STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

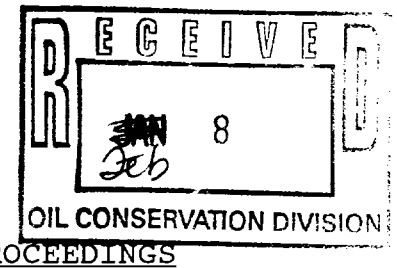
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 11,201

APPLICATION OF DALEN RESOURCES OIL AND GAS COMPANY

ORIGINAL



REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: DAVID R. CATANACH, Hearing Examiner

February 2nd, 1995

Santa Fe, New Mexico

This matter came on for hearing before the Oil Conservation Division on Thursday, February 2nd, 1995, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, Santa Fe, New Mexico, before Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

* * *

I N D E X

February 2nd, 1995
Examiner Hearing
CASE NO. 11,201

* * *

E X H I B I T S

	Identified	Admitted
Exhibit 1	8	17
Exhibit 2	14	17
Exhibit 3	16	17
Exhibit 4	27	33
Exhibit 5	28	33
Exhibit 6	24	25

* * *

A P P E A R A N C E S

FOR THE DIVISION:

RAND L. CARROLL
Attorney at Law
Legal Counsel to the Division
State Land Office Building
Santa Fe, New Mexico 87504

FOR THE APPLICANT:

KELLAHIN & KELLAHIN
117 N. Guadalupe
P.O. Box 2265
Santa Fe, New Mexico 87504-2265
By: W. THOMAS KELLAHIN

* * *

WHEREUPON, the following proceedings were had at 8:17 a.m.:

EXAMINER CATANACH: At this time we'll call Case 11,201.

MR. CARROLL: Application of Dalen Resources Oil and Gas Company for pool creation, the promulgation of special pool rules, and for the assignment of a special depth bracket oil allowable, Lea County, New Mexico.

EXAMINER CATANACH: Are there appearances in this case?

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin and Kellahin, appearing on behalf of the Applicant, and I have three witnesses to be sworn.

EXAMINER CATANACH: Any additional appearances?

Will the witnesses please stand and be sworn in?

(Thereupon, the witnesses were sworn.)

MR. KELLAHIN: Mr. Examiner, we're appearing before you today to provide technical evidence to support our Application, which requests the creation of a new Strawn oil pool. We have a discovery well.

The major issue for you is whether or not you agree with our technical witnesses that temporary rules on 80-acre oil spacing are appropriate. It will be their testimony that it is.

You will see evidence from a petroleum geologist and a reservoir engineer in which they have calculated that the initial drainage area for the discovery well is in excess of 80-acres, so that's the principal reason we're here.

In addition, we would like the following special rules established on a temporary basis for the pool: That there would be only one well in an 80-acre spacing unit and that a well location, to be standard, would be drilled within 150 feet of the center of either 40-acre tract.

We believe that the establishment of the depth bracket allowable is appropriate for the pool. My recollection is, that's 400 barrels of oil a day on the depth bracket and that the standard statewide gas-oil ratio of 2000 to 1 is appropriate. This is a solution gas drive reservoir, and this is the discovery well.

My first witness is Dalen's geologic witness who has reached certain geologic conclusions about the reservoir, and we will call him first.

DAVID A. SCOLMAN,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. For the record, sir, would you please state your

name and occupation?

A. My name is David Scolman, and I'm a geophysicist for Dalen Resources.

Q. Mr. Scolman, for the benefit of the reporter would you spell your last name?

A. S-c-o-l-m-a-n.

Q. You'll have to speak up. There are no amplifications in the room. The microphones are simply for the court reporter's aid, so speak up so we can hear you.

A. Okay.

Q. On prior occasions, Mr. Scolman, have you testified before this agency?

A. I have not.

Q. Summarize for us your education.

A. I have a bachelor's degree in geophysical engineering from the Colorado School of Mines.

Q. In what year did you obtain that?

A. 1982.

Q. Summarize for us your employment experience as a professional geologist or geophysicist.

A. I was employed beginning in June of 1982 as a petroleum geophysicist with Superior Oil Company, Mobil Oil Company, Corpus Christi Oil and Gas, and PG&E Resources, which is now Dalen.

Q. Where are you currently assigned? Where do you

reside?

A. I'm in Dallas, Texas.

Q. And the area of your responsibility, is it such that it would include that portion of Lea County, New Mexico, that's the subject of this Application?

A. It is.

Q. Summarize for us the particular play that's involved here in this case.

A. We have a Pennsylvanian reef play composed of mud mounds that are growing on structural positive features in this portion of the Tatum basin.

Q. All right. You're here before the Examiner to establish what, sir?

A. We are here to establish the geological/ geophysical model that controls the development and placement of these reservoirs.

Q. Have you examined the available geologic information upon which you could then reach geologic conclusions?

A. Yes, I have.

Q. And based upon that work, do you now have certain geologic opinions about spacing for this pool?

A. I do.

MR. KELLAHIN: We tender this witness as an expert.

EXAMINER CATANACH: He is so qualified.

Q. (By Mr. Kellahin) Let me have you turn to what is marked as Exhibit 1. It's a montage of several geologic displays. If you'll take a moment and simply identify for the Examiner what he's looking at.

A. Very good. What we have is a structure contour map of the area that the discovery well is in. It is in the general area of the Lovington-Strawn trend.

Noted on this map is the Lovington arch, which is a large structural positive that runs through this area.

We have then also sketched in what we believe to be the updip limit of the Strawn mounds. That was mostly controlled at time of deposition by sea level.

We have outlined our discovery area, which also has an isopach of the net reef facies within that area.

To the north we have outlined an analogy field that resides in roughly the same structural position that we will use for comparison. An isopach map is there that also has the reef facies isopach.

And we have noted the initial potential of the wells in red, the cumulative total production from the wells in green.

Q. Mr. Scolman if you'll take the part of the display that enlarges the isopach map in the right lower side of the display and specifically locate by footage the

discovery well.

A. It is located in section 20 at 1980 feet from the north line, 1980 feet from the east line.

Q. It's identified by your company as the Shipp Number 1-20 well?

A. That is correct.

Q. What is your preference for an orientation of the 80 acres within the section to be dedicated to the well?

A. We would have the preference of allocating the south half of the northeast quarter.

Q. When we look at this portion of the display, there are two lines that appear to me as a layman to be seismic lines.

A. That is correct.

Q. Describe those for us and why they're of significance to you in looking at this portion of the map.

A. They are seismic lines, one of which, the line I-5, is commercially available. The other is a proprietary line shot in 1988 by British Petroleum. We have inherited that data through their Texcon affiliate. Those lines were used to geophysically delineate the prospect and provided the basis for the original drill location.

Q. What's your geologic opinion about the appropriate temporary spacing to be initially applied for this well and any other well in the pool?

A. We have no evidence to indicate that the 80-acre spacing would not be appropriate.

Q. Okay. Describe for us some of the data with regards to the discovery well. When was it drilled and with what results?

A. The discovery well was drilled -- Let's see, would you like to go to the cross-section for that?

Q. Just summarize for me. This is a recent well?

A. Recent well.

Q. Within the last few months?

A. Within the last few months.

Q. And what type of results did you achieve?

A. We -- As we drilled through the Strawn pay section, we had a significant mud log show. We ran a drill stem test that indicated a potential reservoir. We set casing, perforated it, tested it and are currently producing the well.

Q. You have tied this well into two other wells on cross-sections that we'll look at shortly, at least the B-B' cross-section. Why did you do that?

A. Well, we believe from the map that since we are near the updip limit of the Strawn mounds, that there is a position updip that would be out of the range of the reefs.

To indicate that geologically, we have shown -- we've taken wells both in the area of the field and in the

area of the analogy field and have shown how the reef changes as we move from the updip limit into the productive areas of the Strawn play.

Q. Let's have you do that. Take your interpretation of the Strawn mound for your pool and make the comparisons to the analogy in the Northeast Lovington Pool, which is also shown north on this same display.

A. Okay. We've noted in our well, in our cross section, we start at the BHP Kimbrough well, which we believe to be too far updip to have entered into the reservoir, but it does have traces of the reef facies.

We then come down through our well, which we believe to be a marginal well that has tagged the edge of the reservoir, and that the reservoir will continue and increase in economic and geologic goodness as we move to the northeast.

The Amerind well at the far end of the cross-section also is nonproductive, but does have some indication of reef, indicating that it could be an edge well to this reservoir.

As we move up to the analogy field, the first well on the cross-section, the Montieth, again, is a well that tagged what we believe to be the edge of the reservoir. It did have production.

We move one location away and we move into the

significant reef facies and into a very economic well.

We move through the reef, moving off to the northeast, and then finally get into a dry hole which, again, though uneconomic, did have reef facies in the log.

So that both cross-sections represent coming from the updip limit through the best reef facies and then heading into a downdip limit to the extent of the reef.

Q. Do you have a geologic opinion about whether your discovery well, the Shipp 1-20, is in fact a true discovery of a new pool?

A. We do believe so. Our knowledge of this field in this area would indicate that we have no -- effectively no marginal wells surrounded by dry holes.

In each case where a marginal well exists within one location, you enter into a more significant reef, so that marginal wells indicate the proximity of reef facies and of an economic field.

Q. Characterize for us the geology of this Strawn mound reservoir.

A. You'll notice the updip limit of the Strawn mounds has several re-entrants in it, and at those points of the re-entrants you'll notice on the structure map that there is a structural positive that comes out from those re-entrants.

This map is drawn on the top of the Strawn, and

we believe that structural high represents the thickening of the Strawn in the reef facies.

And what's happening within the grottos or within these re-entrants, they're forming nice embayments for the reefs to grow. So we notice that analogy field has a nice re-entrant, a nice structural high.

As we come down to our new discovery, we notice the re-entrant in the structural high that propagates to the northeast from there. The mounds are growing on structural positives that will form a -- give sea level circulation to allow these reefs to grow.

Q. The Division in the past has established a number of Strawn oil pools, many of them on 80-acre spacing. Where are they in relation to your proposed pool?

A. Well, we've chosen the analogy field, since it is on 80s, as the most direct comparison.

Q. Where would we go to find the Shipp-Strawn and the Casey-Strawn and those other Strawn pools?

A. They would be directly north of our proposed -- of our discovery, in the area, roughly, where the isopach for the analogy field is, within that area. So directly east of the analogy and then to the southeast of the analogy.

Q. Let's go to your cross-section that sets up the vertical display of the reservoir, and see what you

concluded. If you'll take a moment and unfold your copy then we can talk about it.

First of all, Mr. Scolman, describe for me why you've chosen these three wells.

A. These three wells are the closest -- The two wells at the outset and our well form the only wells within a reasonable radius of our area for study. They also have indications of reef in them so that we believe that they are all within one reef, showing indication of one reef area.

Q. Upon what point are these three logs hung or correlated?

A. This is a structural cross-section, datum'd at 7000 feet below sea level.

Q. What is your datum marker that you have found that allows you to establish structure? Is there an identifiable portion of some signature on the log that tells you you are at a certain point --

A. Yes.

Q. -- in one of these reservoirs?

A. Yes, we have several markers.

The topmost marker is a shale hot streak, within the gamma ray, that we have called out Canyon marker.

We also have top of the limestone out here, which is the top of the Strawn.

We have a strawn mudstone, tight micritic mudstone, that we use as a marker to mark the base of the reef, and then a set of siliciclastics, which we've labeled as the Strawn clastics, that underlie the entire limestone complex.

Q. How difficult is it for experienced geologists to come to an agreement about these marker points?

A. These are fairly straightforward markers.

Q. Having established the cross-section, what does it show you that's of significance?

A. What we see here, starting with the BHP well, we believe this is a well that was too far updip, too far towards the shoreline, to have had significant or economic reef development. But we do see the distal end of what we believe is a reef.

As we move into the Dalen, the Shipp 1-20, we notice that this has thickened significantly, that the reef facies also is developing nice porosity. We DST'd that porosity and had excellent evidence of hydrocarbons.

As we move out finally towards the Amerind well to the northeast, again, we see that the reef facies is thickening some, but there is some porosity development, indicating that the reef is present there.

Q. In examining the geology for the Northeast Lovington-Strawn Pool, let's go to that cross-section, and

then have you make the comparison for us.

If you'll take a moment and unfold Exhibit Number 3, then we can talk about that cross-section.

Again, describe for us why you've chosen these wells for this cross-section.

A. Structurally, they represent the same point, as far as environment of deposition, that both these fields are up near the very updip limit of the Strawn reef play.

We start with the southwest, the Montieth. We've got the same markers, the Canyon, the reef facies, the mudstone and the clastics, and we see a well with a thin section of reef that blossoms nicely into the Nearburg well where the significant reef is developed.

We proceed through the reef and we see a second economic well, finally moving out to the Cities well which, though uneconomic, still has the last remnants of reef facies in it and a slight bit of porosity.

So we believe this to be a reasonable type section of what we're seeing down at the Shipp 1-20.

Q. On the cross-section for the Northeast Lovington Pool, which well on that cross-section is the comparable -- or equivalent, if you will -- of your discovery well?

A. We believe it's most comparable to the first well, the Montieth State.

However, based on the DST analysis, we believe

that our well is closer to the reef facies than the Montieth well is.

Q. Summarize for us your geologic conclusions.

A. What we see here, we have an environment of deposition of reefs growing in shallow water that are structurally controlled. They do have an updip limit that would be represented by something analogous to a beach.

That where these reefs grow they're in good continuity, that a marginal well in every case out here is indicative of a reef in close proximity, and that we believe our well has tagged into one of these reef features.

Q. Do you see any currently available geologic information to preclude the development in an appropriate fashion of this reservoir on 80-acre spacing?

A. I do not.

Q. Do you recommend to the Examiner that he adopt 80-acre spacing on a temporary basis for this pool?

A. I do.

MR. KELLAHIN: That concludes my examination of Mr. Scolman, Mr. Examiner.

We move the introduction of his Exhibits 1, 2 and 3.

EXAMINER CATANACH: Exhibits 1, 2 and 3 will be admitted into evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Scolman, Has that updip limit of Strawn mounds been generally defined by development?

A. It has.

Q. Down in the area where you're drilling, how did you define that line down there?

A. We used the Kimbrough well. We also have -- In our own analysis, we carefully isopach out everything that we feel are important facies, and we watch for the thinning. We've calibrated the seismic data to get a sense of how that relates to the hard numbers from the well control.

Q. Does this entire mound that you've mapped -- Is it in communication?

A. We believe so.

Q. What would be the closest Strawn production to your Shipp 1-20?

A. There is a set of wells to the northeast, up in Section 10, in the southeast quarter of Section 10. There are also productive wells in Section 8 and in the north half of Section 9.

Q. Do you know what pool those wells would be in?

A. I do not.

Q. Mr. Scolman, do you know if the Division -- or

generally speaking, in this area, there are some Strawn pools that do contain more than one mound, producing algal mound?

A. There's been some controversy that as you get into these, because the porosity begins to move around in the overall reef section, that you may be dealing with some form of stacked reefs or reefs that are of different ages that have been put -- have become in communication through some sort of diagenesis or some sort of porosity development.

From the model that we have in this area, we believe the Strawn reefs are growing virtually at the same time, so that when you see a reef complex, for all intents and purposes that represents one colony.

Q. There may be -- Within any given Strawn pool, there may be several reef mounds; is that right?

A. Probably the only way to be able to tell that would be if you had significant actual dry holes or if you had pressure information that could delineate that, take it into the reservoir engineering realm.

Geologically, we've seen that these reefs are generally isolated on structures and can have fair continuity along the structures.

There are some relatively high-frequency tectonics that give you lows out here. Those lows tend to

end the reef development.

And the size of the underlying structure, then, generally determines the size of the overall field.

Q. Well, what evidence do you have to show that your particular mound is not connected to anything in the north or northwest?

A. As far as north or northwest -- Any of the existing production to the north?

Q. Right.

A. Or any of the existing production over to the northeast?

Q. Well, I -- Yeah, go ahead and answer that.

A. We have quite a bit of seismic in the area and have delineated what we would consider structure maps that allow us to predict the structural features that have seeded these reefs, and we believe that between the pools, between those pools to the north and pools to the northeast, that there are significant lows in which the reef could not purge, could not cross, to link up with those fields.

Q. So you have -- So you're satisfied that the data you have indicates that your pool is isolated from any other Strawn production in this area?

A. That's correct. The reefs tend to give a good seismic anomaly, and we've got enough seismic data to see

that those seismic anomalies do not exist -- do not continue, in our opinions, up into the other currently developed fields.

Q. Mr. Scolman, have you looked at the geologic properties of the producing formation and compared them to any of the other Strawn fields in this area?

A. Yes, we have. From our well, that would have been based on cuttings. We did not pull any hole core or any sidewall core, but we have looked at core through the field where it's been available and have looked through cuttings.

Q. How does that compare to other Strawn pools in this area?

A. It appears to be the same reef-building organism. These are a phylloid algal mudstone, that the algae acted as a mud baffle. The grasses as such that the algae grew on the structural positives were fed by currents, baffled out mud. That mud later weathered or went through a diagenetic history, then became extremely porous.

Q. Have you compared porosity and permeability in your well?

A. We can look at porosity. Permeability data would be -- you would really need to get some form of hole core for that.

We can infer -- From a reservoir engineering

standpoint, we can infer what we can from the DST information.

From a geologic standpoint, we've looked at the interval of cuttings where the porosity shows up on the logs, and we believe that it is the same type of reef organism that has produced the majority of the Strawn mounds in this area.

Q. So the porosity compares favorably to the other Strawn pools in this area?

A. Both in magnitude and in reason of origin.

EXAMINER CATANACH: I think that's all I have of the witness.

MR. KELLAHIN: All right, sir.

Mr. Examiner, in response to your question about the identify of the pools to the north and northeast, my research leads me to believe that the pool that's to the northeast, approximately two miles away, is the Humble City-Strawn Pool and that the other pool that's north of the discovery is identified by the Division as the Midway-Strawn Pool.

EXAMINER CATANACH: Okay, thank you, Mr. Kellahin.

MR. KELLAHIN: We call at this time Mr. Jerry Anderson.

Just leave the displays there.

JERRY ANDERSON,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Anderson, for the record would you please state your name and occupation?

A. Jerry Anderson. I'm the district landman for Dalen Resources Oil and Gas.

Q. And where do you reside, sir?

A. I reside in Plano, Texas.

Q. On prior occasions have you qualified before this agency as an expert petroleum landman?

A. Yes, I have.

Q. Are you knowledgeable about the operators within one mile of the discovery well?

A. Yes, I am.

Q. And how have you determined that, sir?

A. I had ownership reports prepared by Orion Oil and Gas out of Amarillo and Mckin and McKin out of Midland, Texas.

Q. Are these contract companies with which you have done business in the past and for which you have confidence in their accuracy and reliability?

A. Yes, I do, and yes, I have used them in the past.

MR. KELLAHIN: We tender Mr. Anderson as an expert petroleum landman.

EXAMINER CATANACH: He is so qualified.

Q. (By Mr. Kellahin) Mr. Anderson, let me ask you -- I have taken an exhibit out of order; it's before you as Exhibit Number 6. It is the notification list that we use for purposes of notifying operators within this particular area that might have any comments, concerns or objections to approval of this Application.

Would you look through that, sir, and tell me if we have in fact notified all the appropriate parties that may have an interest?

A. Yes, we have.

Q. All right. If you'll look at the discovery well, give us a general sense of where these other parties have their interests.

A. BTA holds the offsetting interest to the north, the east, I have acreage under control to the south, and Pennzoil is over on the west side. I have Maralo on the north side and Devon as a small tract over on the east side.

Q. Does that pick up all the operators or, in the absence of an operator, the unleased mineral owner within a mile of the discovery?

A. Yes, it does.

Q. Have you received any objection from any of those parties?

A. No.

MR. KELLAHIN: That concludes my examination of Mr. Anderson.

We'll move out of order Exhibit Number 6.

EXAMINER CATANACH: Exhibit Number 6 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Anderson, what acreage does Dalen hold in this area, in particular, Section 28 -- or 20, I'm sorry?

A. We have the north half and the southeast quarter.

Q. You said the north half of the southeast?

A. North half and the southeast.

Q. North half and the southeast, okay.

These operators you've notified, they represent all the leasehold owners within a mile of the pool boundary?

A. Yes, they do.

EXAMINER CATANACH: Okay. I don't have anything further of this witness.

MR. KELLAHIN: All right, sir.

Mr. Examiner, I call at this time Mr. George Vaughn. Mr. Vaughn is a reservoir engineer.

GEORGE L. VAUGHN,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Vaughn, for the record, sir, would you please state your name and occupation?

A. George Vaughn, reservoir engineer.

Q. Mr. Vaughn, on prior occasions have you testified as a reservoir engineer before the Oil Conservation Division?

A. I have.

Q. And where do you reside?

A. Carrollton, Texas.

Q. As part of your reservoir engineering duties for your company, have you studied the reservoir engineering aspects of this discovery well?

A. Yes, I have.

Q. And based upon that work, do you now have reservoir engineering conclusions about drainage areas?

A. I do.

MR. KELLAHIN: We tender Mr. Vaughn as an expert reservoir engineer.

EXAMINER CATANACH: He is so qualified.

Q. (By Mr. Kellahin) Let me have you turn to what

we've identified as Exhibit Number 4, and that's your one-page drainage area calculation summary. Do you have that in front of you, sir?

A. Yes, I do.

Q. All right. Based upon our calculations, what have you concluded to be the potential drainage area for the discovery well?

A. I conclude that it will drain 96.4 acres.

Q. Identify for the Examiner the method that you applied as a reservoir engineer to reach that conclusion.

A. What I have done here is taken the initial month's production which, as you can see on the exhibit, was about 2600 barrels, and based on what I perceive to be a rather general decline rate for wells that have produced initially at rates of around 100 barrels a day in the Strawn, concluded that a reasonable decline rate is 30 percent per year, exponentially.

In order to substantiate that, I searched through nearby wells in the area, specifically in the northeast Lovington field, and found what I believe to be a very good analogy to what I believe to be the situation at our Shipp 20-1.

Q. Do you have a production decline curve for that analogy well that we might look at?

A. Yes, I do.

Q. And that's Exhibit Number 5, is it?

A. That's correct.

Q. If you'll turn to that, tell us where that well is, and then we'll talk about the curve.

A. That is the Amerind State 21 well, located in Section 21, Township 16 South, Range 37 East, in the E location in the northeast Lovington field. It produces out of the Strawn from perforations 11,347 feet to -461 feet.

Q. What caused you to believe that that well was an analogy to your discovery well?

A. This particular well was drilled in 1984. Its first month's production was 3100 barrels of oil, just, you know, essentially the same as we've experienced at our well.

And as you can see on the decline curve, the well went on a rather solid 30-percent-per-year decline form the 100-barrel-a-day rate in 1984 to about 80 barrels per month in February of 1994.

Q. Why is a steady decline of 30 percent in that analogy well of significance to you?

A. That's significant to me because I was seeking a way to, in essence, calculate my estimated ultimate recovery for the Shipp well, which is part of my duties, and concluded that -- as I can show you later -- that the Shipp well will produce around 82,000 barrels, which is

very analogous to the 90,000 barrels that the State 21 well has produced through its life.

Q. When you look at the State 21 analogy well, what would happen in terms of drainage area if that 30-percent decline rate all of a sudden took a steeper decline?

A. Well, it would indicate a very limited depletion area.

Q. When you look at the initial producing rates and characteristics of your discovery well, do you yet see any indication that you're going to change your decline rate?

A. We do not.

Q. So what does that tell you?

A. I believe that we will enjoy a decline rate no more severe than 30 percent, and, you know, this could even be maybe conservative.

Q. Once you've established a decline rate in your calculations, then what did you conclude to be the estimated ultimate recovery for your discovery well?

A. I concluded that by taking the initial rate and a final rate or an economic limit of about 180 barrels per month, that the estimated ultimate recovery for the well will be 82,355 barrels.

We have produced in excess of 4000 barrels already.

Q. You've now established one of the components to

go ahead and do a drainage calculation, have you not?

A. That's correct.

Q. Let's talk, then, about the center portion of your spreadsheet and talk about how you selected these reservoir parameters to complete the calculation.

A. As you can see, the -- several of the parameters came directly off the logs obtained at the Shipp 20-1 well to obtain average porosity, average water saturation, and of course net-pay thickness pay based on a four-percent porosity cutoff.

Q. Are you comfortable with a four-percent porosity cutoff?

A. Yes, I am.

Q. And why, sir?

A. That is the cutoff that we have used throughout our Strawn play in evaluating other wells that we've completed in the Strawn formation.

Q. How did you arrive at an engineering opinion concerning the percentage of recovery of original oil in place?

A. That was based on what from my experience would be a rather good solution drive recovery, as a percent of oil in place, 20 percent.

Q. What is your engineering judgment about the permeability of this reservoir?

A. The permeability of the reservoir at this particular well is probably rather tight, based on the fact that we did not enjoy a top-allowable well, and only -- the initial rates were about 95 barrels a day.

So I would conclude that for this updip portion of the reservoir, that it is rather tight.

Q. What is the general belief about the permeability of these Strawn mounds in general?

A. In general, they have rather good both horizontal and vertical permeability.

Q. Would you expect that permeability component to increase favorably as you move to a better position in the reservoir?

A. Yes.

Q. What does that do for you as a reservoir engineer when you're trying to decide spacing for wells?

A. That would tend to make me believe that a well will drain at least an 80-acre drainage area.

Q. With that initial belief, how, then, did you finish this calculation to confirm in a standard way that you could deplete this reservoir with this discovery well for an area larger than 40 acres?

A. What I've done is simply taken a -- made an original-oil-in-place calculation -- you can see the figures there -- using the porosity, water saturation, the

formation volume factor, which is by analogy to the West Lovington field where there was a good analysis available on similar crude, and calculating an original oil in place of 178 stock tank barrels per acre-foot.

Based on our log analysis, we have 24 net feet of pay in the Shipp 20-1. That then calculates out, by using the 24 feet, to be 4272 stock tank barrels per surface acre.

Then by applying a 20-percent recovery of original stock tank oil in place, you get the 854.4 stock tank barrels per acre as an estimated ultimate recovery number.

Then to calculate a drainage area, you would take my previous estimate of 82,355 stock tank barrels as an estimated ultimate recovery for the well, based on the 30 percent decline initial rate, and divide that by that recovery factor for 20 percent recovery of the oil in place as discussed earlier of 854.4 stock tank barrels per acre, and you come up with a drainage area of 96.4 acres, which I believe to be a rather straightforward calculation to calculate the drainage area.

Q. If this pool is left on statewide 40-acre oil spacing, do you have an engineering opinion as to whether or not that could result in the drilling of unnecessary wells in this pool?

A. I believe it would.

Q. Why, sir?

A. I believe that as calculated here, the evidence that being that at least 80 acres is drained by a well that we perceive to be rather tight, that drilling on 40-acre spacing, would just simply be overkill and economically unsound.

Q. Do you see evidence that puts this discovery well within the boundaries of any existing Strawn pool already declared by the Division?

A. No.

Q. It appears to you as a reservoir engineer that in fact this is a discovery of a new pool?

A. It does.

Q. Do you see any evidence in the engineering aspects of your profession to the contrary?

A. No.

MR. KELLAHIN: That concludes my examination of Mr. Vaughn.

We move the introduction of his Exhibits 4 and 5.

EXAMINER CATANACH: Exhibits 4 and 5 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Vaughn, you guys aren't asking for any kind

of special oil allowable, right?

A. We are not.

Q. Okay. Your perforations are -- top perforations in your well are at 10,858; is that right?

A. I believe that's right. I believe that's what we show on the --

Q. Okay.

A. -- on the cross-section.

Q. So your allowable should be at 400 barrels a day on an 80-acre unit?

A. That's correct.

Q. Okay. Mr. Vaughn, in some of your calculations -- for instance, your formation volume factor -- I see where you have an analogy to West Lovington.

A. Correct.

Q. Did you look at any other pools for that figure?

A. I did not. To my knowledge, that probably would not be available to us. That's normally proprietary information to the individual operators, unless that data might have been presented at the Commission at some point.

Q. Okay. How about your recovery factor, 20 percent? How did you arrive at that figure?

A. That is a recovery factor that, based on literature, would be a rather good solution gas drive recovery.

I think the literature would state that solution gas recoveries could be in the realm of six or eight percent to 20 percent on the high side. I suppose some texts might say even 25 percent. But nevertheless, 20 percent would be generally considered a rather good solution gas drive recovery. I think 15 percent is a number that is quite often used as an average.

Q. Again, did you look at any of the other Strawn pools in the area to try and come up with a figure on those pools?

A. I did not.

Q. Do you know in fact that it's that high, 20 percent, in any of the other Strawn pools in this area?

A. I could not tell you that just as an absolute fact. But based on the studies I've done where you can see, you know, recoveries in excess of half a million barrels, I would certainly say that -- believe I could say that 20 percent is certainly a reasonable number.

Q. As you move to maybe a better permeability area in the reservoir, would you expect the drainage area to increase?

A. I think that would be possible, yes, I certainly do.

Q. What are your company's plans for drilling additional wells in this pool?

A. We plan to monitor this well for several months.

I think we are attempting to obtain another precise line to further nail down the reef.

And we are very hopeful that we will be drilling another well this calendar year to offset, as we certainly believe that we have the opportunity to develop possibly a half-million-barrel well.

If I might just mention, the direct offset to my analogy well --

Q. Uh-huh.

A. -- is a -- in excess of 400,000-barrel well. It came in at top allowable, produced top allowable for several months, in excess of a year, I believe. It's still producing, having produced over 400,000 barrels.

It's an 80-acre offset to the south of this well.

So I believe this to be a very good analogy to what we certainly hope to find in our first offset.

Q. Speaking of that offset, the offset to your analogy well, did you look at the decline rate for that well?

A. I did, inasmuch as I said the well obviously was capable of much more than top allowable for many months and went on a steeper than 30-percent decline, but that was after producing several hundred thousand barrels. But I could not tell you what that decline rate was, or is.

Q. There was some mention earlier about -- in your proposed pool rules, about having only one well per 80 acres?

A. Yes.

Q. Is that what you guys are requesting?

A. Yes.

Q. Can you go into that a little bit on your reasoning?

Generally that's not included in the pool rules for an 80-acre pool. I'm kind of just wondering about the reasoning behind that.

A. Well, as I think we mentioned earlier, we do not wish to over-drill the reservoir. We believe that this reservoir, however large it might be -- I suppose it could be, you know, hopefully maybe as large as a 320-, 480-acre-size reservoir -- we would hope to not have to drill more than the four to six wells to adequately drain it on an 80-acre basis. We do not want to over-drill.

Q. You understand that with 80-acre spacing you're not in any form or fashion required to drill a second well on an 80-acre proration unit?

A. Oh, no, we understand that.

Q. The option is there generally to do that if you wish.

A. And take just the 80-acre allowable, of course.

Q. Right, that's generally how it's done in terms of an 80-acre pool.

But you guys do want that specific provision in there, that there only be one well on the 80-acre unit?

A. That is what we're requesting.

Q. Okay. Again, generally, when we establish pools, we generally establish temporary rules for 18 months or a two-year period. Do you think that's appropriate in this case? Give you time to evaluate some more data?

A. Yes.

Q. Okay. Would you request 18 months or two years? Do you have any preference?

A. I believe we would request two years.

EXAMINER CATANACH: I believe that's all I have, Mr. Kellahin.

MR. KELLAHIN: Thank you, Mr. Examiner.

It was my suggestion that the Applicant seek to limit the wells to one per 80.

It was my concern, that I shared with my client, that they concurred in, that for small oil pools like this it is highly likely that you can dedicate 80 acres and arrange that dedication in such a way that you have *de facto* 40-acre spacing with the producing wells only 40 acres apart, and you have in fact drilled too many wells.

I thought it appropriate to avoid the problem

that we have in some other pools by at least for this temporary period having that additional limitation, which can be easily removed after the two-year period if it appears that additional wells need to be put in place.

But it was my concern from other cases that brought that issue into this case.

EXAMINER CATANACH: Thank you, Mr. Kellahin.

Anything further in this case?

MR. KELLAHIN: No, sir, that concludes this presentation.

EXAMINER CATANACH: There being nothing further, Case 11,201 will be taken under advisement.

(Thereupon, these proceedings were concluded at 9:10 a.m.)

* * *

CERTIFICATE OF REPORTER

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

I, Steven T. Brenner, Certified Court Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I transcribed my notes; and that the foregoing is a true and accurate record of the proceedings.

I FURTHER CERTIFY that I am not a relative or employee of any of the parties or attorneys involved in this matter and that I have no personal interest in the final disposition of this matter.

WITNESS MY HAND AND SEAL February 7th, 1995.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998

I do hereby [illegible] the foregoing is a [illegible] proceedings in the [illegible] hearing on February 2, 1995.

David R. Catanach
Oil Conservation Division

LARGE FORMAT EXHIBIT HAS BEEN REMOVED AND IS LOCATED IN THE NEXT FILE