BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
February 28, 1968

EXAMINER HEARING

IN THE MATTER OF:

Application of Tamarack Petroleum Company, Inc., for a unit agreement, Lea County, New Mexico.. CASE NO. 3730

Application of Tamarack Petroleum Company, Inc., for a waterflood project, Lea County, New Mexico. CASE NO. 3731

BEFORE: DANIEL A. NUTTER: Examiner

TRANSCRIPT OF HEARING

MR. NUTTER: We'll take next Case Number 3730.

MR. HATCH: Application of Tamarack Petroleum Company, Inc., for a unit agreement, Lea County, New Mexico.

MR. KELLAHIN: If the Examiner please, Jason Kellahin, Kellahin and Fox, Santa Fe, appearing for the Applicant. At this time I would like to move that Case 3730 be consolidated for the purposes of the record with Case 3731 but that separate orders be entered on the two cases.

MR. NUTTER: We will also now call Case 3731.

MR. HATCH: Application of Tamarack Petroleum Company, Inc., for a waterflood project, Lea County, New Mexico.

MR. NUTTER: Cases 3730 and 3731 will be consolidated for purposes of testimony.

MR. KELLAHIN: Mr. Nutter, we will have two witnesses I would like to have sworn, please.

(Witnesses sworn.)

(Whereupon, Applicant's Exhibits 1 through 8 were marked for identification.)

ALBERT METCALFE,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Will you state your name, please?

A Albert Metcalfe.

Q Where are you located, Mr. Metcalfe?

A Midland, Texas.

Q What business are you engaged in?

A I manage the Tamarack Petroleum Company in Texas and New Mexico.

Q In connection with your work as manager of Tamarack Petroleum Company, Incorporated, does the area involved in the application in Cases 3730 and 3731 come under your jurisdiction?

A Yes, sir.

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

A No, sir.

Q For the benefit of the Examiner, will you please outline briefly your education and experience as a petroleum engineer?

A My degree in petroleum engineering from Texas A & M, nine years' experience in all types of petroleum engineering, with Tidewater Oil Company, and six years in my present position

with Tamarack.

Q Has this been in the southwestern area, Mr. Metcalfe?

A Yes, sir.

Q Your experience?

A Yes, sir.

Q Have you had particular experience in the State of New Mexico in connection with your duties for Tamarack?

A Yes, sir.

Q Now, Case Number 3730 has to do with the application for approval of the unit agreement, is that correct?

A Yes, sir.

Q Did you have anything to do with the formation of this and perfection of the unit agreement?

A Yes, sir.

MR. KELLAHIN: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, they are.

Q (By Mr. Kellahin) You say you had something to do with the unit agreement. What did you do in connection with that, Mr. Metcalfe?

A Well, in 1963 I obtained consent of all the operators in the proposed unit area to have a waterflood feasibility study made and based on the favorable results of that study, I

called a meeting of all the operators and have been continuously negotiating participation for a unit area since that time, and I wrote this unit agreement.

Q You wrote the unit agreement?

A Yes.

Q Referring to what has been marked as Exhibit Number 1, is that the unit agreement to which you referred?

A Yes, sir.

Q Is this a unit agreement for secondary recovery, then?

A Yes, sir.

Q How many acres does it cover?

A The unit area is 1522.71 acres.

Q What percentage of that acreage is Federal and what percent is fee or what acreage, either way you wish to give it?

A Well, 1320.77 acres of Federal land, there are 201.40 acres of fee land.

Q Is there any State of New Mexico land included in the unit?

A No, sir.

Q Does the unit agreement have any provision for expansion or is it a normal --

A Yes, sir.

Q It has a provision for expansion?

A Yes, sir.

Q What percentage of the acreage that you have referred to has been committed to the unit?

A One hundred percent.

Q You say one hundred percent. Is that of the working interest ownership?

A Yes, sir, one hundred percent of the working interest has ratified the unit agreement.

Q Before we get to that, has the unit agreement been submitted to the U. S. G. S.?

A Yes, sir.

Q Have you a letter showing that the area has been designated as suitable for unit operation?

A Yes, sir.

Q Referring to what has been marked as Exhibit Number 2, would you identify that?

A This is a letter from the United States Department of the Interior saying that they will approve a unit agreement in the form of this agreement for this area and designating this area as the unit.

Q Do you have the ratifications to the unit agreement?

A Yes, sir.

Q Referring to what has been marked as Exhibit Number 3,

would you identify that?

A Exhibit Number 3 are the ratifications signed by all of the working interest owners in the unit area.

Q And Exhibit Number 3-A, would you identify that exhibit?

A Exhibit 3-A are the ratification instruments signed by all of the royalty interest owners in the unit area, which is a hundred percent committed with the exception of one overriding royalty interest in two tracts in Exhibit 3-A, also includes a copy of a telegram from this royalty owner saying they have approved the instrument and the forms are being executed.

Q Then you have for all practical purposes one hundred percent ratification of the working interest and royalty interest ownership?

A That's correct.

Q Does this include the land owners' royalty underlying the fee land?

A Yes.

Q And all of the overriding royalties are involved in the unit?

A Yes, sir.

Q What kind of participation faceot does the unit

provide for?

A Well, the unit agreement provides for a two-phase participation factor, Phase one to run until the remaining primary reserves are produced, which is based on one hundred percent of the present production. Phase two, to run from the end of the time the remaining primary is produced until the abandonment of operations, is based on twenty-five percent cumulative production and seventy-five percent productive sand volume.

Q Now, another witness will testify as to the primary and secondary recovery of this unit, is that correct?

A Yes, sir.

Q Well, Exhibit 1 was prepared by you, the unit agreement, is that correct?

A Yes, sir.

Q And Exhibit 2 is a copy of the letter received by you from the U. S. G. S.?

A Yes.

Q And Exhibits 3 and 3-A are the ratifications that you received?

A Yes, sir.

MR. KELLAHIN: At this time I would like to offer in evidence Exhibits 1, 2, 3, 3-A and --

MR. NUTTER: Tamarack's Exhibits 1, 2, 3, and 3-A will be admitted in evidence.

(Whereupon, Applicant's Exhibits 1, 2, 3 and 3-A were offered and admitted in evidence.)

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

CROSS EXAMINATION

BY MR. NUTTER:

Q As I understand, one hundred percent of the working interest has ratified the unit?

A Yes, that's correct.

Q Tentative approval from the U. S. G. S., as far as government royalty, has been obtained?

A That is correct.

Q One hundred percent of the royalty owners of the fee acres have signed?

A Yes, sir.

Q And all overriding royalties have signed with the exception of one who has sent you a wire to the effect they will sign?

A That's correct.

Q So when you get this, you will have one hundred percent working interest, overriding interest, and royalty?

A Yes.

MR. NUTTER: Any other questions of the witness? He may be excused.

(Witness excused.)

* * *

ARTHUR E. PINSON, JR.

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name, please?

A Arthur E. Pinson, Junior.

Q By whom are you employed and what position, Mr. Pinson?

A I'm employed as a senior reservoir engineer by L. L. C. and C., Incorporated, Midland, Texas.

Q L. L. C. and C. Did that formerly operate under another name?

A Formerly called, until January the 1st, 1968, Lybrook, Landrith, Campbell, and Calroid.

Q How long have you been employed by this firm?

A Approximately two months.

Q Have you ever testified before the Oil Conservation Commission?

A No.

Q For the benefit of the Examiner, would you please outline your education and experience as a petroleum engineer?

A Yes, I hold B. S. and M. S. degrees in petroleum engineering from Texas A & M University, and I have had approximately seven years of work experience in the field.

Q Where did you have this experience and with whom?

A With the Mobil Oil Corporation, Shell Oil Company, and Kern County Land Company, primarily in southeastern New Mexico and west Texas.

Q You say you have been with L. L. C. and C. --

A Two months.

Q -- for two months?

A Yes.

Q In connection with your work for L. L. C. and C., have you made any study of the area involved in the Pearl Queen Pool which is under consideration in Cases 3730 and 3731?

A Yes, I have. I have reviewed the prior engineering work, analyzed the present state of performance of the unit area, and formulated the plan which we propose.

Q The prior engineering work was done by whom?

A By the same firm, first in 1963.

Q You say you have reviewed it?

A Yes.

Q Are you substantially in agreement with the findings that were made by the firm in connection with that study?

A Yes, substantially.

MR. KELLAHIN: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, they are.

Q (By Mr. Kellahin) Mr. Pinson, in connection with your work on the South Pearl Queen Unit area, did you make a study of your own in connection with the reservoir performance or background and history?

A I did, using the prior work as a basis.

Q You used that as a basis and did some supplemental work on your own, is this correct?

A Yes, to establish that I was in agreement with what had been done in the past and to bring it up to date.

Q Referring to what has been marked as Exhibit Number 4, would you identify that exhibit, please?

A Exhibit 4 is a plat showing the area of the proposed South Pearl Queen Unit and the rest of the field, the Pearl Queen field, showing the West Pearl Queen Unit which is operated by Gulf and the East Pearl Queen Unit which is operated by the Shell Oil Company. I might mention in passing on this exhibit,

that the East Pearl Queen Unit has been a resounding success.

Q Is the East Pearl Queen Unit the one that directly offsets the South Pearl Queen?

A Directly to the north and adjoins.

Q You say it has been a success?

A A very big success.

Q Who operates it?

A Shell Oil Company.

Q Has the South Pearl Queen Unit area received any effect from this flood to the north?

A Yes, it has. The Tamarack Lynum Number Two well in Section 3 of the unit has responded to injection in the East Pearl Queen Unit from the injection well, which is labeled on the map East Pearl Unit 54, or excuse me, 53, I'm sorry.

Q What was the nature of this response?

A An increase in oil production.

Q In order to protect the position of the owners in the South Pearl Queen Unit, in your opinion is it necessary that an offsetting flood be instituted in the near future in this area?

A Yes, not only to protect the owners from damage from the north but to insure them of the economic advantage of doing their work work in the south.

Q In other words, to obtain a greater ultimate recovery, is this that you mean?

A Right.

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

A It's a performance curve of the wells included in the proposed unit area.

Q Just to summarize the production history of the unit area, would you say at what stage of depletion this reservoir is?

A It's approximately eighty-five percent depleted now.

Q You have two curves on the exhibit, is that correct?

A The gas-oil ratio curve and the production curve, which is in barrels per month, also a curve showing the number of wells in the proposed unit.

Q What's the nature of the producing mechanism in the South Pearl Queen Unit?

A The South Queen Pearl portion of the Pearl Queen Field is produced by a solution gas drive or depletion mechanism.

Q Is there additional information contained on Exhibit Number 6?

A Yes, Exhibit 6 is a summary of the present status of the unit area, the forecasted benefit to be derived from the

waterflood and a summary listing of the water and flood characteristics.

Q Would you point out in particular on that exhibit the pertinent data as to the production characteristics of the reservoir and the geology of the reservoir?

A This south portion of the Queen Field produces from the Queen sand at approximately 4650 feet to the top of the producing sand. It's an anticlinal structure and producing by depletion drive, as I said before. It has to 1/1/68 produced 1,183,500 barrels. The remaining primary reserves are 202,500 barrels, which is somewhat different from what is shown in the unit agreement; however, that is the legal definition which was made sometime ago.

Q You mean lawyers have different opinions than engineers?

A A lawyer makes his opinion at a specific time and an engineer can continue to change his, make them later, which means that this portion of the field is about eighty-five or eighty-six percent depleted. The current daily oil production is, this is in December of '67, was three hundred thirteen barrels, which amounts to about twelve and a half barrels per day per well. The average gas-oil ratio in December was seven hundred seventy-four cubic feet per barrel.

Q Would you say on the basis of that information that

this reservoir is substantially depleted on primary?

A Yes, it is.

Q Is it a stripper stage of production?

A Yes, it is.

Q Or will be shortly?

A Very shortly.

Q Now, what would you expect, then, did you say, on secondary?

A We expect additional recovery beyond what would be recovered by continued primary depletion of 1,000,627 barrels, which amounts to 19.7 percent of the original oil in place as compared to primary recovery, for instance, of 16.7. This is an indicated ratio of water flood recovery to ultimate primary recovery of about 1.2, indicating this will be a good flood and rather normal.

Q Is the geology of the South Pearl Queen area such that it lends itself to successful waterflood?

A Yes, it is. This is, of course, shown by the Shell unit to the north and by our individual analysis also.

Q Now, referring to what has been marked as Exhibit Number 7, will you identify that exhibit, please?

A Exhibit 7 is a structure map on the top of the first Queen sand in the south portion of the Pearl Queen field.

There are other sands below this and one above, and this map is typical of all, as far as the structure is concerned.

Q Do you have a type log of the area?

A Yes.

Q Exhibit Number 8?

A Exhibit 8 is a log of the Tamarack Federal Number Two, Section 4, Township 20 South, Range 35 East, which we use as a type log for this portion of the field. It has marked on it the top of the unitized formation and the base and the zones of sand in the Queen formation. The Queen formation here is composed of inter-bedded sands, dolomites, and anhydrites. The sand is somewhat dolomitic. We call the first sand mark the upper sand, the next sand, the first sand, the second, and then there's a sand at about 4900 feet on this log, which is ordinarily called the third sand but which we don't consider to be prospective for water-flooding; and also marked is the fourth sand, the lower-most.

Q You have, then, as I understand you, four prospective waterflood zones in this area?

A That's right.

Q Do you propose to waterflood all the four zones through the same well bore?

A We propose to flood these zones, upper zone and

lower-most zone Number 4 independently by injecting into them separately and flood the first zone and the second zone together. This necessitates a large number of injection wells and some dual injection wells in addition to some dual producing and injection wells.

Q Now, in connection with the application that was filed in this case, did you submit to the Commission schematic diagrams of the injection wells?

A Yes, we did.

Q Would you take those -- do you have copies of them available?

A Yes.

Q For the benefit of the Examiner, would you review the proposed completion on the individual wells? As I understand, they differ from one well to the next, is that correct?

A That's correct.

Q At the same time, would you also discuss the cementing program on the wells,--

A Yes.

Q -- the casing, and other pertinent information on the completion?

A Yes. There are three types of injection wells. We have single zone injection wells, in which the water, injection

water will go down tubing and be injected below a packer. We have dual zone injection wells in which one stream will go down tubing, the other down the casing tubing annulus into an upper zone. We have injection producing wells and these injection and producing well duals, the lower zone will be produced through the tubing; the upper zone will receive injection down the casing tubing annulus.

To take these one by one, the Shell Lynum A State No. 1 located in Unit B, Section 3, Township 20, Range 35, has one hundred seven feet of surface casing cemented to the surface. It has five and a half-inch production string set at 5,018 feet; however, this has been cut off at approximately 3900 feet, and we propose to repair the well by repairing the casing. After repairing the casing, we propose a cement top of approximately 3,000 feet.

MR. NUTTER: Where was it cut off?

A 3900 feet, approximately.

MR. NUTTER: How will you repair that?

A We hope to fasten a string of five and a half to the cutoff end.

MR. NUTTER: Have you re-entered the well yet?

A No, we haven't.

MR. NUTTER: Okay.

A Okay. Now, we have the Southern Union Saunders Federal Number 6 in Unit A, Section 8, Township 20, Range 35, which has eight and a half-inch surface casing set at two hundred fifteen feet, cement circulated to the surface and four and a half-inch production casing set at 4,080 feet with the top of the cement by temperature survey at 3380 feet. This will be a single injector, as was the first well.

Q (by Mr. Kellahin) How will the injection be in that well, through the tubing?

A In both these wells the injection will be through tubing below the packer.

Q What type of tubing are you using in these and the other wells?

A It's two inch; it will be plastic-coated.

Q Plastic-coated tubing?

A Yes. Southern Union Saunders Federal 8, also a single injector, has eight and a half-inch casing set at one hundred eighty-five feet with cement circulated to the surface, four and a half-inch casing set at 5,030 feet, with top of the cement by temperature survey at 3330. It also will be a single injector, as I said, with injection down the tubing below a packer. We have one well which we propose to drill as an injection well. It will be the

Tamarack South Pearl Queen Unit injection well to be drilled in Unit F, Section 9, Township 20, Range 35.

We would propose to set eight and five-eighths-inch casing at 200 feet and to cement to the surface and to set four and a half-inch casing at 5,090 feet and cement to approximately 3400 feet. It will be a dual injector with injection down the tubing below a packer into one zone and through the tubing casing annulus into perforations above the packer. The Tamarack Federal A Number 8 located in Unit D, Section 4, Township 20, Range 35, will be a dual injection well into the upper perforation and production to the lower perforations.

MR. NUTTER: Mr. Pinson, I think while we are on that well, I had been checking the location of these wells sometime back. I believe that this well is in Unit L. Let's check that out and make sure. It's in Section 4, Township 20, Range 35, 1650 from the south line, 990 from the west line. That would be in Unit L.

A You are absolutely correct, thank you, Unit L. Dual injection and producer injection into the upper perforation through the casing tubing annulus and production through tubing from the lower perforation. This well has eight and five-eighths-inch casing set at 210 feet, cemented

to the surface, and five and a half-inch production casing set at 5,042 feet with the top of the cement at 3,206 feet.

The Tamarack Federal Pearl Queen Number 1 will be a dual injector, as before, injection down tubing through lower perforation under a packer and injection in the tubing casing annulus into upper perforations. This well in Unit H, Section 24, it has eight and five-eighths-inch casing set at 202 feet, cemented to the surface with five and a half-inch production casing at 5,026 feet, with calculated cement top at 3760 feet.

The Tamarack Federal Pearl Queen Number 2, located in Unit G, Section 4, Township 20 South, Range 35 East, will be a dual injection and production well, injection into upper perforations through the tubing casing annulus and production through lower perforations, through tubing under a packer. It has eight and five-eighths-inch casing set at 200 feet with cement to the surface, four and a half-inch production casing at 5,033 feet, circulated cement top of 3,040.

The Tamarack Federal Number 6 will be a dual injector. It is located in Unit C, Section 4 --

MR. NUTTER: I think we have a correction on that one, too. It should be in K, I think.

A Okay, Unit K. This well has eight and five-eighths-inch casing set at 208 feet with cement to surface, five and a half-inch casing, production casing set at 5,015 feet with cement at 3,630 feet.

The Tamarack Western Federal C Number 1 located in Unit N, Section 3, Township 20, Range 35, will be a dual injector as before, injection upper perforation through the tubing casing annulus and below through tubing below a packer into the lower perforations. This well has eight and five-eighths-inch surface casing set at 217 feet, cement to surface with four and a half-inch casing at 5,040 feet, with cement, the top of the cement at 3,650 feet.

The Tamarack Lowe Number 1 will be a dual injection and producing well, injection into the upper perforation through the tubing casing annulus, production from the lower perforation through the tubing below the packer. It has eight and five-eighths-inch casing set at 91 feet with cement to the surface, five and a half-inch production casing set at 5,040 feet, with the top of cement at 3,340 feet.

Tamarack Lowe Number 2, located in Unit F, Section 3, Township 20, Range 35, will be a dual injector, injection into upper perforations through the casing tubing annulus into lower perforation through tubing below a packer. It

has an eight and five-eighths-inch casing set at 122 feet with cement to surface and four and a half-inch production casing set at 5,040 feet, with the top of the cement at 3,580 feet.

The Southern Union Saunders Federal Number 1 located in Unit B, Section 9, Township 20, Range 35, is a dual injection and production well with injection into the upper perforations through the casing tubing annulus, production from lower perforations through tubing below a packer annulus, eight and five-eighths-inch surface casing at 362 feet, cemented to the surface, four and a half-inch production casing set at 5,010 feet, with cement top circulated at 3,080 feet.

The South Union Saunders Federal Number 2 located in Unit A, Section 9, Township 20, Range 35, will be a dual injection well, injection into the upper perforation through the casing tubing annulus into the lower perforation through a tubing below a packer. This well has eight and five-eighths-inch casing set at 206 feet with cement to the surface, four and a half-inch casing set at 5,070 feet, calculated cement top of 3,600 feet.

Southern Union Saunders Federal Number 9, Unit C, Section 10, Township 20, Range 35, will be a dual injection

and production well, injection into upper perforations through a casing tubing annulus and production from lower perforations through tubing below a packer, and has eight and five-eighths-inch casing set at 209 feet with cement to surface and four and a half-inch production casing set at 5,041 feet, with a circulated cement top of 3,850 feet.

I think that covers our injection wells.

Q According to your exhibits, some of them show a calculated top on cement on the lower zones, is that correct?

A Yes, that's right.

Q In your opinion, is there sufficient cement behind the pipe in all of these wells to cover the injection zones that are contemplated in this application?

A Yes, there is.

Q So there is cement behind the pipe through the injection zones in each of these wells, is that correct?

A Right.

Q Is there any fresh water in this area?

A Yes, there is. My understanding is that the fresh water in this area consists of alluvial sands from about 35 feet to 135 feet. Ogallala is not present here, the Santa Rosa at about 1200 feet, but the Santa Rosa at this location is not potable and a rustler at about 1900 feet also not

potable.

Q In your opinion, is there any possibility of danger to any of these water zones as a result of the waterflood project of Tamarack Petroleum Company?

A No, there's no danger to any of the sources of potable water.

Q Do you have any idea what the injection pressures will be in these wells?

A Approximately twelve to fourteen hundred pounds surface pressure.

Q What is the source of your water?

A The source of our water will be the supply system which now supplies the East and West Pearl Queen units operated by Shell Oil Company.

Q What is the nature of the water?

A It's Ogallala and is fresh.

Q Then you will be injecting fresh water in both, as the case may be, either through tubing or through the casing tubing annulus or both?

A Correct.

Q Depending on the type of completion you are dealing with. What volumes of water do you anticipate will be injected?

A We've asked for five thousand barrels per day.

Q Do you think that will be sufficient water to operate the flood as you contemplate it?

A Yes, sir, this is commensurate with the experience in the East Pearl Queen unit.

Q The type of completion, as you have indicated, there's several different types of completion in the wells. Is this the same type of program as is carried on in the East Pearl Queen?

A In some ways it is. The East Pearl Queen is a pattern flood five spot. Ours will not be peripheral. The East Pearl uses dual injection wells. They have nineteen of them, I believe.

Q Are they injecting through the casing tubing annulus?

A No, they are not; they are injecting through two strings of tubing. It happens that a number of our proposed injection wells have four and a half-inch casing, which makes it impractical to have two strings of tubing.

Q What about the West Pearl Queen flood?

A To the best of my knowledge, it's similar in all ways to the East Pearl Queen.

Q They have dual injectors too but through tubing, is this correct?

A I don't have any specific knowledge as to whether

they have duals or not. I understand that theirs is essentially similar to the East Pearl Queen.

Q As I understand you, this is a peripheral type flood?

A Yes.

Q The other two are five spot?

A Right.

Q Will this type of flood give an efficient sweep of the producing reservoir?

A Yes, it will. The combination of the peripheral flood and our selection of injection wells and zones will provide us with a means to get the maximum sweep in all the zones.

Q You say you are going to use fresh Ogallala water to operate. Do you contemplate reinjecting produced water?

A Yes, we do.

Q Were Exhibits 4 through 8 prepared by you or under your supervision?

A Yes, sir, they were.

MR. KELLAHIN: I would like to offer in evidence Exhibits 4 through 8.

MR. NUTTER: Applicant's Exhibits 4 through 8 will be admitted in evidence.

(Whereupon, Applicant's Exhibits 4 through 8 were offered and admitted in evidence.)

Q (By Mr. Kellahin) Do you have anything to add to your testimony, Mr. Pinson?

A That's all.

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

CROSS EXAMINATION

BY MR. NUTTER:

Q When you were going through these wells individually, now, this Southern Union Saunders Number 6 and 8, the notation on the top of the sheet is "Dry and abandoned, no oil string run."

A Oh, yes.

Q Then when you filed these diagrammatic sketches, you said that four and a half-inch pipe would be set at 4,080 in the Number 6 and four and a half in the Number 8 to be set at 5,030. Then you gave us the top of the cement by temperature survey. I presume in the meantime you have run the pipe and cemented it?

A No, that was a mistake, I failed to note on this sheet. I had those which were calculated marked and those which have casing in them now, and this one, when I put our

proposed top of the cement, I failed to mark it as being proposed.

Q So this is still proposed?

A That's right.

Q But you will use adequate cement to come up to 3,330 in the Number 8 and 3,380 as you reported there on the Number 6?

A Yes, we certainly will.

Q I think we have a little problem here on a couple of other wells. Your Tamarack Lowe Number 1 and 2, the Number 2 has eight and five-eighths at 122 feet. The Number 1 has eight and five-eighths at 91 feet evidently?

A Yes.

Q Yet you reported that the fresh water is in the alluvian from the 35 down to the 135.

A Yes, what we plan to do in these wells is perforate the long string and circulate to the surface.

Q You will circulate to the surface in those?

A Yes, we will adequately protect the fresh water sands with cement.

Q In both of these you are going to be going down the annulus because --

A Yes.

Q -- because you have upper perforations that would be

flooded?

A Right.

Q And then you would have an interval across the fresh water sand that would not be protected by the surface pipe?

A Right.

Q What means will you have of checking your packer on these dual injection wells to be sure that you are not putting water down there on your producing formation where the producing formation is below the injection zone?

A Of course, there will be water going into the producing formation in the injection zone and, if we see fresh water in our production, we will have to determine whether it is time for response or water breakthrough or not.

Q Whether it is coming from another injection well somewhere?

A Right. When we see water appear in an unusual amount, it will be necessary to check the packer.

Q That's what I was asking, how will you check the packer to determine that this water is not leakage water?

A The thing to do would be to pull the packer and run it again. There's really no way, anyway, of checking it.

Q No pressure checks?

A No, not with holes on both sides.

Q When you have got open holes on both sides?

A Right.

Q Now, where will the location of the injection plant be, Mr. Pinson?

A The location of the injection plant hasn't been definitely set yet. The details of the system haven't been designed.

Q At the present time, are there individual tank batteries serving these various leases?

A Yes, I believe there are.

Q Do you propose a consolidated single tank battery for the unit?

A There has been no analysis of that, but if it were economical, I'm sure we would.

Q You will have one central plant for pressuring and distribution of the water, or do you buy it under pressure?

A No, we buy it at normal pressure and pressure it.

Q You will have a pressure plant?

A Right.

Q As produced water is encountered -- incidentally, how much water are the wells making now, any?

A Yes, they are making some. They're nominal amounts except for one of the wells offsetting the East Pearl Queen

unit in Section 3, which has had apparently water breakthrough from injection.

Q That's the Number 2 well that you mentioned had the response?

A I believe that is the one, yes. I will check and make sure it's the correct one. Well Number 2 actually is the one that is making a lot of water and had a breakthrough from the adjoining unit. The well which has shown the best response is the Lynum Number 1. It had its oil increase but without significant increase in the water at that time. As a matter of fact, the Lynum Number 1 was, in November of '67, pumping, did pump 1,650 barrels of oil and 900 barrels of water, while the Lynum Number 2 pumped only 314 barrels of oil and 6,300 barrels of water.

Actually, we plan to do some work on these wells. We think we have identified the zone in which the water has broken through in this particular well. We need to repair it so it will continue its response to the offsetting unit without undue water production.

Q Then as the water production does come up, you'll be reinjecting water that is produced?

A Yes, we plan to.

Q Will you make any distinction as to whether that

produced water goes down the annulus or is run down the tubing only in these dual injectors?

A Shell has found in their commingling of produced and fresh water that it needed no chemical treatment. We hope to inject this through one system.

Q So you would have one system then and you would make no distinction of this produced water going down tubing only and fresh water going down the annulus only?

A Right.

Q Now, on your production decline curve, Mr. Pinson, I don't know if this is germane to this Hearing or not, but I note there was a decided decline here in 1963 which was arrested in early '64 and production went up. The number of wells didn't change, however. Do you know what that would be attributed to?

A Yes, sir, this increase in production was due to the development of what we have marked on our type log as the upper sand. Prior to this time only the other three sands were producing.

Q So you went back into these wells and perforated that upper sand and that is the result?

A Yes, sir.

MR. NUTTER: Are there any other questions of Mr.

Pinson? He may be excused.

(Witness excused.)

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

MR. KELLAHIN: No, that completes our case.

MR. NUTTER: Does anyone have anything they wish to offer in Cases 3730 or 3731?

We'll take the cases under advisement.

* * *

I N D E X

E X H I B I T S

EXHIBIT	MARKED	OFFERED AND ADMITTED
Applicant's 1 thru 3-A	3	10
Applicant's 4 thru 8	3	30

STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

I, ADA DEARNLEY, Notary Public in and for the County of Bernalillo, State of New Mexico, do hereby certify that the foregoing and attached Transcript of Hearing before the New Mexico Oil Conservation Commission was reported by me; and that the same is a true and correct record of the said proceddings, to the best of my knowledge, skill and ability.

Witness my Hand and Seal this 9th day of March, 1968.

Notary Public

My Commission Expires:
June 19, 1971.

I do hereby certify that the foregoing is
a [illegible] record of the [illegible]
[illegible] 3730-31
[illegible] 2/28 68
, [illegible]
New Mexico Oil Conservation Commission