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. 12,114
APPLICATION OF CHESAPEAKE OPERATING, INC., FOR COMPULSORY POOLING AND AN UNORTHODOX WELL LOCATION, LEA COUNTY, NEW MEXICO	)	

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: MICHAEL E. STOGNER, Hearing Examiner

March 4th, 1999

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, MICHAEL E. STOGNER, Hearing Examiner, on Thursday, March 4th, 1999, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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I N D E X

March 4th, 1999
Examiner Hearing
CASE NO. 12,114

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E X H I B I T S

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* * *

A P P E A R A N C E S

FOR THE APPLICANT:

KELLAHIN & KELLAHIN
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By: W. THOMAS KELLAHIN

* * *

WHEREUPON, the following proceedings were had at 8:21 a.m.:

EXAMINER STOGNER: Call next case, Number 12,114, which is the Application of Chesapeake Operating, Inc., for compulsory pooling and an unorthodox well location in Lea County, New Mexico.

Call for appearances.

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin and Kellahin, appearing on behalf of the Applicant. Mr. Examiner, my witnesses had trouble finding the building this morning. If you can give me just a few minutes --

EXAMINER STOGNER: Okay.

MR. KELLAHIN: -- we'll get organized for our presentation.

EXAMINER STOGNER: All righty. How much time do you need?

MR. KELLAHIN: About five minutes will do it, sir.

EXAMINER STOGNER: Okay. Well, in that case, let's take a recess for five, ten minutes.

MR. KELLAHIN: Yes, sir. Thank you very much.

(Thereupon, a recess was taken at 8:21 a.m.)

(The following proceedings had at 8:30 a.m.)

EXAMINER STOGNER: We've returned from recess,

where we have called Case 12,114.

Mr. Kellahin, you've entered an appearance.

Any other appearances?

MR. KELLAHIN: Mr. Examiner, I have two witnesses to be sworn.

EXAMINER STOGNER: Okay, will the witnesses please stand to be sworn at this time?

(Thereupon, the witnesses were sworn.)

EXAMINER STOGNER: Mr. Kellahin?

MR. KELLAHIN: Thank you, Mr. Examiner.

Mr. Examiner, this morning we're presenting you Chesapeake's Application for compulsory pooling. This is for a 40-acre Strawn location. We are not within a mile of the boundary of any other existing Strawn pool.

As of this morning, there are only two interest owners who have not committed their interest to the spacing unit. Despite Chesapeake's efforts, they have not been able to locate these interest owners. They account for about 6.5 percent of the spacing unit.

In addition, the well is at an unorthodox location. Our geologist will show you his 3-D seismic interpretation and his recommendation for a location that is slightly north and west of the closest standard location. His reason to do so is based upon the 3-D interpretation.

The encroachment is towards the same interest owners that have interest in the 40-acre spacing.

With that introduction, Mr. Examiner, we will call and have the testimony of Linda Townsend. Ms. Townsend is a landman for Chesapeake Operating, Inc.

LYNDA F. TOWNSEND,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. For the record, ma'am, would you please state your name and occupation?

A. Yes, my name is Lynda Townsend. I am a landman with Chesapeake Operating, Inc., in Oklahoma City.

Q. On prior occasions have you testified before the Division?

A. No.

Q. Summarize for us your experience as a landman.

A. I have been a landman for approximately 31 years with different companies, usually large independents, handling both inside and outside.

Q. As part of your general responsibilities as a landman, are you familiar with the process by which you and others under your control identify the interest owners in a particular spacing unit?

A. Yes, sir.

Q. And you're accustomed to reading and understanding title opinions and locating those interest owners?

A. Yes, sir.

Q. As part of your responsibilities for Chesapeake, were you engaged in identifying the interest owners in the subject spacing unit?

A. Yes.

Q. And was it your responsibility, then, to try to contact those interest owners or pursue efforts to find out where they might now reside?

A. Yes, sir.

Q. And have you done so in this case?

A. Yes.

MR. KELLAHIN: Mr. Examiner, we tender Ms. Townsend as an expert petroleum landman.

EXAMINER STOGNER: Ms. Townsend, how long have you been with Chesapeake?

THE WITNESS: I've been with Chesapeake for two years in January.

EXAMINER STOGNER: Two years in January.

THE WITNESS: Uh-huh.

EXAMINER STOGNER: That was more information for my part than anything.

Ms. Townsend is so qualified.

Q. (By Mr. Kellahin) Ms. Townsend, let's turn to what we have identified as Chesapeake Exhibit 1, if you'll unfold that display.

Section 21 is centered in the display, and it's coded. What's the significance of the color code?

A. The significance of the color code are the 40-acre units surrounding the M.I. Allen unit.

Q. Okay. When we look in the south half of Section 21, are we looking at a single lease, or does it consist of multiple leases?

A. It consists of multiple leases. However, the south half of 21 is one tract.

Q. All right. For example, if the well is located in the southeast of the southwest, and the well encroaches towards the west and north of that spacing unit, would it be encroaching upon interest owners who are common both in identity and percentage --

A. Yes, sir.

Q. -- to the drilling spacing unit?

A. Yes.

Q. Let's set this aside for just a moment as a reference map and have you turn your attention to Exhibit Number 2. The summary on Exhibit Number 2 was prepared by you?

A. Yes.

Q. As of today, Ms. Townsend, identify for us the interest owners with whom there is yet no agreement.

A. Ernest Roy Caudill and David L. Rankin.

Q. How were you able to determine that they had an interest in the spacing unit?

A. We did a cursory check, an initial cursory check, at the courthouse.

Q. Was that cursory check subsequently followed up with a drill-site title opinion?

A. Yes, it was.

Q. As a result of both efforts, then, you've established the identity of these two individuals?

A. Yes, sir.

Q. What kind of interests do they have in the spacing unit?

A. Ernest Roy Caudill, they have mineral interest. Ernest Roy Caudill got his interest in 1970 through his parents.

David L. Rankin got his interest in 1975 through his father.

Q. These are then unleased mineral interests?

A. Exactly.

Q. When did you first start working on this project to consolidate the interest owners?

A. Back in June of 1998.

Q. When you first started the project, how many individuals or companies were you trying to obtain voluntary agreement from?

A. They were all actually mineral interest owners, so we were trying to get -- obtain leases from all of them.

Q. Okay, and approximately how many did you start out pursuing?

A. There are 20 owners in the whole tract, and we had to diligently pursue about six or seven of them.

Q. And at this point you're down to two?

A. Right.

Q. What efforts did you make, or others under your control and supervision, to find out where you might locate Mr. Caudill and Mr. Rankin?

A. We checked through the abstractor's office in Midland, we also went through all the Lea County Courthouse records, the Lea County Assessor records, we checked the death records, tax records, we went through the Internet databases, which consisted of three: There was Yahoo, Infocity, Database America. We contacted relatives in that area, and we also telephoned people with similar names.

Q. As a result of that effort, you were still unable to identify the current residence or location of either of these individuals?

A. Yes, sir.

Q. In your opinion, have you exhausted all good-faith efforts to find these parties?

A. Yes.

Q. Let's turn now to a different topic. Let's look at Exhibit 3. Exhibit 3 is the proposed AFE --

A. Right.

Q. -- that Chesapeake is submitting for the Examiner's consideration?

A. Yes.

Q. Is this an AFE that was utilized by Chesapeake for the Strawn exploration taking place in Lea County?

A. Yes.

Q. And was it specific as to this well?

A. Yes, it was.

Q. The anticipated measured depth of the well is what depth, Ms. Townsend?

A. 11,830 feet.

Q. And the total cost of the AFE, including intangibles and tangibles for a completed well is what, ma'am?

A. $1,227,000.

Q. Okay. How do these costs compare to the estimated and actual costs that Chesapeake has incurred for other Strawn wells to this depth in this area?

A. All right, during the year of 1998, our actual AFE costs were anywhere from -- on the Runnels well it was $1,092,000. We have $1,053,000. The actuals on the Runnels, being $1,092,000, were $1,088,000. So they're fairly close.

Q. When you're talking about that reference, there's a population of wells that Chesapeake drilled in this area to the Strawn in 1998?

A. Yes, sir.

Q. And you're referencing some five or six other wells?

A. Yes.

Q. Is this AFE prepared in the ordinary course of Chesapeake's business in preparing these AFEs?

A. Yes, it is.

Q. And to the best of your knowledge, is it accurate and reasonable?

A. Yes.

Q. Let's talk about a different topic. The Examiner has the authority to award Chesapeake some overhead charges. Are you familiar with that process?

A. Yes.

Q. As part of your work with joint operating agreements and the COPAS attachments to those agreements, are you familiar with what Chesapeake charges in this area

for drilling and producing wells rates on a monthly basis?

A. Yes, sir.

Q. And what are those rates, ma'am?

A. Our drilling rates are $6000, and our overhead rates on a monthly basis are $662.

Q. Is it your recommendation that the Examiner include those rates in the compulsory pooling order to be entered in this case?

A. Yes, sir.

MR. KELLAHIN: Mr. Examiner, that concludes my examination of Ms. Townsend. We move the introduction of her Exhibits 1, 2 and 3.

EXAMINER STOGNER: Exhibits 1, 2 and 3 will be admitted into evidence at this time.

EXAMINATION

BY EXAMINER STOGNER:

Q. Let's see, Ms. Townsend, this is a fee tract, is it not?

A. Yes, sir.

Q. Okay. And you're showing on your first exhibit that Chesapeake controls 93.5 percent of that interest?

A. Yes, sir.

Q. And you said there were how many parties between -- how many --

A. There's 20 all together, counting the two that

are unlocated.

Q. Did you just not find an address at all?

A. No known address at all.

Q. Were there any Caudills or Rankins in Lovington?

A. Yes, sir, and we did call those names. Most of them -- I take it that these two gentlemen were older gentlemen, and they just did not know the whereabouts of them at this time.

Q. Did you find any relatives?

A. Distant relatives, yes.

Q. Distant relatives.

A. Uh-huh.

Q. And they didn't know where they were, or --

A. No.

Q. How old -- Did you have any idea about how old these gentlemen would be at this point?

A. Well, the original mineral owner, Caudill, I really don't know, because they were the first owners in this one tract, his parents were, and they died some time ago. Their will was probated in 1975.

Q. Now, that was Rankin or Caudill?

A. That was Caudill.

Q. That was Caudill.

Did you look in the Hobbs area?

A. Yes, uh-huh.

Q. So you looked through the Lea County area?

A. Right, anywhere we thought they may be in the surrounding areas.

Q. Out of curiosity, how many Caudills were in Lea county that you talked to?

A. Steve Lunsford, our broker, went through the Internet and pulled Caudills up, and I would imagine he probably talked to eight or ten.

Q. Eight to ten. And you called them?

A. He called them.

Q. He called them.

Now, these tracts of lands out there that are owned by 20 people, is this a -- what? A farming area, a housing addition? Are the tracts relatively small, are they about the same size?

A. I'm not really sure. I'm going to guess that it's farming.

Q. Farming area?

A. I think most of that is.

Q. And that lays what? About four and a half miles northeast, four miles northeast of Lovington?

A. Yes, yeah. Yes, sir.

Q. Do you remember which side of the Tatum Highway that would be?

A. No.

Q. Now, you're requesting $6000 drilling and $662 while producing. Has that rate been given or approved on previous orders that Chesapeake has sought from this Commission?

A. I don't -- I'm not aware of our doing any pooling before, before the Commission.

Q. Do you know of any other orders issued by this Commission for either Chesapeake or anybody else for that rate especially? I'm looking at the production rate; it seems a little high.

A. Uh-huh. No, sir, I don't.

Q. Has Chesapeake participated with other parties in this area at that rate?

A. We have participated with very few parties in that area, and I think the rates are fairly common to the rates in those areas. They're comparable to.

Q. And what do you base that on?

A. Let's see, we have participated in two or three -- Normally, we operate our own wells, but we have participated in a couple wells and we had to sign a JOA with those people, and those rates are comparable to what we are charging.

EXAMINER STOGNER: Mr. Kellahin, I'll take administrative notice of any previous Chesapeake orders in the last couple years.

MR. KELLAHIN: I'm not sure we have any pooling orders for the Strawn, Mr. Examiner. If you'd like, I'm happy to research to see if there's other Strawn compulsory pooling orders.

For your information, the 1997 Ernst and Young survey shows that our rates are slightly above the median.

EXAMINER STOGNER: Okay, you've just handed copies from the 1997 for west Texas and southeastern New Mexico, or eastern New Mexico.

MR. KELLAHIN: Yes, sir. It's reported in the 1997-98 book, and the tabulation shows 1997.

EXAMINER STOGNER: Okay.

I have no other questions of Ms. Townsend. You may be excused. Thank you.

THE WITNESS: Thank you.

MR. KELLAHIN: Mr. Examiner, our next witness is Robert Hefner.

ROBERT A. HEFNER, IV,

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. Hefner, for the record, sir, would you please state your name and occupation?

A. My name is Robert Hefner, and I work as a

geologist for Chesapeake Operating in Oklahoma City.

Q. Mr. Hefner, on prior occasions have you testified as a petroleum geologist before the Division?

A. Yes, I have.

Q. As part of your employment as a geologist with Chesapeake, are you the primary geologist responsible for the exploration of the Strawn hydrocarbons in Lea County, New Mexico, in this particular area?

A. Yes, I am.

Q. What is your methodology for locating wells?

A. This particular play is really conducive just to 3-D seismic because of the nature of the reservoir, and so that's the primary tool that we use. It's a stratigraphic trap with a structural component to it, so it's somewhat complex, because of the two requirements to make a drillable location.

Q. Are you knowledgeable and familiar with how to read and interpret 3-D seismic data?

A. Yes, I am.

Q. And have you utilized it on other well locations and other prospects for Chesapeake looking for Strawn production?

A. I have.

MR. KELLAHIN: We tender Mr. Hefner as an expert witness.

EXAMINER STOGNER: Mr. Hefner is so qualified.

Q. (By Mr. Kellahin) Mr. Hefner, to orient the Examiner let's take a moment, turn to your Exhibit Number 4. First of all, we're looking at a structure map. But before we look at the structural interpretation, have you identify for us what is the significance of the black dots shown in the north half of 21 and in the south of 16.

A. Okay, this nine-parcel, nine-section plat shows all the penetrations in the area. The wells to the north of the proposed location, the north half of 21 and south half of 16 is an old Devonian discovery, back in the 1950s that has pretty much been depleted. It was based on a structural high that's to the north of this location.

And also in blue you'll find the subsea values for the top of the Strawn, Devonian being the older reservoir, but the Strawn was penetrated in all those wells. However, the Strawn -- This feature was high during Strawn deposition, and so the Strawn itself was thin on top and did not develop any reservoir characteristics.

Q. When you're attempting to explore for Strawn oil production in Section 21, what are the geological components or characters that you're evaluating?

A. There really are two components, and we'll see that in the next exhibit. But this exhibit showing the structural component, we need to find actual reservoir

development or algal mound growth at a point structurally high for its coincidence with the maximum structure and mound growth.

Q. Is there any other character or component of your analysis, other than structure?

A. Yes, there's -- I use -- in the next exhibit, which would be an amplitude interpretation of that interval.

Q. And for what purpose do you utilize that information?

A. I'm able to interpret where there has been actual mound development and growth.

Q. Do you have an opinion as to what an appropriate risk factor penalty is for assessment against any nonparticipating working interest owner in this spacing unit?

A. In our joint operating agreements it's 500 percent. So I would suggest that it be high, because it is a very risky exploration. As you can see from all the wells to the north of us, none of those have reservoir-quality rock in the Strawn formation.

Q. Within the context of this Examiner's authority, the maximum that he's allowed to award are cost plus 200 percent.

A. So I would ask for the maximum.

Q. When we look at the specifics of the M.I. Allen location, it in fact is at an unorthodox location, is it not, Mr. Hefner?

A. Yes, it is. We're actually too far north and too far west of what would be considered an orthodox location.

Q. When you look at Exhibit Number 4, what causes you to want to move this farther north and west than the closest standard location?

A. Well, if you look at where the center of each of those 40s are, the color on the 3-D seismic, the hotter the color, the higher structurally the Strawn is. And so as you go to the south you go into those green colors, which is structurally downdip. So you're wanting to go as high structurally as you can. So the center of that 40 would be structurally lower.

Q. So the strategy here for structure is to move slightly north and west in order to gain elevation?

A. That's correct.

Q. Based upon your general experience with Strawn production in this area, is there a water component and a risk of being downstructure in the Strawn?

A. Yes, there is. Actually, we've drilled some wells to the southeast of here that have actually been all water wet, and so there is the risk of finding water-filled Strawn. And so we would need to take advantage of getting

as high structurally as we possibly can.

Q. All right, let's look at the other factor that you utilized in assessing this location. If you'll turn to Exhibit Number 5, identify for us what we're looking at in this display.

A. What you see there is a piece from the 3-D seismic interpretation. It represents amplitude of the Strawn interval.

The way to interpret it using this color bar is that the blue represents nonreservoir-quality Strawn, and then the hotter colors, going into the oranges and reds, would represent reservoir quality or actual algal mound growth.

And you can see that the -- most of the amplitude that would be favorable to finding productive Strawn is in the southeast of the southwest quarter of 21.

But if you refer back to the structure map, you see that the highest point structurally would be where we're proposing the well. And I think that can be further demonstrated with our vertical seismic section.

Q. In Exhibit 5, then, you're targeting those color codes that have the red or orange color associated with them?

A. That's correct.

Q. That would be the way to analyze this display?

A. That's right, that would be where you would have the maximum mound -- or algal-mound growth.

Q. But then you have to integrate that with your structural position?

A. That's correct.

Q. And when you combine the two, you have picked a location that is slightly unorthodox?

A. That's correct.

Q. Let's look at this illustration in a different way. If you'll turn to Exhibit 6, what are we looking at here?

A. Exhibit 6 is a vertical seismic profile out of the 3-D seismic survey.

Q. All right, and that is the Line 232 that appears on both Exhibits 4 and 5?

A. That's correct, it's a north-south line, and north would be to your right as you're viewing the exhibit, and south to your left.

Q. As we view the exhibit, you have given us a vertical blue line. What does that represent?

A. That represents the diagram of where the wellbore will be located in the subsurface.

Q. And as we start at the blue line at the surface and move down the blue line, you get to a horizontal marker of 1.550? Do you see that?

A. Yes.

Q. You read below that, and then you get down to where there is a purple contour line. Do you see that?

A. Yes.

Q. What does that represent?

A. That represents the top of the Strawn, which would be what the structure map represents would be the top, that top.

Q. And as you go down to the base of the Strawn, there is a black line that is paralleling, if you will, the purple line?

A. That's correct, and that would be the top of the Atoka shale. And so in essence what you have is the top and bottom of the Strawn formation.

Q. As we look within that Strawn interval, you have some more information, and it is displayed in segments, vertical segments. How far apart are each of those segments?

A. Each of these segments represent a trace, and their spacing is 110 feet.

Q. Okay. At the point where the horizontal purple line intersects the vertical blue line, just below that is another blue line. It looks like we're at the top of that point?

A. Yes.

Q. What does that represent?

A. What has been superimposed on this vertical seismic section is the interpretation of the actual algal mound growth.

And the methodology that's used, if you look to the north, where in between the top and bottom of the Strawn, that that amplitude is principally the dark blue, which would be the equivalent of what you see in an areal map on the exhibit, being that same dark blue, and that dark blue representing lime mud or nonreservoir rock.

You also notice that the top and bottom interval, the time in between those is also less than it is over where the proposed well is. And so you see that the Strawn is actually thickening as you come to the south towards the proposed wellbore.

You also notice some other things happening with that wavelet, and you'll see that the amplitude at the top is being diminished and becoming more in the orange colors, and that happens to coincide where I am interpreting the maximum growth of that algal mound.

Q. If you move south to a standard location, we would move south to the first wave set to the left of the control point for the vertical blue line, and that would be less favorable than your proposed unorthodox location, if I read this correct?

A. That's correct. As you move to the south you can see that you start losing structure pretty rapidly, and also the interpretation of how much vertical height you have in mound growth diminishes as well.

And so where the proposed wellbore is represents where -- the coincidence between maximum mound growth and structure.

Q. You did not bring us an east-west line, but if we were to have that line, it would appear that if you move to a more standard location to the east, you're going to lose reservoir?

A. That's correct.

Q. And I can see that by looking at Exhibit 5 --

A. That's right.

Q. -- you would be moving into the green area.

A. That will show you three-dimensionally that relationship that you're seeing in this vertical seismic profile.

Q. Okay. In summary, then, Mr. Hefner, based upon your geologic experience and expertise, it is your opinion that the unorthodox location is necessary to give Chesapeake the greatest opportunity for success in this spacing unit?

A. That is correct.

MR. KELLAHIN: That concludes my examination of

Mr. Hefner, Mr. Examiner.

We move the introduction of his Exhibits 4, 5 and 6.

EXAMINER STOGNER: Exhibits 4, 5 and 6 will be admitted into evidence at this time.

EXAMINATION

BY EXAMINER STOGNER:

Q. Okay, I'm a little confused now. What's the spacing on the Strawn?

A. The spacing?

Q. Yes, sir.

A. This would be a wildcat spacing.

Q. Okay, which is -- ?

A. Which is 40 acres, excuse me.

Q. Forty acres. And what's a standard location for an oil well in wildcat Strawn?

A. It would be 330 from the edge of that 40.

Q. Okay. And 330 from the north, right?

A. That's correct.

Q. Okay, because you show a 150-foot radius on these two maps.

A. That was just kind of for a visual --

Q. Oh, okay.

A. -- location, just to help you get centered in each of the 40s.

Q. So we're only 38 feet unorthodox?

A. That's right, to the north. And we're 94 feet too far west also.

Q. Okay. What's the closest Strawn production?

A. I guess it would be in Section 4, or perhaps -- I haven't actually measured it out -- or Section 6 of 16-37.

Q. 16-37?

A. Yeah. Also Section 1.

Q. Of 16-37?

A. Yeah -- 16-36.

Q. 16-36?

A. Those two sections right there, there's some Strawn production. There's also some in Sections 4 and 5.

Q. Now, the wells that you show on Exhibit Number 5, the black dots, did they actually penetrate the Strawn?

A. Not all of them. You'll notice at the bottom is the total depth drilled. All the wells to the north of the proposed location did penetrate the Strawn. There was only one to the south of us that actually penetrated the Strawn; that was in Section 29. The others were Wolfcamp tests or failed tests. That Humble well in the northwest of the northeast of 28.

Q. Now, that little cluster of wells to the north that did penetrate the Strawn, did they produce from the Strawn?

A. No, they didn't, they were -- It was principally Devonian and Wolfcamp production, and the Strawn was nonproductive.

What happens geologically on some of these old structural features is, you'll find that the Strawn thins on top and was not conducive to algal mound growth, because there was too much energy, the wave base was -- did not allow for algal mound growth to occur on the tops of these structures.

Q. When was that little cluster of wells drilled? Do you know what era?

A. Principally the Fifties, mid-Fifties, early Sixties.

Q. And there was very little, if no, algal-mound completions or even technology at that time?

A. No, the closest would have been over, really, in Dean field. I think there was an early discovery there. But again, that was being drilled for Devonian. So most of the activity out here at that time was for deep structure.

Q. Okay. Now, you essentially have the whole south half of Section 21 to choose from; is that correct?

A. Yes.

Q. As I understand it, it was all one lease?

A. That's correct.

Q. Okay. And really the combination of the data on

Exhibit 4 and 5 --

A. -- brings you to the proposed location.

Q. And that Exhibit Number 5 pretty muchly pinpoints, because you're essentially right there in that little -- what I call the orange area or --

A. That's correct.

Q. -- what you call reservoir quality?

A. Exactly.

Q. Okay. Now, on Exhibit Number 4, you show a fault --

A. Yes.

Q. -- one to the west and one up there to the north and east. Does that have any significant play as far as the Strawn formation or the Strawn reservoirs or how these algal mounds were formed or laid out or anything? How do they affect the production out there?

A. Well, as I alluded to earlier, everything that would have been on top of that would have been more lime mud, but as you went off to both the east and west you would gain more depth, water depth, and that would give you the opportunity to have algal-mound growth, because algal mounds don't like a lot of energy, water energy, to nucleate and start growing.

But that doesn't necessarily imply that everywhere there was deep water you'll find algal-mound

growth.

Q. Okay, what is the minimum depth, roughly, that algal mound development would occur in the marine environment?

A. It is usually below the wave base, so 30 to 40 feet.

Q. And then what would be the maximum depth that one would expect algal mounds to form?

A. I'm not sure I really know what that depth would be, where the limitation is. At some point you'll get too deep. I don't know what that number would be. Because you'd still need some sunlight.

Q. Yeah.

A. So I don't know at what depth that diffuses to a point where it wouldn't grow.

Q. All this was going on out there near the shoreline?

A. Exactly.

EXAMINER STOGNER: Okay, I don't have any other questions, Mr. Kellahin.

MR. KELLAHIN: That concludes our presentation, Mr. Examiner.

EXAMINER STOGNER: Okay, you may be excused.

Do you have anything further, Mr. Kellahin?

MR. KELLAHIN: No, sir.

EXAMINER STOGNER: If you can shed some light for me, Mr. Kellahin --

MR. KELLAHIN: Yes, sir.

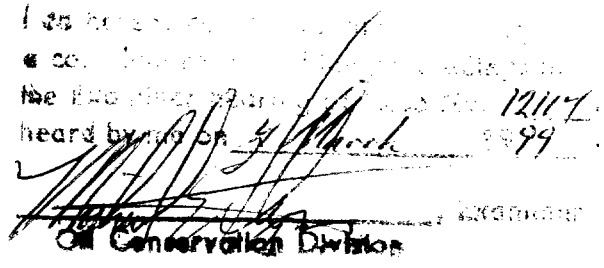
EXAMINER STOGNER: -- by the time I write this order, which will be shortly, concerning that $662?

MR. KELLAHIN: Yes, sir, we'll research that and see if we can find you a reference.

EXAMINER STOGNER: Then this matter will be taken under advisement.

(Thereupon, these proceedings were concluded at 9:05 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 March 4th, 1999.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 2002

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