LEA STATE N.M.
LOCATION 560' FS & EL'S, SEC. 6
T-25-S, R-37-E

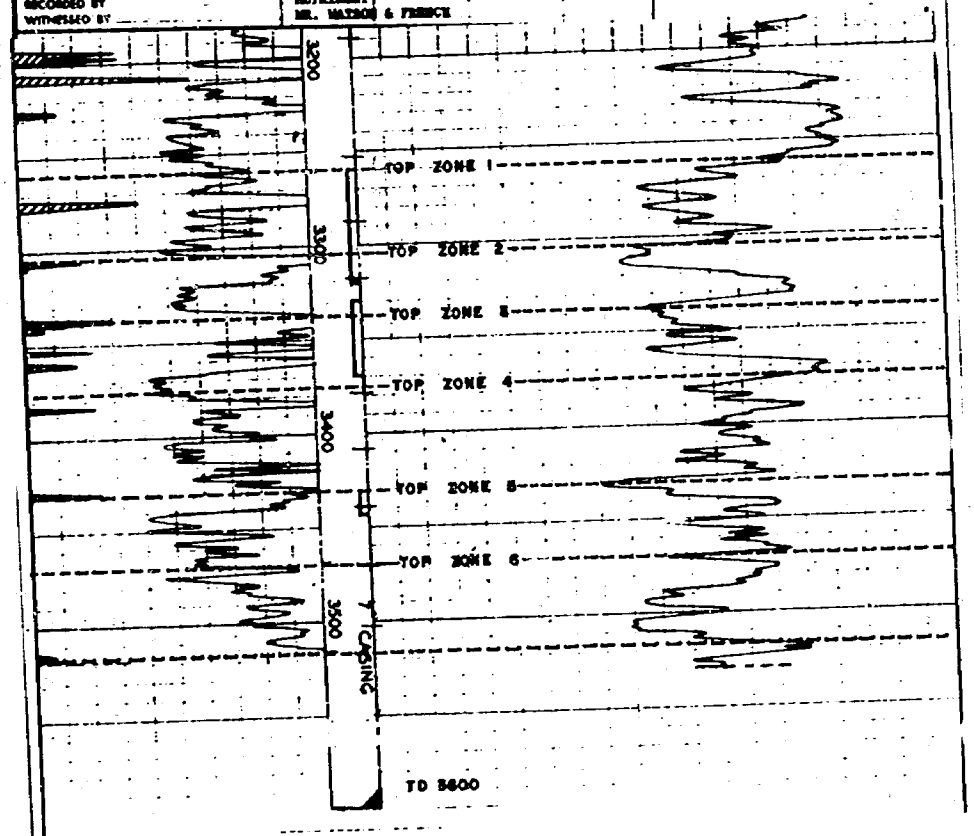
COMPANY R. OLSEN PERSONAL
WELL OLSEN PHILLIPS # 5
FIELD LANGLIE MATTIX
COUNTY LEA STATE NEW MEX.
LOCATION 560' FS & EL'S, SEC. 6
T-25-S, R-37-E

LOCATION

FILE "A"
LOG NO. 125847

LOG MEAS FROM 10.5 ABOVE GROUND LEVEL ELEV.
DRLG MEAS FROM 10.5 ABOVE GROUND LEVEL ELEV
PERM DATUM GROUND LEVEL ELEV.

	G/R	N/N
TYPE OF LOG		
RUN NO	1-RW	1-RW
DATE	12-17-58	12-17-58
TOTAL DEPTH (DRILLER)		
EFFECTIVE DEPTH (DRILLER)	3535	3535
EFFECTIVE DEPTH (WESTERN)	3530.5	3530.5
TOP OF LOGGED INTERVAL	SURF.	SURF.
BOTTOM OF LOGGED INTERVAL	3517.5	3529
TYPE OF FLUID IN HOLE	OIL	OIL
FLUID LEVEL	FULL	FULL
SOURCE STRENGTH & TYPE		810A3
SOURCE SPACING		13.5"
DETECTOR CLASS	SCINT.	SCINT.
DETECTOR TYPE	D4G1	D4B1
DETECTOR LENGTH	6"	6"
O.D. OF INSTRUMENT IN.	3 5/8	3 5/8
TIME CONSTANT SEC.	2.0-3.0	2.0-3.0
LOGGING SPEED FT/MIN	25-60	25-60
STATISTICAL VARIATION	RECORDED	RECORDED
SENSITIVITY REFERENCE	C-933	D-360
RECORDED BY	MC/KINSEY	
WITNESSED BY	MR. MATSON & PRINCE	

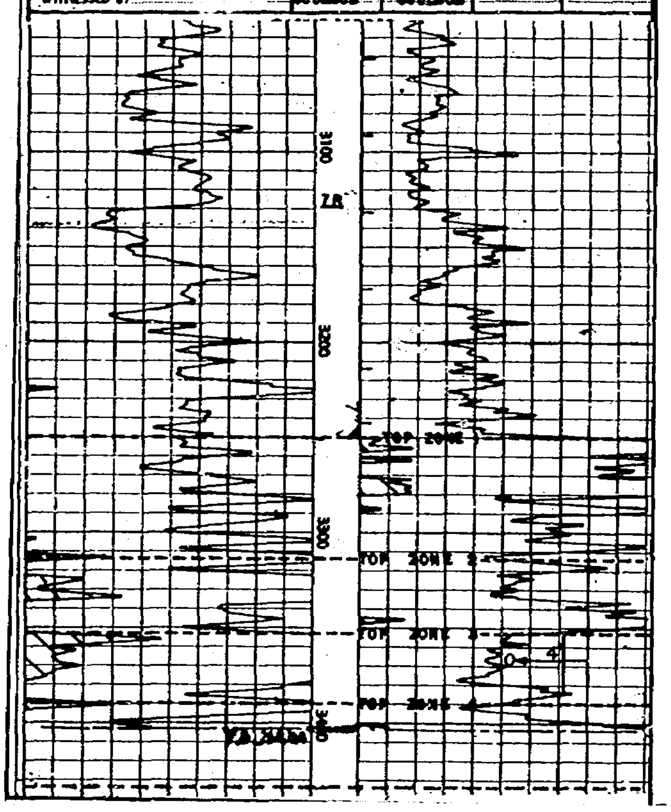


Location of Well	
	COMPANY: ANDERSON PRICHARD OIL CORP.
	WELL: LANGLIE C - 8
	FIELD: LANGLIE MATTIX
	COUNTY: LEA STATE: N.M.
	LOCATION: 660' FNL, 1980' FEL, SECTION 17, 25S, 37E.

COMPANY: ANDERSON PRICHARD OIL CORP.
WELL: LANGLIE C-8
FIELD: LANGLIE MATTIX
COUNTY: LEA STATE: N. M.
LOCATION:

LOG MEAS. FROM KELLY DRIVE BUSHING ELEV. [illegible]
DRLG. MEAS. FROM KELLY DRIVE BUSHING ELEV. [illegible]
PERM. DATUM 7" BRADEN HEAD ELEV. [illegible]

TYPE OF LOG	GAMMA RAY	NEUTRON		
RUN NO.	[illegible]	[illegible]		
DATE	[illegible]	[illegible]		
TOTAL DEPTH (DRILLER) STRAIN	3405'	3405'		
EFFECTIVE DEPTH (DRILLER)	3405'	3405'		
TOP OF LOGGED INTERVAL	SURFACE	SURFACE		
BOTTOM OF LOGGED INTERVAL	3405'	3405'		
TYPE OF FLUID IN HOLE	OIL	OIL		
FLUID LEVEL	FULL	FULL		
MAXIMUM RECORDED TEMP.				
NEUTRON SOURCE STRENGTH & TYPE		[illegible]		
SOURCE SPACING — IN.		[illegible]		
LENGTH OF MEASURING DEVICE — IN.	[illegible]	[illegible]		
O.D. OF INSTRUMENT — IN.	[illegible]	[illegible]		
TIME CONSTANT — SECONDS	[illegible]	4		
LOGGING SPEED FT./MIN.	[illegible]	[illegible]		
STATISTICAL VARIATION — IN.				
SENSITIVITY REFERENCE	[illegible]	[illegible]		
RECORDED BY	TAYLOR	TAYLOR		
WITNESSED BY	COULSON	COULSON		



Location of Well	ANDERSON PICKARD
	COMPANY: OIL CORPORATION
	WELL: LANGLIE NO. 6
	FIELD: LANGLIE MATTIX
	COUNTY: LEA STATE: N.M.
	LOCATION: 1980' FSL, 2310' FEL,
ELEVATION OF G.L. 3140'	SECTION 8, 22S, 37E.

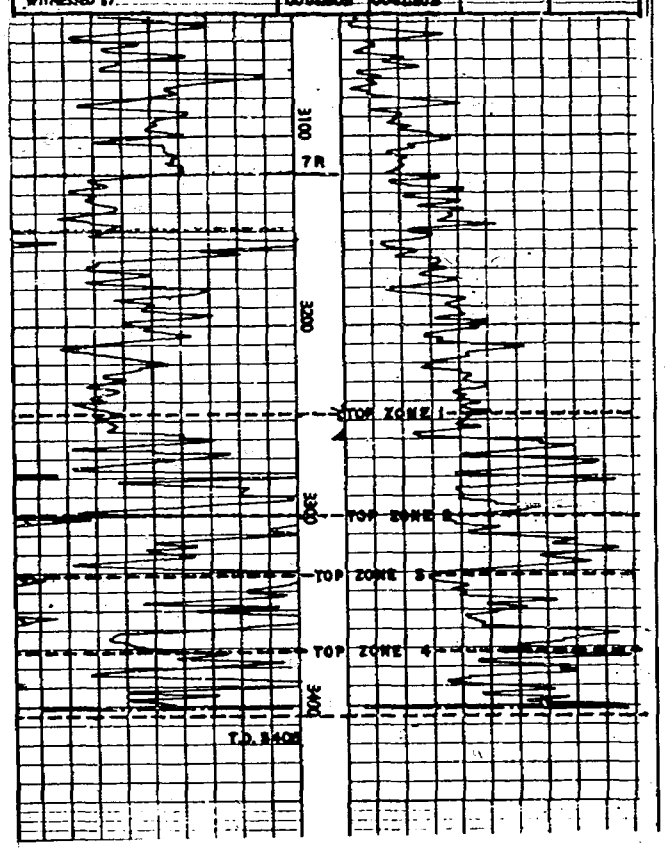
LOG MEAS. FROM ROTARY TABLE ELEV.

DRLG. MEAS. FROM ROTARY TABLE ELEV.

PERM. DATUM 9' BRADEN HEAD FLANGE IS BELOW ROTARY TABLE. ELEV.

COMPANY: OIL CORPORATION
WELL: LANGLIE NO. 6
FIELD: LANGLIE MATTIX
COUNTY: LEA STATE: N.M.
LOCATION:

TYPE OF LOG	GAMMA RAY	NEUTRON		
RUN NO.	1 RW	1 RW		
DATE	9-24-53	9-24-53		
TOTAL DEPTH (DRILLER) 3406'	3404.5'	3404.5'		
EFFECTIVE DEPTH (DRILLER)	3404.5'	3404.5'		
TOP OF LOGGED INTERVAL	SURFACE	SURFACE		
BOTTOM OF LOGGED INTERVAL	3401'	3401'		
TYPE OF FLUID IN HOLE	OIL	OIL		
FLUID LEVEL	FULL	FULL		
MAXIMUM RECORDED TEMP.				
NEUTRON SOURCE STRENGTH & TYPE		400M		
SOURCE SPACING — IN.		8.25		
LENGTH OF MEASURING DEVICE — IN.	24	8		
O.D. OF INSTRUMENT — IN.	3 5/8	3 5/8		
TIME CONSTANT — SECONDS	5	4		
LOGGING SPEED FT./MIN.	28-48	28-48		
STATISTICAL VARIATION — PL				
SENSITIVITY REFERENCE	274	278		
RECORDED BY	[illegible]	[illegible]		
WITNESSED BY	COVINGTON	COVINGTON		

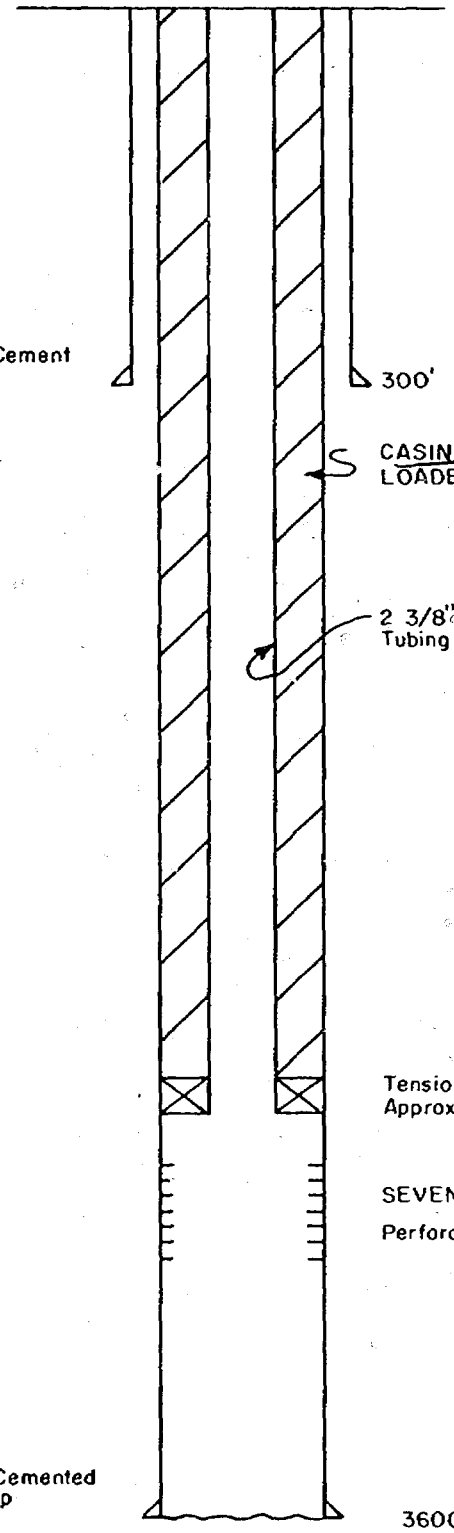


DIAGRAMMATIC SKETCH

TYPICAL PROPOSED INJECTION WELL
PROPOSED LANGLIE-JAL UNIT

Lea County, New Mexico

SINGLE COMPLETION



8 5/8" OD Casing Cement Circulated.

300'

CASING-TUBING ANNULUS WILL BE LOADED WITH INHIBITED FLUID.

2 3/8" OD 4.70# EUE 8rd. J-55 Tubing Cement Lined Internally.

Tension Type Packer To Be Set At Approximately 3250'

SEVEN RIVERS-QUEEN

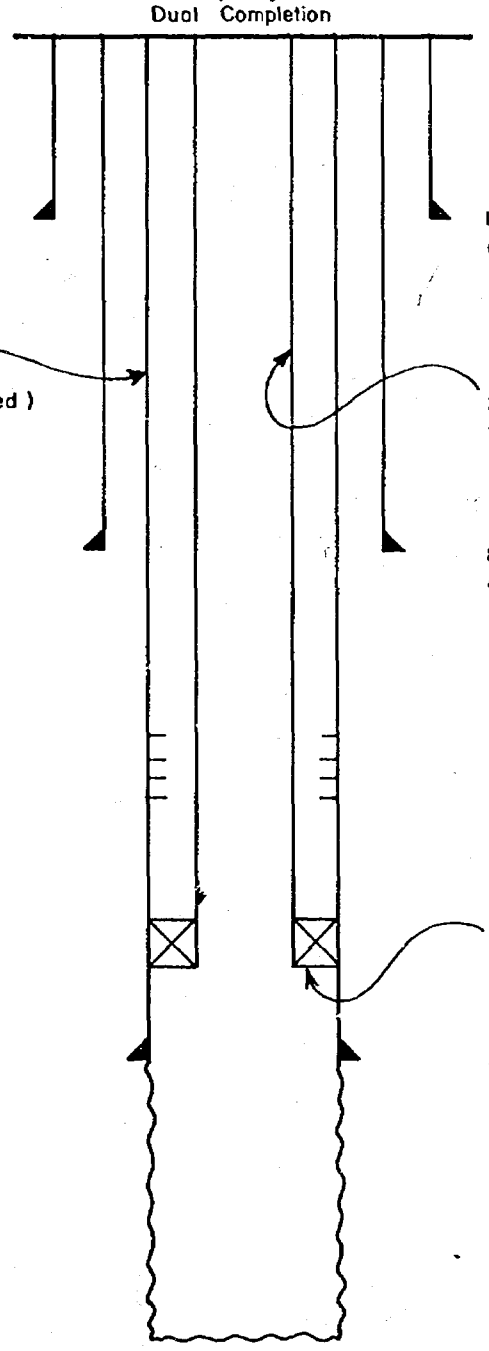
Perforated or Open Hole 3300'-3600'

4 1/2" OD Casing Cemented With 600 sx. Cmt. Top At Surface

3600'

Exhibit 1-G

DIAGRAMMATIC SKETCH
PROPOSED INJECTION WELL
PROPOSED LANGLIE-JAL UNIT
Lea County, New Mexico
Pan American, Langlie "A" No.2
Dual Completion



13" at 162'
Cement Circulated

Top of Cement
on 5 1/2 at 910' (Calculated)

2 3/8" O.D. 4.70 # EUE 8rd. J-55
Tubing Cement Lined Internally.

8 5/8 at 1185'
Cement Circulated

Yates Gas Produced
Through Tubing Casing
Annulus.

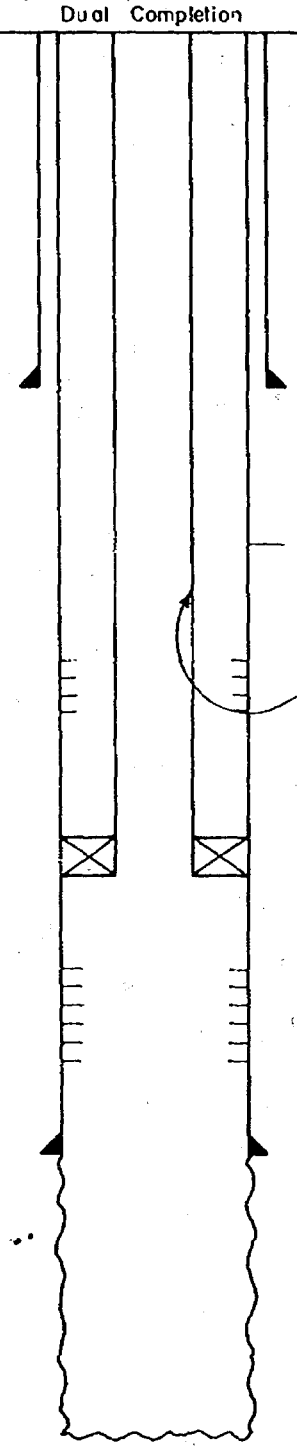
Tension Type Packer at 3170'

5 1/2" at 3221'

T.D. 3463

Exhibit 1-H

DIAGRAMMATIC SKETCH
PROPOSED INJECTION WELL
PROPOSED LANGLIE-JAL UNIT
Lea County, New Mexico
Skelly Sherrill, No. 3
Dual Completion



9 5/8" at 1192
Cement Circulated

Top of Cement at 1740' (Calculated)

Yates Gas Produced
Through Tubing-Casing
Annulus.

2 3/8" O.D. 4.70 # EUE 8rd. J-55
Tubing Cement Lined Internally.

Tension Type Packer at 3200'

Top of Production 3250'

7 1/2" at 3401' With 250 sx.

T.D. 3490'

Exhibit 1-I

INITIAL PLAN OF OPERATION

The proposed injection pattern is an 80 acre five-spot. We propose to drill replacement wells and development wells to complete every five-spot pattern in the unit area. Strategic wells will be cored to obtain additional reservoir data. All wells drilled will be logged. After development is complete, injection will commence. Injection of 500 barrels of water per day per well is anticipated. Injection wells will be equipped with cement lined tubing and a packer. Singly completed injection wells will have inhibited fluid in the annulus above the packer. The injection water will be produced Seven Rivers water and Capitan Reef water purchased from Skelly Oil Company's Jal Water System. Water produced in unit operations will also be injected. To insure maximum recovery through cooperative waterflood operations and to protect the correlative rights of the unit, line well agreements will be negotiated with offset operators at the earliest possible date.

All work will be conducted in a prudent manner utilizing the best techniques and equipment deemed by the working interest owners to be most efficient.

L. C. CASE, P. E.

CONSULTANT, OIL FIELD WATER PROBLEMS

200 SUNSET DRIVE

TULSA 14, OKLAHOMA

LUTHER 3-9307

LUTHER 3-3067

WATER ANALYSIS- Seven Rivers brine, Skelly Oil Company, Coates Lease. Sampled at supply tank, 7/29/66

	Milligrams/liter	E.P.L.%(R.V.%)
Sodium,Na	2,005	32.19
Calcium,Ca	520	9.61
Magnesium,Mg	266	8.10
Sulfate,SO_4	540	4.15
Chloride,Cl	3,595	37.55
Bicarbonate,HCO_3	1,366	8.30
Carbonate,CO_3	nil	0.00
Total	8,292	100.00%

Other determinations:

Sp.Gr. at 60°F	1.009
pH value	6.8
Hydrogen sulfide,H_2S	- 408* (At supply tank,7/29/66)

Hypothetical Combinations, milligrams/liter:

	* Milligrams/liter
Calcium bicarbonate,$Ca(HCO_3)_2$	1,816
Magnesium bicarbonate,$Mg(HCO_3)_2$	0.0
Sodium bicarbonate,$NaHCO_3$	0.0
Calcium sulfate,$CaSO_4$	241
Magnesium sulfate,$MgSO_4$	462
Sodium sulfate,Na_2SO_4	0.0
Calcium chloride,$CaCl_2$	0.0
Magnesium chloride,$MgCl_2$	675
Sodium chloride,NaCl	5,098
Total	8,292

Definition of water character:

Primary salinity	64.58
Secondary salinity	18.82
Primary alkalinity	0.00
Secondary Alkalinity	16.60
Total	100.00%

Remarks:

Considerable time was spent in an attempt to count the bacteria in a sample of this brine taken from the supply tank. The count was not accurate due to the very high H_2S, which darkened the agar. Final results were indicated to be as follows: Aerobic bacteria-- less than 500/ml in API agar. SO_4-reducers- 0 colonies in 18 days.

This brine shows no tendency to deposit gypsum, calculated from gypsum solubility data. This brine is incompatible with waters having appreciable dissolved iron or oxygen.

BEFORE EXAMINER NUTTER
OIL CONSERVATION COMMISSION
9/30/70 EXHIBIT NO. 1-L
CASE NO. 4429 & 4430

Exhibit 1-L

ENJAY CHEMICAL COMPANY

Houston Chemical Plant
8230 Stedman, Houston, Texas 77029

ENJAY

April 21, 1969

WATER ANALYSIS

SAMPLE DESCRIPTION: Jal water supply well #2. 4-14-69

COMPANY: Skelly Oil Company
STSR NUMBER: #46986
REQUESTED BY: A. R. Bohannon

DATE RECEIVED: 4-15-69
ANALYZED BY: J. L. Johnson

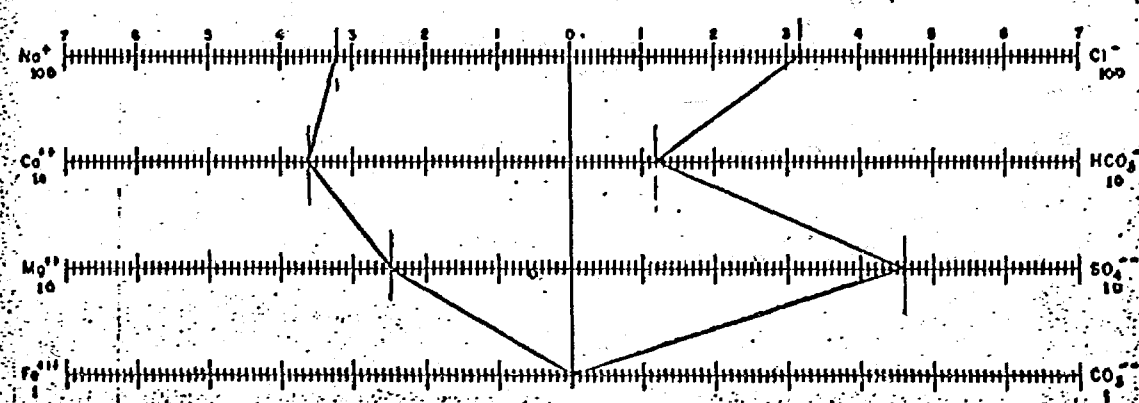
	Mg/L	Meq/L
Sodium	7,298	317.3
Calcium	724	36.2
Magnesium	301	24.8
Chloride	11,363	320.4
Sulfate	2,218	46.1
Bicarbonate	720	11.8
Carbonate	0	
Hydroxide	0	
TOTAL	22,624	
Dissolved Iron		
Total Iron	0.12	0.0

pH 6.8

Specific Gravity at 60 °F. 1.0076

	Mg/L
Oil Content	
Organic Matter	
Hydrogen Sulfide	313

WATER PATTERN (Stiff Method)



Meq/LITER

Remarks:

L. C. CASE, P. E.
CONSULTANT, OIL FIELD WATER PROBLEMS
200 SUNSET DRIVE
TULSA 14, OKLAHOMA
LUTHER 3-9307
LUTHER 3-3007

WATER ANALYSIS- Seven Rivers brine. Skelly Oil Company, Coates Lease. Sampled at supply tank, 7/29/66

	Milligrams/liter	E.P.I.%(R.V.%)
Sodium,Na	2,005	32.19
Calcium,Ca	520	9.61
Magnesium,Mg	266	8.10
Sulfate,SO_4	514	4.15
Chloride,Cl	3,595	37.55
Bicarbonate,HCO_3	1,366	8.30
Carbonate,CO_3	nil	0.00
Total	8,292	100.00%

Other determinations:

Sp.Gr. at 60°F	1.009
pH value	6.8
Hydrogen sulfide,H_2S	- 408* (At supply tank,7/29/66)

* Milligrams/liter

Hypothetical Combinations, milligrams/liter:

Calcium bicarbonate,$Ca(HCO_3)_2$	1,816
Magnesium bicarbonate,$Mg(HCO_3)_2$	0.0
Sodium bicarbonate,$NaHCO_3$	0.0
Calcium sulfate,$CaSO_4$	211
Magnesium sulfate,$MgSO_4$	462
Sodium sulfate,Na_2SO_4	0.0
Calcium chloride,$CaCl_2$	0.0
Magnesium chloride,$MgCl_2$	675
Sodium chloride,NaCl	5,098
Total	8,292

Definition of water character:

Primary salinity	64.58
Secondary salinity	18.82
Primary alkalinity	0.00
Secondary Alkalinity	16.60
Total	100.00%

Remarks:

Considerable time was spent in an attempt to count the bacteria in a sample of this brine taken from the supply tank. The count was not accurate due to the very high H_2S, which darkened the agar. Final results were indicated to be as follows: Aerobic bacteria-- less than 500/ml in API agar. SO_4-reducers- 0 colonies in 18 days.

This brine shows no tendency to deposit gypsum, calculated from gypsum solubility data. This brine is incompatible with waters having appreciable dissolved iron or oxygen.

Exhibit 1-L

ENJAY CHEMICAL COMPANY

Houston Chemical Plant
8230 Stedman, Houston, Texas 77029

ENJAY

April 21, 1969

WATER ANALYSIS

SAMPLE DESCRIPTION: Jal water supply well #2. 4-14-69

COMPANY: Skelly Oil Company
STSR NUMBER: #46986
REQUESTED BY: A. R. Bohannon

DATE RECEIVED: 4-15-69
ANALYZED BY: J. L. Johnson

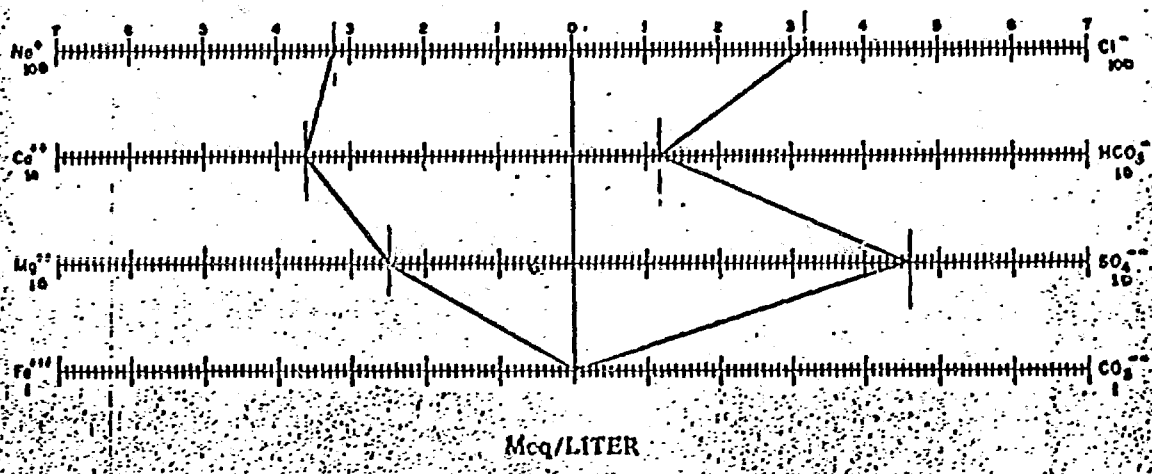
	Mg/L	Meq/L
Sodium	7,298	317.3
Calcium	724	36.2
Magnesium	301	24.8
Chloride	11,363	320.4
Sulfate	2,218	46.1
Bicarbonate	720	11.8
Carbonate	0	
Hydroxide	0	
TOTAL	22,624	
Dissolved Iron		
Total Iron	0.12	0.0

pH 6.8

Specific Gravity at 60 °F. 1.0076

	Mg/L
Oil Content	
Organic Matter	
Hydrogen Sulfide	313

WATER PATTERN (Stiff Method)



Meq/LITER

Remarks:

17 Pm 1 10

BEFORE THE OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO

APPLICATION OF UNION TEXAS PETROLEUM DIVISION OF ALLIED CHEMICAL CORPORATION FOR APPROVAL OF A WATERFLOOD PROJECT TO BE CO-EXTENSIVE WITH THE PROPOSED LANGLIE-JAL UNIT AREA EMBRACING 3,748.06 ACRES IN TOWNSHIPS 24 AND 25 SOUTH, RANGE 37 EAST, N.M.P.M. LEA COUNTY, NEW MEXICO. APPLICANT SEEKS APPROVAL OF THE PROJECT AREA AND OF 46 INJECTION WELLS, 34 BY THE CONVERSION OF PRESENTLY PRODUCING WELLS AND BY THE DRILLING OF 12 NEW WELLS AND FOR THE INJECTION OF WATER IN THE PRODUCTIVE INTERVAL BETWEEN THE TOP OF THE SEVEN RIVERS FORMATION AND THE BASE OF THE QUEEN FORMATION OCCURRING BETWEEN THE DEPTHS OF 3095 FEET AND 3695 FEET IN THE SKELLY OIL COMPANY SHERREL NO. 7 WELL LOCATED 1980 FEET FROM THE SOUTH AND EAST LINES OF SECTION 31, TOWNSHIP 24 SOUTH, RANGE 37 EAST: ALSO PROVISION FOR ADMINISTRATIVE APPROVAL OF ADDITIONAL INJECTION WELLS AND A PROJECT ALLOWABLE IN ACCORDANCE WITH RULE 701 OF THE COMMISSION	) Case 4430

Oil Conservation Commission
Box 2088
Santa Fe, New Mexico 87501

Comes Union Texas Petroleum Division of Allied Chemical Corporation and hereby makes application for approval of a waterflood project to be co-extensive with the proposed Langlie-Jal Unit Area embracing 3,748.06 acres in Townships 24 and 25 South, Range 37 East, N.M.P.M. Lea County, New Mexico. Applicant seeks approval of a project area and of 46 injection wells, 34 by the conversion of presently producing wells and by the drilling of 12 new wells, and for the injection of water in the productive interval between the top of the Seven Rivers formation and the base of the Queen sand occurring between the depths of 3,095 feet and 3,695 feet in the Skelly Oil Company Sherrel No. 7 well located 1980 feet from the South and East lines of Section 31, Township 24 South, Range 37 East; also provision for administrative approval of additional

injection wells and a project allowable in accordance with Rule 701 of the Commission, and in support thereof respectfully shows:

1. That applicant has filed simultaneously herewith an application to the Commission for approval of the Langlie-Jal Unit Agreement with embraces 2,075.23 acres of federal land, 640 acres of state land and 1,032.83 acres of fee lands, or a total of 3,748.06 acres, in Townships 24 and 25 South, Range 37 East, N.M.P.M. Lea County, New Mexico. That said unit agreement is being entered into primarily for the purpose of conducting a waterflood project co-extensive with the unit area and the unit agreement is to be limited to the interval between the top of the Seven Rivers formation and the base of the Queen sand.

2. There is attached hereto, made a part hereof and marked as Exhibit "A", a plat showing the location of the proposed injection wells and the location of all other wells within a radius of 2 miles from the proposed injection wells and the formation from which said wells are producing or have produced. The plat also indicates the lessees within said 2 mile radius. Applicant proposes to use 46 injection wells, 34 of which are presently producing wells which will be converted to injection wells and 21 new wells will be drilled for such purpose. There is attached hereto as Exhibit "B" Table No. 1 showing the location of all the proposed injection wells and the interval in which fluid will be injected in each well; there is also attached hereto and made a part hereof as Exhibit "C" a diagrammatic sketch of a typical proposed injection well; also attached as Exhibits "D" and "E" are diagrammatic sketches of the Pan American Langlie "A" No. 2 and the Skelly Sherrel No. 3 wells which are to be dual completions.

3. Applicant contemplates obtaining water for injection purposes from the Skelly Oil Company Jal Water System which originates from the Capitan Reef and also using produced water. Applicant contemplates that the initial injection rate will be around 500 barrels of water per well per day and it is estimated that the initial injection pressure will be around 1,000 psi.

4. Applicant requests that upon approval of the waterflood project it also be given the right to request administrative approval of any additional injection wells or changes in injection wells which may be necessary or required in inaugurating and operating the waterflood project.

5. Applicant also requests that a project allowable be assigned in accordance with Rule 701 of the Commission.

6. That applicant believes that said waterflood project is in the interest of conservation and the prevention of waste and will tend to promote the greatest ultimate recovery of oil and gas and will protect correlative rights.

7. Applicant requests that this matter be set down for hearing at the examiner's hearing to be held on September 30, 1970.

Respectfully submitted,

UNION TEXAS PETROLEUM DIVISION
ALLIED CHEMICAL CORPORATION

By _____
Member of the Firm of
HINKLE, BONDURANT, COX & EATON
P.O. Box 10
Roswell, New Mexico 88201
Attorneys for Applicant

Case 4430

DIAGRAMMATIC SKETCH

TYPICAL PROPOSED INJECTION WELL
PROPOSED LANGLIE-JAL UNIT

Lea County, New Mexico

SINGLE COMPLETION

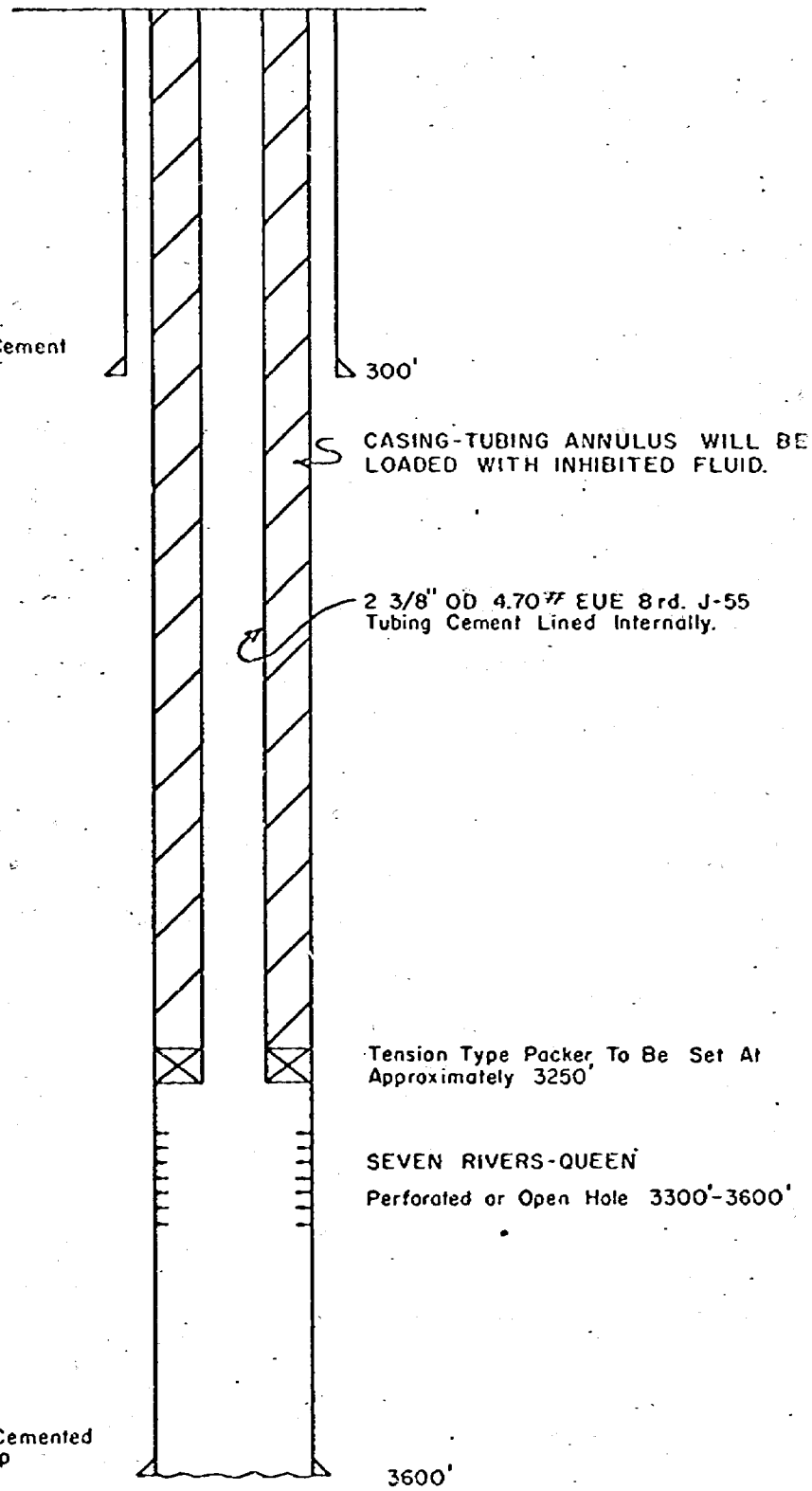


EXHIBIT "C"

Case 4430

DIAGRAMMATIC SKETCH
PROPOSED INJECTION WELL
PROPOSED LANGLIE-JAL UNIT
Lea County, New Mexico
Pan American, Langlie "A" No.2
Dual Completion

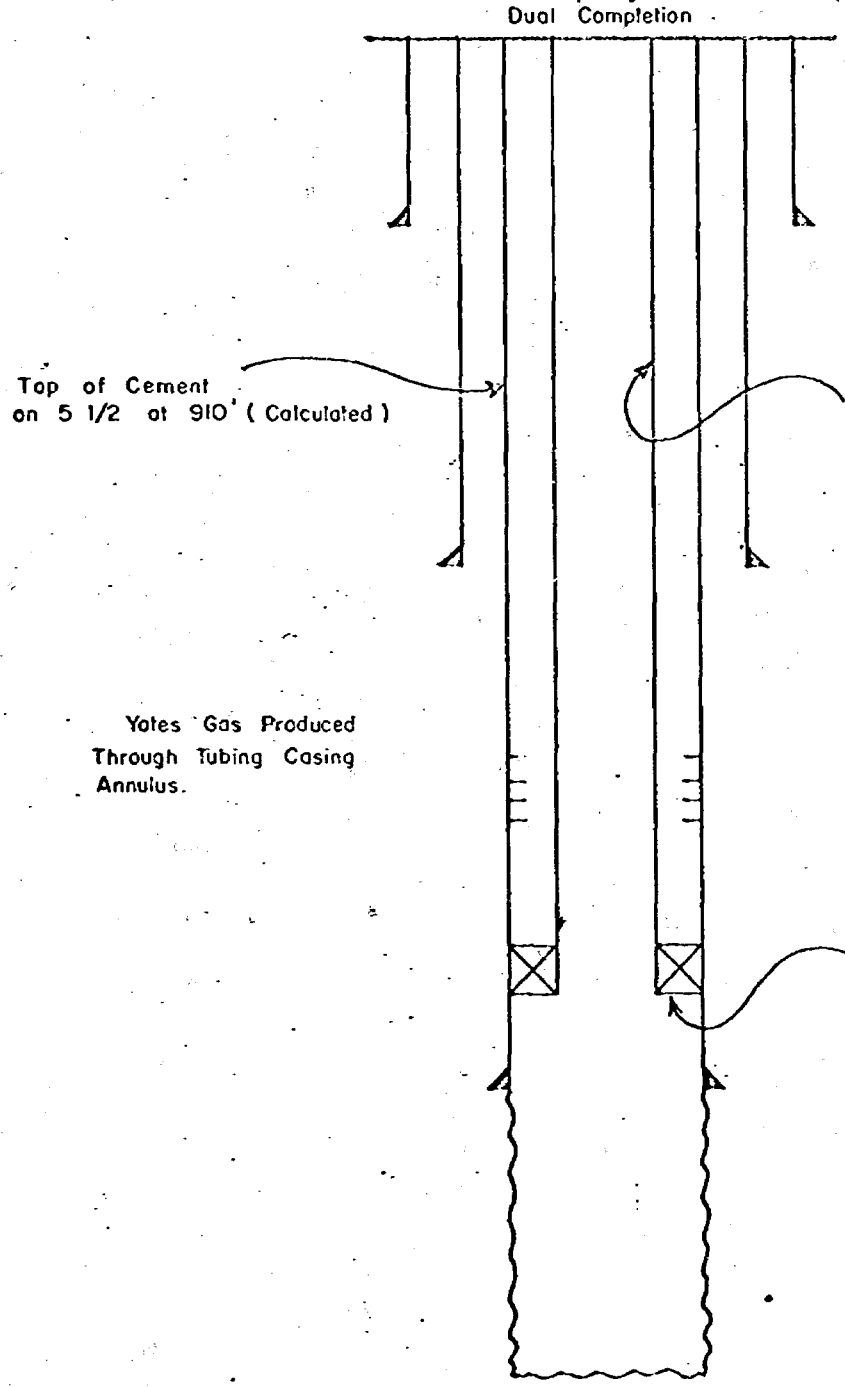
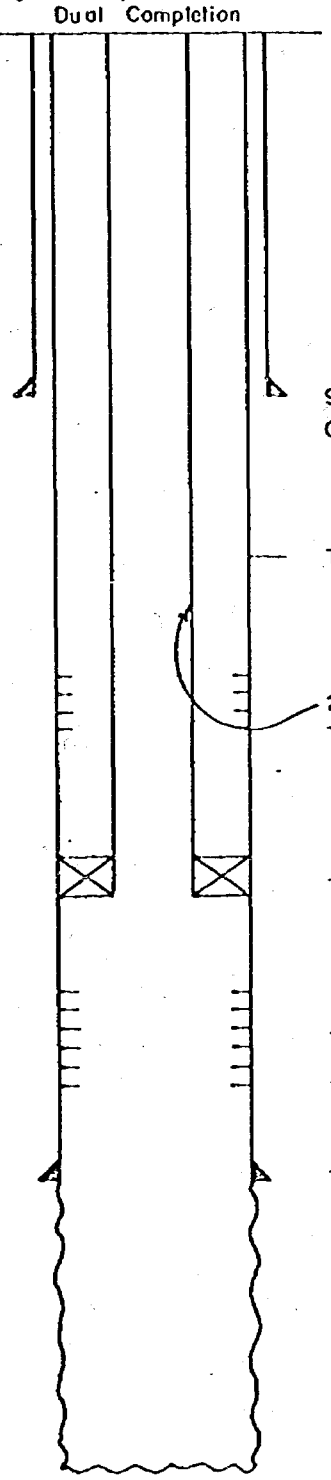


EXHIBIT "D"

Case 4430

DIAGRAMMATIC SKETCH
PROPOSED INJECTION WELL
PROPOSED LANGLIE-JAL UNIT
Lea County, New Mexico
Skelly Sherrill, No. 3
Dual Completion



9 5/8" at 1192
Cement Circulated

Top of Cement at 1740' (Calculated)

Yates Gas Produced
Through Tubing-Casing
Annulus.

2 3/8" O.D. 4.70 # EUE 8rd. J-55
Tubing Cement Lined Internally.

Tension Type Packer at 3200'

Top of Production 3250'

7 1/2" at 3401' With 250 sx.

T.D. 3490'

EXHIBIT "E"

DRAFT

GMH/esr

(9)

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. 4430

Order No. R- 4057

APPLICATION OF UNION TEXAS PETROLEUM CORPORATION
FOR A WATERFLOOD PROJECT, LEA COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on September 30, 1970, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this _____ day of ~~October~~ November, 1970, 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, Union Texas Petroleum Corporation, seeks authority to institute a waterflood project in the _____ Langlie-Jal Unit Area, Jalmat and Langlie-Mattix Pools, by the injection of water into the Seven Rivers and Queen formations through 46 injection wells in ~~Section~~ Townships 24 and 25 ~~Xxxxxx~~ South, Range 37 ~~Xxxxx~~ East, NMPM, Lea County, New Mexico.

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

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

DRAFT

GMH/esr

(9)

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. 4430

Order No. R- 4051

APPLICATION OF UNION TEXAS PETROLEUM CORPORATION
FOR A WATERFLOOD PROJECT, LEA COUNTY,
NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on September 30, 1970, at Santa Fe, New Mexico, before Examiner Daniel S. Nutter.

NOW, on this _____ day of ~~October~~ Nov, 1970, 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, Union Texas Petroleum Corporation, seeks authority to institute a waterflood project in the Langlie-Jal Unit Area, Jalmat and Langlie-Mattix Pools, by the injection of water into the Seven Rivers and Queen formations through 46 injection wells in ~~Section~~ _____, Townships 24 and 25 ~~North~~ South, Range 37 ~~West~~ East, NMPM, Lea County, New Mexico.

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

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

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

IT IS THEREFORE ORDERED:

(1) That the applicant, Union Texas Petroleum Corporation, is hereby authorized to institute a waterflood project in the Langlie-Jal Unit Area, Jalmat and Langlie-Mattix Pools, by the injection of water into the Seven Rivers and Queen formations through the following-described wells in Township 25 South, Range 37 East, NMPM, Lea County, New Mexico:

Unit

COMPANY	LEASE AND WELL NO.		LOCATION S-T-R-U
Atlantic	State 24 No. 1		SE 32-24-37-N
Richfield	** State 157 "E" No. 2		32-24-37-B
	* State 157 "C" No. 3	- to be drilled	32-24-37-P
	* Burleson No. 3	- to be drilled	8-25-37-F
	* Burleson No. 4	- to be drilled	8-25-37-D
Pan American	** Langlie "A" No. 2	- to be dually completed	9-25-37-I
Phillips	* Woolworth 3-4	- to be drilled	6-24-37-H
Reserve	** Martin No. 1		31-24-37-H
	* Martin No. 4		31-24-37-B

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

County, New Mexico:

COMPANY		LEASE AND WELL NO.		LOCATION S-T-R-U
Atlantic		State 24 No. 1		32-24-37-N
Richfield	**	State 157 "E" No. 2		32-24-37-B
	*	State 157 "C" No. 3	- to be drilled	32-24-37-P
	*	Burleson No. 3	- to be drilled	8-25-37-F
	*	Burleson No. 4	- to be drilled	8-25-37-D
Pan American	**	Langlie "A" No. 2	- to be dually completed	9-25-37-L
Phillips	*	Woolworth 3-4	- to be drilled	6-24-37-H
Reserve	**	Martin No. 1		31-24-37-H
	**	Martin No. 4		31-24-37-B
	*	Martin "B" No. 3	- to be drilled	31-24-37-F
Skelly	**	Sherrill No. 1		31-24-37-P
	**	Sherrill No. 3	- to be dually completed	6-25-37-B
	**	Sherrill No. 7		31-24-37-J
	*	Sherrill No. 9	- to be drilled	31-24-37-N
	**	State "M" No. 2		32-24-37-L
Texaco	**	Fristoe NCT-4-"B" No. 1		31-24-37-L
Texas Pacific		Wells No. 6		5-25-37-J
	**	Wells No. 7		6-25-37-F
	**	Wells No. 9		6-25-37-D
	**	Wells No. 10		6-25-37-J
	*	Wells No. 12	- to be drilled	5-25-37-F
Thornton Prod.	**	Humble State "I" No. 2		32-24-37-C
Union Texas Petroleum		Jal "D" No. 2		8-25-37-B
		Langlie No. 1		8-25-37-P
		Langlie No. 3		8-25-37-H
	**	Langlie No. 6		8-25-37-J
	**	Langlie "A" No. 2		17-25-37-P
	*	Langlie "A" No. 5	- to be drilled	17-25-37-J
		Langlie "C" No. 1		17-25-37-H
		Langlie "C" No. 2		17-25-37-B
		Olsen Phillips No. 3		6-25-37-N
		Olsen Phillips No. 5		6-25-37-P
	**	Phillips No. 2		6-25-37-L
	**	State "A"-32 No. 2		32-24-37-F
	**	State "A"-32 No. 3		32-24-37-D
		Stuart No. 3		9-25-37-D
		Wells No. 1		5-25-37-P
	**	Wells No. 4		5-25-37-D
		Wells No. 5		5-25-37-B
		Wells No. 7		4-25-37-L
	**	Wells No. 10		4-25-37-B
	*	Wells No. 15	- to be drilled	5-25-37-N
	*	Wells No. 16	- to be drilled	5-25-37-L
Westates	**	Wells "B"-5 No. 2		5-25-37-H
	*	Wells "B"-4 No. 3	- to be drilled	4-25-37-D
	*	Wells No. 13	- to be drilled	4-25-37-F

Unit

(under)

(2) That the subject waterflood project is hereby designated the Union Texas Langlie Jal Waterflood Project and 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 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.

ROUGH DRAFT FOR WATERFLOOD LETTERS

Mr. Clarence Hinkle
Hinkle, Bondurant, Cox & Ea~~s~~ton
Attorneys at Law
Post Office Box 10
Roswell, New Mexico 88201

Dear Sir:

Reference is made to Commission Order No. R-4051, entered in Case No. 4430, approving the Union Texas Langlie Jal Waterflood Project.

Injection shall be through the 46 authorized water injection wells each of which shall be equipped with cement-lined tubing set in a packer located as near as practicable to the ~~casing shoe~~ uppermost perforation, or in the case of openhole completions, as near as practicable to the casing shoe. The casing-tubing annulus of all but the three dual completions shall be loaded with inert fluid and equipped with a pressure gauge at the surface.

As to allowable, our calculations indicate that when all of the authorized injection wells have been placed on active injection, the maximum allowable which this project will be eligible to receive under the provisions of Rule 701-E-3 is 3822 barrels per day when the Southeast New Mexico normal unit allowable is 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 allowable provisions of Rule 701, it behooves him to promptly notify both of the aforementioned Commission offices by letter of any change in the status of wells in the project area, i.e., when active injection commences, when additional injection or producing wells are drilled, when additional wells are acquired through purchase or unitization, when wells have received a response to water injection, etc.

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

Very truly yours,

A. L. PORTER, Jr.
Secretary-Director

cc: OCC: Hobbs x
Artesia
Aztec
USGS Hobbs
~~Mr. Frank Irby~~, State Engineer Office, Santa Fe, New Mexico
Mr. D. E. Gray,

CASE 4431: Application of WILLIAM A. & EDWARD R. HUDSON FOR UNORTHODOX LOCATIONS & DUAL COMPLETION.