BEFORE THE
NEW MEXICO OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
June 16, 1971

EXAMINER HEARING

IN THE MATTER OF:

Application of BTA Oil Producers for expansion of a pressure maintenance project, Lea County, New Mexico.

Case No. 4555

BEFORE: DANIEL S. NUTTER, EXAMINER

TRANSCRIPT OF HEARING

MR. NUTTER: Call next Case Number 4555.

MR. HATCH: Case 4555. Application of BTA Oil Producers for expansion of a pressure maintenance project, Lea County, New Mexico.

MR. KELLAHIN: If the examiner please, Jason Kellahin, Kellahin & Fox, appearing for the applicants. We have one witness I would like to have sworn, please.

(Witness sworn)

MR. KELLAHIN: If the examiner please, the docket on this case, and I presume the advertising was listed to these wells, conversion of water injection, it is Bond Wells Number 2 and 3, and that should have been the Bond Well Number 2 and the Northcut Number 3.

The location of the wells, however, are correct, and I don't think it would require readvertising.

MR. NUTTER: I think as long as we have the location that solves the problem.

MR. KELLAHIN: It would change nothing in the matter of the application.

JERRY L. MORITZ

having been first duly sworn, testified upon his oath as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q Would you state your name please?

A My name is Jerry Moritz.

Q M-o-r-i-t-z; is that correct?

A Right.

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

A I am employed by BTA Oil Producers as secondary recovery engineer.

Q Have you testified before the Oil Conservation Commission as an engineer and made your qualifications a matter of record?

A Yes, I have.

MR. KELLAHIN: Are the witness' qualifications acceptable?

MR. NUTTER: Yes, they are.

Q (Mr. Kellahin continuing) Mr. Moritz, are you familiar with the application of BTA Oil Producers in Case 4555?

A Yes.

Q What is proposed by the application in this case?

A BTA is proposing and asking that they be allowed to expand their project known as the Vada Bond Pressure Maintenence Project.

We propose to expand it by the addition of three more injection wells into the Bough "C".

This project was approved by the Commission on February 8, 1971, under Order Number R-4098. BTA made the application at that time as a one well Bough "C"

project, and after continuous injection from that time to the present, we believe we have about accomplished all we can with one injection well.

And likewise, in the original order we proposed to use produced Bough "C" water. However, it is becoming apparent that we will not be able to continue use of this, so we are proposing in this application to use what is called the Bough "D", which we believe contains water.

Q Now, are you running out of produced water? Is that your problem?

A Yes. We are running out of water.

Q And you need a new water source?

A Yes.

Q Now, insofar as the order entered by the Commission is concerned, it had a provision for the addition of injection wells by administrative procedure.

Is it because of this change of the water supply that you need to have a hearing in this case?

A Yes. Essentially, the application or the approval in February did grant us permission to add additional injection wells by administrative approval, and like I pointed out before, we had planned to use surface water.

However, our investigations show that this amount of water available through produced water is not going to be sufficient to add three more additional injection

wells.

Q Is there any other reasonable available source of water in this area?

A There is other water available. It is in the form of produced water. There is on this Bough "C" water that is produced.

However, the quantity is very low, and would require considerable expenditure to get it, and as we have seen in this one well piloted, it declined so rapidly that we do not feel we can go after more.

There is Devonian water available, some, oh, ten miles to the southeast, but we are not quite prepared to make that big of an expenditure to go after that water at this time.

Q Now, referring to what has been marked as the applicant's Exhibit Number 1, would you identify that exhibit?

A Exhibit Number 1 is a land plat. Actually, this is just another copy of the exhibit presented in February.

It shows our approved project area in the dashes. The original injection well, which is BTA's 685 limited Bond Number 5, the original injection well is shown as a red triangle.

The three proposed additional injection wells are shown as yellow triangles.

Q Now, referring to what has been marked as Exhibit Number 2,

would you identify that exhibit?

A Exhibit Number 2 is a plat of injection volume in barrels of water per day versus time.

Likewise, on the curve is a plot of the cumulative water injected versus time.

The cumulative is the red circles. As you can see, we started injecting about February 9th, and we maintained the injection rate at about 1500 barrels of water a day for approximately two weeks there.

During this time we checked our equipment to make sure it was working, and the well was in a condition to where it can take the water.

After this two week period we pushed the injection rate on up to about 7000 barrels. You can see it held there for some two weeks, and then we had a rather drastic drop in the rate, and at this time we found that our system would not sustain a 7000 barrels, so we had reduced our salt water disposal system such that we could get on up to a higher rate, and you can see we subsequently went up to about 9000 barrels.

And sporadically we held that til about the 27th of April, at which time the rate dropped to slightly over 7000 barrels, and we have been able to maintain the rate there ever since.

Cumulative wise, we have injected 745,000 barrels of

water to June 4, 1971.

Q Now, what about your pressure, injection pressure, Mr. Moritz?

A I did not show injection pressures on here.

However, our injection pressures have been ranging from approximately eighteen to twenty inches of mercury vacuum.

Q In other words, you have no pressure taking on a vacuum, and it has continued to do so in spite of the high volume of water you are using.

A Yes. Periodically we do have a little pressure of ten pounds, but we have found this to be normally just scale and parafin plugging up perforations, and is easily removed with acid.

Q Now, referring to what has been marked as Exhibit Number 3, would you discuss that exhibit?

A Exhibit Number 3 is a plot of cumulative net reservoir voidage in thousands of barrels versus time.

As the first point here is shown, as the 1st of February, this is the amount of oil, water, and reservoir equivalents of gas that we had produced out of this area directly offsetting the Bond Number 5.

I might just point out the area that it does cover. It covers all of section four, the east half of section five, and the north half of section nine.

The reason I point this out, I have another curve that is very similar that covers a different area, but we felt that this was the area that Bond Number 5 might ultimately affect, so we present this plot as only a review of what we have done.

As you can see, our withdrawal rates, net reservoir withdrawal rates are greater or have been greater than our injection up to the month of April.

In April we did show a slight decrease in the net cumulative, and have shown it in May, and we are predicting that our injection will exceed our production in the month of June.

MR. NUTTER: Now, I don't understand this exhibit, Jerry.

THE WITNESS: Okay.

MR. NUTTER: Now, this is net voidage. In other words, what you are depicting here is the difference between the amount that is withdrawn and the amount that you are injecting?

THE WITNESS: Right.

MR. NUTTER: Each month?

THE WITNESS: Right, right.

MR. NUTTER: And the area that you are withdrawing from and figures into the net voidage would be the wells in the east half of five, all of four and the north half of nine?

THE WITNESS: Yes.

MR. NUTTER: So you are taking the total volume of withdrawals in that area?

THE WITNESS: Yes.

MR. NUTTER: And then subtracting from that the amount of injection --

THE WITNESS: Yes.

MR. NUTTER: -- into this well?

THE WITNESS: Yes.

MR. NUTTER: And then you are depicting your net voidage?

THE WITNESS: Right. Now, we did start at approximately 6,000,000 barrels. The point that we started at was 6,000,000 barrels. In other words --

MR. NUTTER: And as long as this is going up, you are not making any headway?

THE WITNESS: Right.

MR. NUTTER: But as soon as that curve starts coming down, you are getting ahead of withdrawal?

THE WITNESS: Yes. And of course, this is one point I would like to make with this curve here is the difficulty of a one well project attempting to overcome this tremendous withdrawal rate. It is almost impossible to do, even though we have maintained probably overall a 7000 barrel a day injection rate.

We have still not been able to do it.

MR. NUTTER: Have you ever determined what the maximum on this well would take as far as injection is concerned?

THE WITNESS: Yes.

MR. NUTTER: What the total --

THE WITNESS: It is approximately 11,000 barrels of water a day. This is on vacuum.

MR. NUTTER: But you never have put that much in it yet, have you?

THE WITNESS: No. We have not been able to do it.

MR. NUTTER: Haven't had the water?

THE WITNESS: Just haven't been able to get the water together long enough to sustain it, and now I would say it would be impossible on our part to tie in enough system to be able to do it.

MR. NUTTER: I see.

Q (Mr. Kellahin continuing) Now, does that indicate -- at the original hearing I believe there was some discussion of the possibility of channeling and other problems that might arise from the injection.

Does that indicate you have had that situation?

A No, it doesn't. We have not had any indication of channeling, direct communications or anything of this type.

Q And you have no indications of a directional permeability

in this reservoir, either, do you?

A No. We do not. We thought there was a possibility, and we, of course, at the original hearing discussed this possibility, but we have had no indication that there is.

I would like to make a comment that we had thought there was a possibility, a good possibility, that the Vug System fuel thing of it that way in this reservoir might fill up with water, and you would have an immediate breakthrough of water then.

This point in our predictions should have been reached at about 393,000 barrels. We, as you can see, were on up above this almost twice.

Now, we still have not seen water breakthrough, so we believe that we are filling something other than the Vug System.

Q Now, this exhibit does indicate, though, that it is necessary to inject additional amounts of water?

A Yes. Yes, very definitely.

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

A Exhibit Number 4 is a continuation of an exhibit presented in the February hearing, an update.

We have had three additional pressures shown here. They are actually shown as only two points, because we averaged them on a month's basis, but again, you can see

that the pressure has continued to go down, and we think this is a further indication that we are not effectively affecting the reservoir.

MR. NUTTER: Not getting enough injection?

THE WITNESS: Not enough fluids.

Q (Mr. Kellahin continuing) Now, referring to Exhibit Number 5, would you discuss that one?

A Exhibit Number 5, which is in two pages, is another plot from the February hearing. It is just barely brought up to date. This is the total project area performance curve.

Again, you can see that the production, oil production has continued to decline at a fairly rapid rate, and likewise, the water, now, it is somewhat curious that the gas is somewhat stabilized.

It is down from its peak, but it is stabilizing there on this point.

Q Now, referring to the group of exhibits numbered 6 through 18, would you discuss those, please?

A Exhibits 6 through 18 are individual lease plots that were developed. Exhibit Number 5 is a total of all of these exhibits, but these are individual lease plots, and they are just updated to show mainly that we have not affected the reservoir and not stimulated the production in any apparent way.

The first two, 7, 6, 7 and 8 -- excuse me, and 9, are the direct offset leases, and again, not any of them show any response to this injection.

The others are just of the other leases contained within the project area.

Q Maybe I am not looking at it right, but where is the lease identified on these exhibits?

A The leases are identified at the top.

Q I see.

A The BTA producers.

Q I see.

A The number of wells on the leases are also shown there.

Q Now, the exhibits numbered 2 through 10 in summary, then, are indicating that there is really no noticeable effect from this injection program; is that correct?

A Yes. That is correct.

Q And again, indicate that you need to increase your order injection if you are going to determine whether this is a practical program?

A Yes.

Q So you are still in a pilot stage; is that correct?

A Yes.

Q Now, referring to what has been marked as Exhibit 19, would you identify that exhibit?

A Exhibit 19 is another cumulative net reservoir voidage

plot versus time.

However, this is for what we are calling the expanded area. We have made this plot to show what we think would happen if we were granted the additional three injection wells.

Now, I might point out what areas this would include. This one includes all of the wells in section four, five, the north half of section nine, and you can see from here that this curve at its beginning is approximately 2,000,000 barrels greater than the previous curve that I presented, which I believe, is the Exhibit Number 3.

Likewise, you can see that the injection from Bond Number 5 only has not affected it until about May, and again, we are predicting that June will slightly exceed the withdrawal rates.

I have shown here as of July 1 the addition of the three new injection wells. We believe that if this hearing is granted relatively quick, that we can have this work done by July 1st. We are predicting that we will be able to inject 25,000 barrels of water per day for the four wells, and that is what this dashed curve represents, a decrease of the net voidage by 25,000 barrels.

Q Now, Mr. Moritz, you have proposed in this application to use water from the Bough "D" formation to inject into the Bough "C"? Is there any evidence in the area of this

project that the "BD" formation is productive in water?

A Yes. I made a study in approximately six-mile radius around our project area here to determine if the Bough "D" did have water, and if its permeability would be great enough to give us the kind of water we want.

Exhibit Number 20 is a tabulation of most of the DST's that I found in this six-mile radius.

As you can see, most of these wells on DST recover about 1600 to 7000 barrels of feed of water of a drill stem test.

Now, the Bough "D" kind of lost its identity in this area, so I included only tests that were at least fifty feet below, below the "B", "C", and not greater than 150 feet below the Bough "C", which we believe will cover the major portion of the Bough "D".

Q Now, your Exhibit 20 shows the tests on all these wells, is that correct?

A Yes. I might point out that most of the tests show that the reservoir pressure in the Bough "D" was 3500 to 3800. We confirmed this on one of our wells, the Bond Number 4, which we drilled in October of 1969 had 468.

We inadvertently drilled into the "BD" and tested it. It is shown as the second test, and we recovered 7510 feet of salt water.

We had no shows. We had a sixty-minute final shut-in

of 3547 pounds.

Q Is there any oil production or gas production from the Bough "D" in this area?

A I have examined the area, and I know of no well that has produced or is producing from the Bough "D".

Every indication we have is that it contains nothing but water.

MR. NUTTER: You have never seen a drill stem test, either, that shows any hydro-carbon?

THE WITNESS: No. No tests.

Q (Mr. Kellahin continuing) Now, referring to what has been marked as Exhibit Number 21, would you identify that exhibit?

A Exhibit number 21 is a schematic drawing of BTA Oil Producers 685 Limited Bond Number 4.

There is one of the wells that we propose to convert to injection.

Q And does that show the completion date you will use?

A Yes. It shows the completion that we are proposing to use, as I pointed out on this sketch on Exhibit 20 of the Bough "D" that we had tested the Bough "D" in this well, and we set pipe below the Bough "D".

We are proposing to go do this well first, since it would require only drilling out a cement plug, and perforating the Bough "D" interval and hooking up our

equipment as shown here, essentially, the equipment consists of just tubing on a Packer with some special equipment in the tubing perforations in the tubing to allow the water to flow free Bough "D" up through this special equipment into the perfs and out into the Bough "C".

Q The water won't come to the surface, then?

A No, it will not.

Q You have a later exhibit which shows this?

A Yes. I have a later exhibit which shows in detail this.

Q Now, referring to Exhibits 22 and 23, are those similar exhibits to 21?

A Yes. Exhibits 22 and 23 are again, the other two injection wells that we propose.

They differ slightly in that we will have to drill these two wells deeper to the Bough "D". We propose to run a four inch plus joint liner with a packoff-type hanger, and then set our Packer permanent Packer on tubing inside of this liner.

We'll have to perforate this Bough "D", but otherwise, it is essentially the same as Exhibit 21.

Q Now, does Exhibit Number 24 show the equipment that will be used for controlling the injection rate in these wells?

A Yes. Exhibit Number 24 is a blown up schematic of the down hole equipment to be run in all three wells with the exception of Bond Number 4.

Bond Number 4 will not have a liner set in it since its casing is already through the Bough "D", so I showed this well since it will be the most complicated one.

Again, it shows that we will be setting a four-inch plus joint liner through the Bough "D". We will tie into the five and a half inch production casing that we previously ran, and this liner will be packed off at the top where there will be no flow behind the liner.

We propose then to perforate the Bough "D" through its productive interval, and set a Model F permanent-type Packer inside this four-inch liner.

This Packer will have what is called a lock set seal assembly, which will lock in place.

However, it can be removed with special tools. On top of this seal assembly we plan to run what is called an on and off tool.

This tool will allow us to remove what is colored green on this. With the tubing, the other portion will remain in the hole.

We propose to set a wire-lined check back in the top of this on and off tool. This will prevent fluids flowing free, Bough "C" into the tubing, and back down into the Bough "D".

Q Now, will that control the flow of water? Can you regulate the flow of water from the one zone to the other?

A We could regulate it, yes. We are not proposing to regulate it.

Q Do you think it would be necessary?

A No. We do not think so. We have made an attempt to calculate what the rate of flow between the Bough "D" and the Bough "C" would be.

We have, of course, a very good information from drill stem tests in this area, and we believe that the flow rate between the Bough "D" and the Bough "C" will be about 6000 barrels of water a day.

Q Is there any method whereby you could calculate that flow?

A Yes. We have two methods that we would like to try. One, we are sure will work. That would be a means of going in there and making a spinner survey tool just below the perforated nipple shown here. There is a short space there.

Actually, it would probably be twenty or thirty feet long, and we can actually measure the volume of water going out into the Bough "C" at that time.

We believe that we have one other method that we can use. We feel that by knowing the size of the perforations in the nipple, perforated nipple there that we will be able to by running sonic logs down the casing annulus and determining how high this water is standing that we will be able to determine how much water is going into this zone.

Likewise, it will give us a virtually conscious record of what the bottom hole pressure is in the Bough "C", which we believe is going to get important.

Q Now, referring to Exhibits 25,26 and 27, would you discuss those exhibits?

A I do not have much to say about these exhibits. These are exhibits of the three well locations only three proposed injection wells.

They merely show the tops of the various formations encountered, and where we set pipe, and where we perforated each one of the wells.

Q Now, Mr. Moritz, you have had no positive results from your program up to date; is that correct?

A No. We have not.

Q But in spite of that, you still feel that the project is worthwhile, and you want to continue your project on an expanded basis?

A Yes. We feel that there is still unrecovered reserves down there. We still believe in our original prediction of how much oil we think the flood will recover, and are perfectly willing to go with this expansion and evaluate an attempt to evaluate this reservoir for floods.

Q Now, to summarize your testimony here, is it to the effect that the production in this area is continuing to decline, in your opinion, will decline to an uneconomic rate or

status unless additional water is injected in this formation?

A Yes.

Q And you feel that the injection will restore or at least hold the production at a steady rate for some period of time?

A Yes.

Q In your opinion, will correlative rights of the owners in this area be protected?

A Yes.

Q Including the overriding royalty owners?

A Yes.

Q Were Exhibits 1 through 27 prepared by you or under your supervision?

A Yes.

MR. KELLAHIN: At this time I would like to offer in evidence Exhibits 1 through 27 inclusive.

MR. NUTTER: Applicant's Exhibits 1 through 27 will be admitted in evidence.

Q (Mr. Kellahin continuing) Do you have anything else, Mr. Moritz?

A No.

MR. KELLAHIN: That completes the presentation of the case, Mr. Nutter.

MR. NUTTER: Off the record a minute.

(Whereupon, a discussion was held off the record)

CROSS EXAMINATION

BY MR. NUTTER:

Q Mr. Moritz, I think you have got a lot of exhibits here, and well-prepared case and everything.

However, I thought that you were going to come up with some kind of an instrument that down hole here that you could measure the flow from one reservoir into the other.

A Mr. Nutter, we have --

Q How are you going to be able to maintain records and determine your cumulative net voidage and so forth in the absence of accurate measurement?

A Well, Mr. Nutter, we have talked to several people, Sperry Son, one, in particular, that does manufacture a down hole meter, but to be able to measure these type of volumes, they have to have at least seven-inch casing, so these are the only people that we have been able to determine that measure a down hole -- that have a down hole meter.

Q Well, what about that Baker jewel flow thing that we have for injection into two zones?

A They can control the volume that goes through that, yes. We have taken a look at this, but the thing that seems to be on this type of application, those devices require only,

as I understand it, about 125 pounds to open them up, and you can only get so much through them.

In this case we would not know since we have a pretty good differential. We have predicted 3500 pounds in the Bough "D", and probably 900 pounds in the Bough "C".

We would most certainly have that much pressure, but we would not know whether we were putting in 6000 barrels through it or maybe 1000.

We would only know that we were not getting over 6000 barrels.

Q I thought that pool could be set so that you could control the amount that goes there.

A No. Only a maximum, as I understand it, and in this application, it would only be set for a maximum volume, and we would not know whether we were going at the -- like I say, 1000, 2000 or somewhere up to 6000.

This is why we plan to try using these spinner surveys to get a handle on what volume we are injecting, and I think they are very accurate.

Q Well, now, will water also be coming down the tubing here?

A No, no.

Q Total footing would be from down below?

A Yes. That's right.

Q Now, the tubing will be present, though?

A Yes. The tubing will be present, yes.

Q Now, isn't it feasible, then, to run a continuous spinner deal down through here?

A Yes. Except for they won't survey for eight hours, run about four or five hundred dollars.

Q You can't play the spinner tool and install it permanently in the tubing? In other words, to use it as a meter?

A I'm sure you could, but, see, this is what you would call a logging system. It is a hole service provided, and they come out, you know, with a big logging truck and a multi-conductor cable.

Q There is no simple spinner survey tool that can be run on a wire line down in here and left in place?

A No, there sure isn't. We thought of that, and, of course, our first desire would have been to have a meter. What they call knocking meters. They send out a pulse, and the time between the pulse determines how much you are injecting, but they can't get them in these wells.

Q Now, that is the one that you mentioned first?

A Yes, right.

Q The down hole meter?

A They can't get them in this casing. They have to --

Q Seven --

A Seven minimum, seven minumum for 6000 barrels of water per day, but we believe that through correlation of these spinner surveys with our pressure sonics down the casing,

that we will be able to determine what rates were reasonably accurate.

As you may not know, we drill stem tested every one of our wells, so we have a very good handle on what kind of permeability we have in all of our wells, and we believe that with this data we are going to be able to do it.

Q Well, it should be theoretically possible to calculate it?

A Yes.

Q But if it is not accurate, it would turn out, it would be questionable?

A Well, this is what we plan to use, the spinner survey for periodically to check our calculations.

Q How much did you say it cost to run a spinner survey?

A Right at five hundred dollars four, I think, they allow you eight hours on their time is what they say.

So continuous basis would be rather expensive.

Q If the Commission should require a spinner survey to be taken at some interval, what would be a reasonable interval to confirm your calculations or to get a new factor to base your calculations on?

A I would say that it would depend on two things. There is only two things going to affect this.

One is going to be how rapidly the Bough "C" pressure builds up.

Q Right.

A And the other will be how rapidly the Bough "D's" pressure declines. From our study so far we don't see that the Bough "D" is going to decline much because of aerial extents of it.

We have had cases that the BC is not going to build up very much. Obviously, we haven't seen it yet, but so I would say possibly quarterly would be appropriate.

Q Would that impose any kind of an undue hardship or quarterly test on this?

A I don't think so, because I think we would probably do it anyway.

Q I see.

A We are sufficiently concerned or worried about the floodability of this that we have been making almost all efforts that we can to determine what is going on.

MR. NUTTER: Are there any further questions of the witness?

MR. LE MAY: Mr. Examiner, may I ask a question as an individual? William J. Le May, consulting geologist in the area, project area, as well as representative of Charles B. Reed and Norman L. Stevens, likewise royalty owners in this area as individuals.

MR. NUTTER: But you are representing yourself?

MR. LE MAY: Myself and also Mr. Stevens and Mr. Reed.

They asked me to attend.

CROSS EXAMINATION

BY MR. LE MAY:

Q Two questions, Jerry. One is you mentioned the 6000 barrels a day. Is that referring to one project well?

A Yes.

Q The flow between the "D" and the"C"?

A Yes. Our calculations show 6000 barrels on each individual well. Now, this varies a little, depending on what the permeability is.

Q I see.

A Between the permeability ratio, between the two zones is what it depends on.

Q Also your cumulative net voidage, you started out with a figure -- figuring everything that was produced from that well to that point, and then you carried that figure of voidage, whether injection increased is over production?

A Oh, which exhibit are you referring to?

Q Well, on both of them, Jerry, on Exhibits Number --

MR. NUTTER: 3 and 19.

Q (Mr. Le May continuing) -- 3 and your projected one.

MR. NUTTER: 19.

MR. LE MAY: 19, yes.

Q (Mr. Le May continuing) You started out with a figure of 8000 or 8,000,000 barrels of voidage, so that figure, what

you are starting at is really the amount of fluids that were taken out of the indicated area at that point, right?

A Right. At February 1st.

Q At February 1st? So you have some cumulative production that starts your chart, and then the variations from the horizontal indicate either injection over production or production over injection?

A Right. Right. Yes. We have calculated this calculation or this chart --

Q Yes.

A -- is conducted and calculated on a monthly basis. We know how much water we injected, naturally, on the Bond Number 5.

We have an individual service meter, so we know how much we inject each day, and at the end of the month we know how much oil, water and gas we produced out of that appropriate area.

Q Yes.

A And by converting this back to reservoir barrels and converting the injected water back to reservoir barrels, we merely subtract them, and either add or subtract off.

Q The horizontal would mean you are keeping even with production?

A Right.

Q And what you want to do is repressure the formation?

A Right.

Q But since the project began and you have this horizontal roughly on Exhibit Number 3, you are just keeping base with production, just about?

A Yes. Essentially it works out during this period here at about 40,000 barrels a month was all we was adding.

Q Right.

A Net was all we were adding.

Q Net over the whole test period day?

A Right.

Q And yet your decline curve kept indicating that nothing is being put in the reservoir. Where is it going?

A Right.

Q Any ideas on that or --

A Not really. The thing that we think is significant from this is that we did not communicate through the Vug System.

Q To this subsidy?

A Yes. Right.

Q Because I talked with Buddy on the thing, and he figures you are going to inject the water and never see it again and never see the response, so his theory was discussed at some length, and if his theory was correct, you would be injecting and never see the water, then, never see your response, and, of course, I admire --

A We don't believe this.

Q Well, I hope you are right, naturally.

A We believe that we will see it. We hope -- fully hope that we will see a big bank of oil, but it is not uncommon or out of the realm of possibility that we will have nothing but water.

Q Yes.

A Now, this is the reason I mentioned that this sonic shooting down the casing is so important. We do not believe that we want to get back above the original bubble points. We believe --

Q What is the bubble point on it again?

A About 1800 is what we think, and we believe that if we get back past this point we definitely will have an unsuccessful flood, so --

Q Well, then, you actually agree with some Tenneco engineers which you have talked to which indicate that anything over 1800 points you are going to produce may be all water and that 18,000 pounds you will start to feel the effect of oil and gas begin to go down breaking through to the well bore?

A Yes.

Q So you intend to maintain your pressure somewhere between 1300 and 1800 when your pilot is far enough along and then your projects are far enough along to maintain this

equilibrium?

A Yes. I wish we had more encouraging results, but our results -- the only encouraging results we have had is that we have not had some of the things that people told us was going to happen.

Q Just one other outside possibility. Just -- not even a possibility, but there were some cases when a liaison was drilled where they thought there may be some BD oil. Now, this is outside of your project area? In the event the Bough "D" reservoir acted similar to the Bough "C" where you might be producing a hundred percent water for four or five months and then you started to get some oil, do you have any monitoring way of monitoring the fluid, going into the "C" to see if it might change? You know, the "C" has had that characteristic where you produce a hundred percent water and all of a sudden you start getting some oil.

A Well, to answer your question, I don't think we would have any direct way to monitor.

Now, we could, since we have got tubing in this wall swab, at any time we wanted to, but what you are talking about an I in my study here went into the completions and the Bough "C", and in the liaison, and I did not find cases where the Bough "D" gave up any shows.

Q So you coupled their minor --

A I was unable to find them, and I was interested in this part of it, because I wanted to know, but I didn't find them.

Q Well, it is mainly water reservoir, but I just thought it is a freak possibility, but, you know, it is an outside one.

MR. LE MAY: That's all the questions I have.

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

(Witness excused)

MR. NUTTER: Have you already offered these?

MR. KELLAHIN: Yes.

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

MR. KELLAHIN: That's all, Mr. Nutter.

MR. NUTTER: Does anyone have anything they wish to offer in Case Number 4555?

MR. HATCH: The Commission has received letters from Tenneco Oil Company and from Roger C. Hanks supporting the applicants in this case.

MR. NUTTER: Did they arrive in time?

MR. HATCH: We will pretend they did.

MR. LE MAY: I have a statement. William J. Le May, Le May Stevens & Reed, again, as royalty owners support the applicant's request in this case.

MR. KELLAHIN: Thank you.

MR. NUTTER: If there is nothing further, we will take Case Number 4555 under advisement.

I N D E X

STATE OF NEW MEXICO)
)
COUNTY OF BERNALILLO)

I, LINDA MALONE, 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 that the same is a true and correct record of the said proceedings, to the best of my knowledge, skill and ability.

Linda Malone
Court Reporter

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 4553 heard by me on 6/16, 1971.

Examiner
New Mexico Oil Conservation Commission