STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

ORIGINAL

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

CASE NO. 14300

APPLICATION OF CHESAPEAKE OPERATING, INC. FOR SPECIAL RULES AND REGULATIONS FOR THE SOUTHWEST WILLOW LAKE DELAWARE POOL, EDDY COUNTY, NEW MEXICO.

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

June 2, 2009
Santa Fe, New Mexico

BEFORE: WILLIAM JONES: Hearing Examiner
TERRY WARNELL: Technical Advisor
DAVID BROOKS: Technical Advisor

This matter came for hearing before the New Mexico Oil Conservation Division, David Brooks Hearing Examiner, on June 2, 2009 at the New Mexico Energy, Minerals and Natural Resources Department, 1220 South St. Francis Drive, Room 102, Santa Fe, New Mexico.

REPORTED BY: Peggy A. Sedillo, NM CCR NO. 88
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I N D E X

A P P E A R A N C E S

FOR THE APPLICANT: W. THOMAS KELLAHIN, ESQ.
Kellahin and Kellahin
706 Gonzales Road
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HEARING EXAMINER: Okay, I guess we're ready to get started this morning. We will attempt to hear Case 14301 at 1:00 p.m. this afternoon.

And so the next case on the docket is Case 14300, which is the Application of Chesapeake Operating, Incorporated, for Special Rules and Regulations for the Southwest Willow Lake Delaware Pool, Eddy County, New Mexico. Call for appearances.

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

HEARING EXAMINER: Will the witnesses please stand and state your names and be sworn?

MR. WESCOTT: Lee Wescott.

MR. TAYLOR: Raymond Taylor.

MR. BIRDSHEAD: Ed Birdshead.

(Note: The reporter placed the witnesses underoath.)

MR. KELLAHIN: Mr. Examiner, Chesapeake is before you this morning to seek Division approval to change the oil allowable in what is described as the Southwest Willow Lake Delaware Pool.

The presentation will be made by three witnesses. I have a landman to present the ownership and

operatorship in the pool, a geologist to describe the geologic events, and then a reservoir engineer to discuss the production and performance of the well.

The key well here is going to be something called the Mosaic 34 Federal Well 3-H. There's three of these Mosaic wells. The one we're talking about is going to be a very long east\west producing lateral in the Delaware.

Under the current rules for the pool, the depth bracket oil allowable is 80 acres times 40. This is an approved nonstandard ~~proration unit~~ LOCATION with a project area consisting of 160 acres. And it is four 40 strung horizontally across the north half of the south half of 34.

In doing so, Chesapeake also obtained a nonstandard location, so the penetration in the Delaware is farther east than would be a standard setback of 330. So it's a very long horizontal well bore.

The typical configuration of the allowable for such a project would be 80 barrels times four, or 320 barrels of oil a day.

There is not an issue about changing the gas-oil ratio. These are not high GOR wells for which there is an inclination.

We have sent the appropriate notice to all

operators in the pool, and it is uncontested.

And we are about to present you the evidence that we believe will persuade you to increase the allowable such that for wells like this, they will be entitled to a special depth frac allowable of 800 barrels of oil.

ED BIRDSHEAD,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. For the record, Mr. Birdshead, would you please state your name and occupation?

A. My names is Ed Birdshead. I am a landman for Chesapeake Energy.

Q. Where do you reside, sir?

A. In Oklahoma City.

Q. On prior occasions, have you qualified before the Division as a petroleum landman?

A. Yes, I have.

Q. As part of your responsibilities for Chesapeake, have you and others prepared a display to show the Examiner what Chesapeake believes is the current boundary for the Southwest Willow Lake Delaware pool?

A. Yes, we have.

Q. As part of that exercise, have you attempted to locate and spot on this exhibit all the existing Delaware wells that are subject to these pools?

A. Yes, sir.

Q. In addition, have you made yourself knowledgeable about the operators of any Delaware oil wells that are surrounding this pool within a mile radius?

A. Yes, we have.

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

HEARING EXAMINER: Mr. Birdshead is qualified as an expert petroleum landman.

Q. Mr. Birdshead, let's take a moment, and would you turn to what is marked as Exhibit 1? Would you identify for the record what we're looking at?

A. What we have here in red are the pool boundaries, and then in green we have the one mile buffer around the pool.

And then we have two operators in that one mile buffer, Marbob Energy and Chesapeake Energy in that mile buffer. And then we have various other operators, Marbob, Sundown Energy, LP, Lime Rock Resources, and Nearburg Producing within the boundaries of the pool.

Q. Would you take a moment and use this display to orient the Examiner as to approximately where the

Chesapeake Mosaic 34 Federal wells are located?

A. At the top of the pool are the Mosaic wells which are in the mile buffer of the pool.

Q. The well that has the data for which this application is predicated is the northernmost Mosaic 34 Federal 3-H well; is that right?

A. Yes.

Q. Have you caused notification of this hearing to be sent to all the appropriate parties in this case?

A. Yes, we have.

Q. Let me direct your attention to an affidavit executed by Ocean Munds-Dry which is marked as Exhibit 2. Did Mrs. Munds-Dry file this and send these notifications pursuant to your directions?

A. Yes, she did.

Q. And to the best of your knowledge, has she provided notification to all the operators affected by the application?

A. Yes, she has.

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

HEARING EXAMINER: Exhibits 1 and 2 will be admitted as evidence. So the spacing unit -- or the -- was this -- I guess I didn't quite catch it. It's four

40; is that across the section? Is it the north half of the south half, is that --

MR. KELLAHIN: Yes, it is. There is a subsequent exhibit that we have for you that gives you the completion report and the C102, and will show what you just said, the four 40, which is in the north half of the south half of 34.

HEARING EXAMINER: Okay. And you're seeking to change the depth ~~frac~~ bracket allowable for whole pool?

MR. KELLAHIN: Yes, sir.

HEARING EXAMINER: Okay. So you notified everybody within the pool and the operators within a mile --

MR. KELLAHIN: That had Delaware wells.

HEARING EXAMINER: That had Delaware wells that were current operators of record?

MR. KELLAHIN: Yes, sir.

HEARING EXAMINER: Okay. David, any questions?

MR. BROOKS: No, I think that's clear enough.

HEARING EXAMINER: Mr. Warnell?

MR. WARNELL: I don't have anything.

HEARING EXAMINER: Okay. Thanks a lot, Mr. Kellahin.

MR. KELLAHIN: Mr. Examiner, at this time I would call Mr. Lee Wescott. Mr. Wescott is a petroleum

geologist for Chesapeake.

LEE WESCOTT,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A. My name is Lee Wescott, I'm a senior petroleum geologist with Chesapeake Energy.

Q. On prior occasions have you testified as an expert geologist before the Division?

A. No, sir, I have not.

Q. Summarize for us when and where you obtained your degree in geology.

A. I obtained my degree at the University of Texas at Dallas.

Q. And what year was that?

A. 1999.

Q. Subsequent to graduation, have you performed geologic responsibilities in west Texas and southeastern New Mexico?

A. Yes, sir, I have.

Q. And for what companies have you worked?

A. I've worked for Cohoe Resources, Pride Energy,

Ascent Energy, and with Chesapeake Energy for the past four and a half years.

Q. Pursuant to your employment with Chesapeake, are you familiar with the Delaware pool that is the subject of this application?

A. Yes, sir, I am.

Q. Are you also familiar with the geology involved in the Mosaic 34 Federal Well 3-H?

A. Yes, sir.

Q. And in addition, have you made a study of the other geologic components of this project?

A. Yes, I have.

MR. KELLAHIN: We tender Mr. Wescott as an expert in petroleum geology.

HEARING EXAMINER: Mr. Wescott, do you like exploration or development more?

THE WITNESS: Do I like, is that your question?

HEARING EXAMINER: Yes.

THE WITNESS: I like both, actually.

HEARING EXAMINER: Good answer. What about limestone versus sand, shaley sand?

THE WITNESS: Primarily -- at least in my time spent at Chesapeake, I have worked primarily all in deep water sandstones. Just the way that our district is set up, we have geologists that work particular geologic

settings, more or less, and all of my experience with Chesapeake has been within the Delaware basin surrounding deep water sandstone deposition.

HEARING EXAMINER: Okay. Thank you.

Mr. Wescott is qualified as an expert in geology.

Q. Mr. Wescott, if you'll turn to what is marked as Exhibit 3, which is a geologic cartoon, I want to take a moment so that we can first orient the Examiner as to where we are subsurface, and then we'll talk more specifically about the Delaware formation that's the subject of this application.

First of all, if you'll start with Exhibit 3, find for us which one of these Delaware mountain groups is the productive interval in the Southwest Willow Lake pool.

A. That would be the Cherry Canyon.

Q. When we look at the display, where are we going to find the Bone Springs?

A. The structure map on Exhibit 4 is on the top of the Bone Springs formation, which would be the base of the Bushy Canyon formation in this stratigraphic column.

Q. Have you satisfied yourself as you examine the geology that the Bushy Canyon interval, the top of that, is a good, logical geologic marker that you can easily correlate from log to log?

A. The top of the Bone Springs?

Q. I'm sorry, the top of the Bone Springs.
A. Yes, sir.
Q. Is that what you've done in this case?
A. Yes, I have.
Q. As you move into the well bores that produce out of the Bushy Canyon, what type of Reservoir would you be dealing with?
A. Deep water sandstones.
Q. If you now turn with me to what is marked as Exhibit 4, take a moment and go over your process.
A. I believe Exhibit 4 is a structure map.
Q. Okay, a structure map. Is this structure map a map that you prepared, Mr. Wescott?
A. Yes, sir, it is.
Q. When we look at the top -- when we look at the structure of the Bone Springs, tell us how this reflects itself as structural characteristics into the Bushy Canyon.
A. What you see in structure at the top of the Bone Springs is more or less a flat panel of depth going up to the west, down to the east, striking north/south.
Q. Is this pool in a geologic feature for which structure is of significant?
A. No, sir, it is not.
Q. When you drill on structure, will that matter to

you in terms of the productivity of your well bore?

A. It does not appear as though any of the wells contained within this pool, the production has an influence better or worse.

Q. What type of reservoir is this mechanic?

A. Sandstone.

Q. What type is the dry mechanism --

A. Solution gas.

Q. Is there water/oil contact somewhere in the reservoir that's of significance to you and other operators?

A. No, sir, there is not.

Q. When we look at the four Mosaic wells that Chesapeake has drilled, is there any significance about the Mosaic 34 Federal 3-H that makes it suitable for geologic discussion?

A. Well, I believe geologically, the three wells are very similar to one another. I would say the characteristic of the No. 3 that sets it apart from the No. 2 lies in the fact that it was a long-reach lateral that was drilled.

Q. Do you have logs of sufficient quality that you can utilize for each of these three wells?

A. Of the three wells that Chesapeake drilled, the Mosaic 34 Federal 1-H, which is located in the south half

of the southwest, that well, we did drill a pilot hole prior to setting the kick-off plug and drilling our horizontal lateral. We did not drill a pilot hole on the 2-H nor on the 3-H.

Q. Without drilling a pilot well in those other two wells, you would not then have a log section across the entire Delaware pool?

A. That's correct.

Q. Are you satisfied that the quality of the log for the Mosaic Federal 1-H is of sufficient quality that you can make specific opinions and conclusions from it?

A. I am.

Q. As part of that exercise, did you work with a reservoir engineer with Chesapeake, Mr. Ray Taylor, to formulate opinions about the reservoir values to use in his work?

A. Yes, I did.

Q. And did the two of you come to agreement about those values?

A. We did.

Q. Tell us, as a geologist, what makes the Mosaic 34 Federal 3-H well unique among these well bores?

A. Again, geologically, I would characterize the three wells to be quite similar. And what sets the 3-H apart is the fact that it's -- the lateral length on it is

more than twice the length of the 1 and the 2.

Q. When you look to the south in Section 3, there appears to be a number of Marbob horizontal well bores?

A. That's correct.

Q. Some of those well bores have been drilled north/south?

A. Yes.

Q. And there's a couple in here that are also in east/west orientation?

A. That is correct.

Q. Why has Chesapeake chosen to use an east/west orientation for its laterals on these horizontal wells?

A. The primary reason, if you look at all of these horizontals that were drilled, there is a square that denotes where the surface location is and a circle that denotes where the bottom hole location is.

And so as you can see, Chesapeake has chosen to drill all three of these laterals from east to west. And if you recall in our discussion regarding the top of the Bone Springs structure, you move then up-dip to the west.

And so, what we were hoping to do was to let gravity work in our favor and hoped to drain these wells back towards the -- the sump, if you will, where the pump would be located.

We felt as though it would be advantageous to

have the oil draining back towards the vertical portion of the well bore for production purposes.

Q. Does Chesapeake plan to drill more wells similar to the Mosaic Federal 3-H well?

A. Yes, we do.

Q. Will it be of significance to you if the oil allowable for the pool is increased to 800 hundred barrels a day?

A. I certainly believe that it would. Our intentions are moving forward with any additional development in here that we would, again, utilize the full 160 acre lateral.

Q. Let's turn now to Exhibit 5 and look at the log for the Mosaic 34 Federal 1-H. First of all, Mr. Wescott, identify for us what we're looking at and then we'll talk about it.

A. Well, we're looking at a large section on just the Mosaic 34 Federal 1-H. And as you recall, I mentioned of the three wells that Chesapeake drilled, this was the only one that we -- we drilled a pilot hole to log this section.

And so what you are looking at is a section of the Cherry Canyon. And what is highlighted in yellow is our targeted interval for when we did kick off in all three of these wells the interval that we were targeting.

HEARING EXAMINER: Cherry or Bushy?

THE WITNESS: Cherry Canyon.

Q. Are there other wells in this pool that also target the Cherry Canyon?

A. It is my belief that all of the horizontals that you see on Exhibit 4 that are contained within this map area are targeting the same interval.

Q. Approximately how thick is this interval?

A. In this location, it is approximately 28 feet, I believe.

Q. Is that generally characteristic of the productive interval within the Cherry Canyon member of the Delaware?

A. That's a close approximation, certainly for the area contained within the south half of Section 34.

Q. When we look at the log on this well bore, what was the strategy for the horizontal portion of the well bore as it went through this portion of the Cherry Canyon?

A. To keep the horizontal portion contained within the highlighted interval that is shown in yellow on this log section.

Q. Do you do that in such a way that you try to center through that interval or not?

A. Yes, we do. While drilling the lateral, we do obviously have directional drillers with MWD, or measured

well drilling capabilities, that will send back gamma ray information while the well is being drilled.

And so every 30 feet I would be obtaining this gamma ray information that I can then tie back to the pilot hole to ensure that I am -- where it is that I need to be in the drilling of that lateral.

Q. Show us on this example of Exhibit 5 how you and Mr. Taylor went about calculating the net foot height that you associate with this calculation.

A. We took the characteristics of the highlighted interval, but also took into account that when this well was completed, we did run casing on this.

This was a multiple stage frac job. We took into account that it was certainly reasonable to believe that when this interval was fracture stimulated, that the fracture would have not necessarily been contained strictly within the highlighted interval, but that fracture would go up as well as down.

And so if we looked at this log section as to what would provide barriers in there, we felt as though the shale barrier that's right around just about 4,800 feet and right at about 5,000 feet, that those intervals would contain the fracture stimulation.

And I believe -- you have the document in front of you, but I believe that calculated out to 178 feet, the

overall interval that we believed that was fracture stimulated.

Q. It was 174 feet.

A. 174.

Q. That was a number that you and Mr. Taylor worked out together using your best effort to come up with that number?

A. That is correct.

Q. What do you do about porosity values when you study this type of work?

A. We calculated the cross-plot porosity being average of neutron and density porosity over that interval that we felt contained the frac for fracture stimulation.

Q. Is there core data available for that purpose?

A. No, sir, there is not, not in this immediate area.

Q. Anything else, Mr. Wescott?

A. No, sir.

MR. KELLAHIN: That concludes my examination of Mr. Wescott. And I move the introduction of his Exhibits 3, 4, and 5.

HEARING EXAMINER: Exhibits 3, 4, and 5 will be admitted. So did you say it was just -- start on the east and drill west up dip? Did you guys look at Marbob's wells? Obviously, you've been real successful here, so --

But did you look at Marbob's wells and decide drilling orientation? I mean, as far as the -- was the object to get a good fracture stimulation or was it your object to intersect fractures?

THE WITNESS: There has been some work that's been done out in this general area, not necessarily just on the Cherry Canyon but in the Bone Springs by ourselves as well as other operators that have given us information as to -- as far as what the preferred principal stress direction is for the area.

And we do feel as though it's advantageous to orient these wells east/west for the reasons that I stated earlier, but also for what you're bringing up, to intersect the natural fractures and go normal -- as normal as possible to the principal stress direction.

Obviously, trying to contain this lateral within a string of four 40 acre proration units, you're somewhat limited as to -- you can't be perfectly normal to that principal stress direction and also stay within four 40.

So with all of that in mind with just a choice of do you go north/south or east\west, we felt east/west was best.

HEARING EXAMINER: Okay, so it's a compromise, then, between your land and your geology, basically?

THE WITNESS: Yes.

HEARING EXAMINER: That sand down at 5,120 or so that looks like -- what -- I mean, where is your top of Bone Springs on this log here? Is it on this log?

THE WITNESS: It's not on this log. This is really just -- it is showing just the upper roughly 125 feet of the Bushy Canyon.

HEARING EXAMINER: Okay.

THE WITNESS: So you have several hundred more feet below you before you have -- I say several hundred more feet. You have probably 300 more feet before you get to the top of the Bone Springs.

HEARING EXAMINER: Oh, wow. It's real thick. And do you really think that frac job went that high and that low, 174 feet?

THE WITNESS: Well, in looking at the characteristics on the open hole log, we didn't feel as though that it was necessarily any barrier other than the shale intervals in there. There's not a thick, tight line that would act as a barrier for that frac.

And so, really, again, what we saw was at -- just about 4,800 to about 5,000, that those shale sequences in there were thick enough to act as a barrier to the fracture stimulation.

HEARING EXAMINER: Okay, so it's a maximum?

THE WITNESS: Yes.

HEARING EXAMINER: It would never grow beyond that --

THE WITNESS: Exactly. That's correct.

HEARING EXAMINER: What about -- how much was prompted with -- Do you guys have a stimulator or anything that stimulated that to see how much your frac job actually did or --

THE WITNESS: I'm certain that work was done. I don't know that I would have been involved with that, with the design of the fracture stimulation. I don't have that information, I apologize.

HEARING EXAMINER: What about as far as what would contribute to your production, is this just sand?

THE WITNESS: Yes, sir, it is.

HEARING EXAMINER: Okay. So no matter what you frac'ed if it is just sand -- unless you get into some water at that frac job?

THE WITNESS: That's correct.

HEARING EXAMINER: Were you worried about that?

THE WITNESS: Well, certainly, any time in the Delaware you're worried about water.

HEARING EXAMINER: Okay.

THE WITNESS: And it's very difficult to stay away from water in the Delaware. Not that there is a -- necessarily oil-water contact in the targeted interval,

but because of the stratigraphic complexity of the Delaware, you do have shingled or stacked intervals that are oil bearing, water bearing, oil bearing, water bearing.

HEARING EXAMINER: Okay. So frac job aside, it was to your advantage to drill that long-reach well the way you did?

THE WITNESS: Absolutely. Just our basic thinking on it was that the more lateral that we could come into contact with the pay interval, the better.

And so if you look at the -- roughly, if we assume that these are 80 acre horizontals and the work that has been done not only by us but by other operators to the south, if we compare what we actually contacted in the 1-H and in the 2-H, we started with an offset of 330 feet from the lease line and we would end at 330 feet, or no closer than that to the west line of those 80 acre units.

It roughly takes 500 feet to deviate off of a vertical before you've actually landed into your lateral target.

And so, if we're just talking rough numbers, if you look at the 330 foot offset and added another 500 feet before you're actually in contact with your horizontal target, there is, you know, roughly 800 or so feet of

nonpay interval.

And so, you multiply that by two wells and you have over a thousand feet that you're not in contact with a productive interval, whereas in drilling a single lateral covering the full 160 acres and locating our surface location as far as we could to the east, and then we assume again that 500 feet to actually before you've contacted with the target, we spent a whole lot more time contacting productive rock than we had previously and believed that the other operators had in drilling these other 80 acre horizontals.

HEARING EXAMINER: Is that still considered a medium radius well, 500 feet for the curve, or you don't talk of it in those terms?

THE WITNESS: I haven't heard of it in those terms. You know, since we are running casing in these wells, we have to be very cognizant of our dog-leg severity and try not to get over 12 degrees per hundred feet while building our angle. I don't know if that answers your question or not.

HEARING EXAMINER: It does. So where do you set your casing? Is it down at -- where was your casing?

THE WITNESS: The casing will be tied all the way back up to the top of the Delaware. So our production string goes from the base of the salt section all the way

out to the toe of the horizontal.

HEARING EXAMINER: Okay. And it's not slotted line or anything out there, it's perforated?

THE WITNESS: No, sir, it is perforated.

HEARING EXAMINER: Okay. I guess one more question is, sand is my -- Our geologist in Aztec lectured me last week about sands as being -- the definition of sand being grain size instead of what type minerals make up the sand. So what is this sand made out of?

THE WITNESS: It's very fine-grain sand.

HEARING EXAMINER: Is it quartz?

THE WITNESS: Oh, I'm sorry, yeah. There would certainly be a -- I don't know that I can give you the exact mineralogical makeup, but it will certainly be primarily quartz, yes.

HEARING EXAMINER: It's very fine grain?

THE WITNESS: Very fine grain.

HEARING EXAMINER: So what develops the porosity in it, then? The top of this looks like the best porosity.

THE WITNESS: It is of a granular porosity. But this isn't secondary porosity development, it's all inner granular.

HEARING EXAMINER: Is it bigger sand at the top of this sand, is it portion-upward type of --

THE WITNESS: I think that that's an accurate statement. You know, again, speaking in relative terms, what you may be seeing there is going from the base of that highlighted interval of almost a silt-type grain size grading up into very fine and as coarse as you may get in that higher porosity interval towards the top as fine grain.

So again, from a relative standpoint, yes, you are getting coarser, but you're talking about very fine grain sand.

HEARING EXAMINER: Okay. And no quartz in this --

THE WITNESS: No, sir we have none.

HEARING EXAMINER: Your drill time helps you stay in that interval, or just your gamma ray, is that the only thing you've got to go by?

THE WITNESS: Well -- yeah, gamma ray, and like I say, drill time, and really, primarily the gamma ray. And so, it's rather subtle, but if you notice in that highlighted interval, the overall gamma ray signature in there is quite a bit cleaner than the surrounding rock, and certainly as you move up into -- above or below into some of the shale intervals.

And so, it would be easy enough for me to tell if we had started to come up or down in a section getting

to a higher gamma-ray type of rock, and then we could reorient our tools to get back over into the middle of this interval.

HEARING EXAMINER: Your cuttings that you pulverized, you just look at the gamma ray and the real time?

THE WITNESS: We did utilize mud loggers in this, and so they would have been analyzing our samples for us. And we certainly use all the information that we can, gamma ray, rate of penetration. And my mud logger's telling me what our samples are looking like and I can try to stay in the best part of this zone as possible.

HEARING EXAMINER: So why is this well so much better besides just the long reach? In other words, you're coming to get an increased allowable here, it looks like. So from geologic perspective, why is this one so good? Frac jobs just did a good job?

THE WITNESS: Well, I think that that certainly plays a part in it. As I described earlier, the total number or amount of footage that was in contact with this reservoir versus the wells that had been drilled previously out here -- and unfortunately, we don't have a pilot hole for this.

And so I can't point to anything directly and say, you know, that this is really different. An

evaluation of the open-hole data that I have, the reservoir is fairly consistent as far as porosity development.

And so I would not expect to encounter a well out here that suddenly has very different reservoir characteristics, it's more of a variation in overall thickness of the reservoir.

But with the data that I do have, at least in the south half of Section 34, that reservoir thickness is relatively uniform.

HEARING EXAMINER: Okay. Terry?

MR. WARNELL: No questions.

MR. BROOKS: No questions.

HEARING EXAMINER: Thanks a lot, Mr. Wescott.

THE WITNESS: Thank you.

MR. KELLAHIN: Mr. Examiner, at this time we call Mr. Raymond Taylor.

RAYMOND TAYLOR,

The witness herein, after being duly sworn upon his oath was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A. My name is Raymond Taylor. I go by Ray. I'm a

senior reservoir engineer and I work for Chesapeake Energy.

Q. Where do you currently reside?

A. In Oklahoma City.

Q. On prior occasions, have you testified as a petroleum landman before this Division?

A. Yes, I have.

Q. As part of your responsibilities for Chesapeake, have you examined the performance of these Mosaic wells in this pool?

A. I have.

Q. In addition, have you made yourself knowledgeable about the other engineering components of wells in this pool?

A. Yes, I have.

Q. As part of your studies, have you reached the conclusions that you're about to express?

A. Yes.

Q. And have you satisfied yourself that you have sufficient engineering data upon which to make those recommendations?

A. I have.

MR. KELLAHIN: We tender Mr. Taylor as an expert petroleum engineer.

HEARING EXAMINER: Mr. Taylor is qualified as an

expert petroleum engineer.

Q. Let's step back a moment, Mr. Taylor, and let's go back to the permit, for the Examiner's benefit. Referring to what is marked as Exhibit 6, what do you find, sir?

A. It's an Administrative Order numbered NSL-5888.

Q. And is this the permit which was obtained for Chesapeake for which the Mosaic Federal 34 3-H well was drilled?

A. That's correct.

Q. If you'll set that aside for a moment, let's look at the Division form C102 that's associated with the permit. And you'll find that on Exhibit No. 7.

A. Yes.

Q. Looking down on the survey plat, quickly describe for the Examiner the starting point and the ending point for the horizontal lateral for this well bore.

A. Yes. First of all, you're looking at the north half of the south half of Section 34. The surface location is on the east side of the section located approximately -- this indicates 25 feet from the boundary of the section.

The lateral would progress across the section from east to west with a bottom hole terminus of 350 feet

from the west side of Section 34.

Q. Would you now turn to what is marked as Exhibit 8? Is this a correct copy of the completion report for the subject property?

A. Yes, it is.

Q. Give us a general summary of the productivity of this well.

A. Actually, I can probably touch upon the productivity of the well with the next exhibits a little better.

Q. Yeah. When this well was initially tested, what was its highest production rate?

A. Once again, if you -- I apologize for skipping ahead, but on Exhibit No. 9, this is a listing of the various Delaware wells that are producing within the Willow Lake Southwest pool.

This is a pool that has been dominated by horizontal drilling. There have only been two vertical wells in the pool, only one of which is still productive.

Information on this particular Exhibit 9, moving from left to right across the exhibit, you'll move from well main to API number, operator, location, section, township, range, month of first production.

And then you'll have some initial rate information, current rate information, and cumulative

recovery to this point in time for each well.

If you'll drop down and look at the Mosaic 34 Federal 3-H, which is about the fourth well down on the horizontal well grouping and move to the initial rate information, you can see that that well produces as high as 1,066 barrels a day at the highest point of production. And 514 MCF was making 554 barrels of water.

This is the very best well, obviously, horizontal or vertical, that has been drilled in the pool to date.

If you'll compare the 1,066 barrels to the next wells, which happen to be Chesapeake's Mosaic 34 Federal 1-H and 34 Federal 2-H, you can see that those two wells only had initial rates of approximately 300 barrels a day.

So this is really a significant increase in the productivity for the Delaware in the manner in which we drilled this well and completed it.

Q. Step back a moment, Mr. Taylor, and describe for us the generalized reservoir characteristics of the Southwest Delaware Willow Lake pool.

A. Okay, well, when you say reservoir, that's a difficult term, because you don't have a single reservoir, you have multiple reservoirs in a common source of supply. The hydrocarbon bearing ones would be solution gas drive.

Q. Are you focusing on the Cherry Canyon, that is

the solution gas drive?

A. That is correct, a solution gas drive reservoir. You probably do have some water-bearing reservoirs in there, as well.

But once again, I want to emphasize we're not talking about a reservoir, we're talking about many small, thin reservoirs in a much larger common source of supply.

Q. What in your opinion accounts for the high productivity of this well bore?

A. Obviously, it's -- and I'll amplify what Mr. Wescott had said, it's the length of the lateral, number one. We contacted that much more reservoir rock than the other laterals that have been drilled to date in this pool.

I will say that this well was probably fracture treated a little more aggressively, at least, than the two wells that we have completed previously. Job size was slightly larger. We actually pumped more stages than we pumped in the other two wells.

So that would lead me to believe that we just contacted that much more reservoir and common source supply. I want to get that term in. We contacted that much more common source of supply, and that's where the productivity is coming from. And that's the approach that we will follow in the future when we drill additional

wells.

Q. If the Examiner approves the application and increases the allowable for the pool, such as well Mosaic 34 Federal 3-H, and have the ability to produce up to but not in excess of 800 barrels of oil a day, is there a future need for that? What's the advantage of doing that?

A. Well, the future need would be for the long lateral wells that would be drilled in the future and give us an ability to recoup our investment back that was made drilling those long laterals and pumping the fracture stimulations necessary to contact the common source of supply.

Q. When you talk about well bores like this, what is the approximate cost of this well?

A. This well cost a little bit less than $5 million, about $4.7 million. From a horizontal's perspective, it's a relatively shallow well, it's, you know, 4,900 to 5,000 feet in depth. But the expense comes in drilling the long lateral and the completion that's necessary.

Q. Have your studies caused you to conclude that there is any risk to the correlative right of the other interest owners if the pool rules are changed to allow an allowable 800 barrels a day?

A. No, I don't believe that there would be any risk

to correlative right, because as Mr. Wescott had described, we're trying to contact a very thick interval.

There's potentially a great deal of hydrocarbons contained in that thick interval, and we're just trying to contact as much of it as possible.

However, even with that we still are within the confines of the 160 acre unit that this particular well sits on. And we'll discuss that here in a little bit on another exhibit.

Q. Let's turn back now to Exhibit No. 9.

A. Yes.

Q. Apart from drawing our attention to the type of activity of the 3-H as showing as the best well in the pool, is there any other data that you want to drawn the Examiner's attention to?

A. There's really nothing of significance. I have looked at the wells in this pool -- horizontal wells -- to see if there is any preference to drilling east\west as opposed to north/south.

Obviously, as you look at the structure map exhibit, this is dominated by east/west drilling. We have a very small population of north/south wells that are drilled.

There might be a slight preference in well behavior to drill east\west as opposed to north/south, but

it's very slight.

The wells that were drilled north/south with the exception of one which was another poor portion of the common source of supply, they behaved reasonably similar to the east\west wells.

And fracture stimulation here, you're going to cause a fracture to initiate and propagate more or less southwest to northeast. There will be a slight variation and it might not necessarily be at a 45 degree angle.

So with that, you can see that whether you orient north/south or east/west, you're still allowing your fractures to be perpendicular or reasonably perpendicular to the horizontal well bore.

Q. Is there any need for the Examiner to address changing the statewide gas-oil ratio limit from what it is?

A. No, there should not be at all.

Q. Let's turn to Exhibit 10. Can you describe that for us?

A. Exhibit No. 10 is -- I'll call it an allowable schedule for the Mosaic 34 Federal 3-H. This is historic data that is -- I produced it up through the end of May of this year.

This document was actually produced before May was completed, so there is a little bit of projection

involved for May.

The rest of the data that appears on here is historic data. Working across the exhibit from left to right, we have month and year of production.

Q. December of last year would be the first month in which there was production from the well?

A. That is correct.

Q. If we read across, what's the significance of having a number in parentheses?

A. Okay, when we arrive over at the column entitled "Status, the number in parentheses indicates that there was actually underproduction during that month.

We did not exceed the depth bracket allowable of, in this particular case, 320 barrels of day during that month.

Then obviously the converse of that is a positive number in that Status column which would indicate overproduction for that month.

And as you progress across the exhibit, there is a couple of columns here for test allowable and status based on test allowable.

Test allowable was requested but wasn't granted here, so I won't dwell on that.

And then we have gas production, the allowable, based on the 2000 to 1 limiting GOR in this particular

case. That would be 640 MCF a day.

And then, once again, a Status column for gas. Focusing on the Status column for gas, you can see during April and May, there were very, very small volumes of overproduction of gas -- or projected overproduction, because once again, May is a projected month.

But overall, we're underproduced with respect to gas by almost 40 million cubic feet.

If you move back over to the Status column on the oil side of the exhibit, we're overproduced about 12,830 barrels at this point in time.

Q. If the Examiner agrees to change the oil allowable for the pool, the application indicates a proposed effective date of January 1 of this year; is that the date you're seeking?

A. Yes.

Q. Let's turn now, Mr. Taylor, to Exhibit No. 11. What are we looking at here?

A. Exhibit 11 is, once again, an allowable schedule. It's exactly in the same format as the previous Exhibit No. 10.

The only difference now is that I have moved from historic information to historic plus projected information.

And the projected information will become

apparent when we look at the next exhibit which is a decline curve.

I have projected the performance of this well all through December of 2009. That is the point in time at which with no relief from the Commission, this well would have mitigated all of its overproduction.

That's the yellow highlighted cell here under the cum status for oil.

You can see that in 2009, you develop a negative number there. That would mean the well would be in non-overproduced situation.

If you'll focus on the Oil Production column and look at July of 2009, I'm projecting that the well will fall below the depth bracket allowable of 320 barrels a day at that point in that particular month.

So you can see that the high productivity at least of this well has been very early in its life, and that's exactly what you would expect for a well that has a great deal of hydraulic fracturing in a very tight reservoir. You would expect hyperbolic behavior and that's certainly what you're getting.

And finally, if we focus on the Gas Production column, you can see that there were a couple of months, as I pointed out earlier, April and May, where we actually exceeded the 2000 to 1 limited in GUL for gas.

By June, this particular month, I'm anticipating or projecting that the well will fall beneath that capability to produce that.

And the well will never have a serious problem with respect to gas production and its allowable. The focus would be on oil.

And you can see that I'm anticipating the well will have produced above 120,000 barrels by the end of December of this year when it would conform to -- or have mitigated all of its overproduction.

Q. Let's turn now to the rate-time curve. I think that's Exhibit No. 12?

A. Yes. This is a rate-time plot for the Mosaic Federal 3-H. You're plotting daily production values versus time.

I displayed actually daily GOR, daily water, daily gas, and daily oil.

As you move upward across the plot, you can see that there -- moving through daily oil data, there is a green solid line. That's the -- I'm projecting what the performance of this well will be into the future.

And similarly for the gas, there is a red solid line, that's what I'm projecting the performance of the gas will be into the future.

That is based not only on the immediate data

that you see before you here in this well, but also in the manner in which our two Mosaic wells and other wells within the pool have produced.

But anyway, this projection forward is what I've utilized in Exhibit 11, that's what I've utilized to add the projection data to that particular exhibit.

Q. When you look at Exhibit No. 12, do you see any of the effects that you might associate with the change of oil-water contact in this reservoir?

A. Really not. If you focus on the water production for this well, you can see that it's been in the range of a thousand barrels, maybe slightly less, up to perhaps 1,300 barrels a day.

It's really been pretty consistent. Of course early on, some of that is going to be impacted by the load that was placed with the hydraulic fracture treatments, but even since that time you can see that the water production has been fairly uniform and consistent.

And that's not unexpected with respect to Delaware production. We're going to hopefully move a lot of oil and gas, but we're going to move some water, too. This well is produced with an electric sump pump.

Q. Let's look at this with a slightly different perspective. Assuming the Examiner chooses not to grant the exception, can you give him an illustration of what

the magnitude of the frac is of what would be the accumulated overproduction associated with this well bore and put it in terms of acre feet or area?

A. Certainly. Once again, if you move back to Exhibit 11, which was the historic plus projected allowable status, and you look at the Cum Status column, you can see that for the month of June, the cum status is about 14,074 barrels.

That is the maximum amount of overproduction that I'm anticipating the well will accumulate if it functions only against the current depth bracket allowable of 320 barrels a day.

So now if we move on to Exhibit 13, I have taken that particular volume and translated it volumetrically into an area surrounding the well bore.

At the top of the exhibit is data which reflects the various petrophysical and reservoir characteristics I utilized to make this calculation. The lower portion of the exhibit is the calculation itself.

And that maximum accumulated overproduction of 14,074 barrels equates to about 1.3 acres surrounding the well bore. So it's an extremely small area volume around the well bore.

Q. When you analyze this application, Mr. Taylor, do you see any harm or disadvantage that occurs to any of

the other operators and interest owners outside of this spacing unit?

A. I do not.

Q. And summarize for us what you see to be the advantage of changing the rules for the pool.

A. Once again, the advantage to changing the rules in the pool is to account for the significant increase in productivity that we have experienced by drilling a long-lateral well as compared in to anything else that has been drilled to date in the pool.

Plus, it also accounts for the fact that we are more aggressively fracture stimulating these wells with more stages and somewhat larger treatments.

Q. Is it of help to Chesapeake if the higher allowable is approved to provide the incentive to do this type of drilling?

A. Absolutely.

MR. KELLAHIN: That concludes my examination of Mr. Taylor. I move for the introduction of his Exhibits 6 through 13.

HEARING EXAMINER: Exhibits 6 through 13 are admitted. Mr. Taylor, I'll try to go pretty fast here. You have a big day ahead of you. You drilled on the balance of this stuff, so we can see how well -- You can't predict how good your well is before you --

THE WITNESS: If we do, only slightly so. The presumption is that we're penetrating oil and gas bearing rock, as we're drilling it anyway.

The shows are not of tremendous significance. Perhaps the only thing that they give us some assistance on is where to physically place perforation clusters as we progress to our various completion stages.

That's probably the biggest assistance we get from that information.

HEARING EXAMINER: Your perforation clusters would be good if you have some sort of log to --

THE WITNESS: Well, of course, we have -- in many of our horizontal holes, we conduct shuttle logging operations and we gather log data along the lateral as well.

But by comparing that data to what you get from the mud logging information, that aids you hopefully in placing those perforation clusters as well as they can be placed.

HEARING EXAMINER: Okay. The 2,100 pounds, is that from your drilling gradient?

THE WITNESS: That really is from drilling grading. I don't really have any bottom-hole observations in this area. That's more or less a standard pressure gradient for approximately 4,900 feet in depth.

HEARING EXAMINER: Okay. But, you know, if you did redo this calculation and you only use the thickness of your sand, do you know how much acreage you would affect there?

THE WITNESS: Let me gather my calculator.

HEARING EXAMINER: I didn't mean to cause that, actually.

THE WITNESS: And providing that there was consistency in porosity and water saturation --

HEARING EXAMINER: Right.

THE WITNESS: Certainly. And if we used the approximately 28 feet that Mr. Wescott indicated earlier, you'd be looking at -- you'd be moving from 1.3 acres to about 8 acres to contain that maximum overproduction.

HEARING EXAMINER: Okay. Let's see, those two wells to the south, have they been there awhile?

THE WITNESS: The two Mosaic wells? Our two Mosaic wells. If you'll refer back to -- I guess it's Exhibit No. 9, and the date of first production for each is listed.

They're not terribly old wells. The Mosaic No. 1 first produced in May of 2007. The Mosaic No. 2 first produced in January of 2008.

So they're not terribly old wells. None of the horizontal drilling here is terribly old. Most of it's

occurred since the 2003, 2004 time frame.

HEARING EXAMINER: Do you think it changes your stresses in that vicinity to where your fracs changed a little bit there?

THE WITNESS: I really don't think so. I think the least principal stress is the controlling factor.

HEARING EXAMINER: Pore pressure wouldn't affect it that much?

THE WITNESS: I don't really believe so.

HEARING EXAMINER: Okay.

THE WITNESS: Because you're going to create fractures that propagate southwest to northeast, more or less.

HEARING EXAMINER: Okay, so multi stages on those and no C102 or anything to --

THE WITNESS: No.

HEARING EXAMINER: Okay. Your surface facilities, are they all the same? I mean, how does this well -- are you confident it's measured correctly in its relation to these other wells?

THE WITNESS: Yes.

HEARING EXAMINER: It's common ownership, I assume, out there?

THE WITNESS: Yes, it is common ownership. There is some commonality in the facilities between our

Mosaic wells, but we take great care on a month-by-month basis attempting to test wells and make sure that we're adequately allocating production where it needs to be allocated.

HEARING EXAMINER: Okay. That submersible pump, do you have a variable speed drive on it?

THE WITNESS: I believe it does. I'm not terribly familiar with it.

HEARING EXAMINER: Is that common nowadays?

THE WITNESS: Yes, more or less, I believe so. I'm not a production engineer, so I'll plead a little ignorance in that realm.

HEARING EXAMINER: But I guess the big thing is, are you confident that -- if you did -- You didn't harm your reservoir any, you don't think, by -- because it's -- the top of the reservoir drive by producing as much as you can as long as you can?

THE WITNESS: Not at all. If you look at classic literature, it indicates that in solution gas drive reservoirs -- which are just inherently inefficient recovery mechanisms anyway, the volume of recovery from a given well is reasonably independent of the rate at which it's produced at.

HEARING EXAMINER: Okay. Is there such a thing as a pure solution gas drive reservoir? In other words,

you got some water coming in here.

THE WITNESS: Yeah. I think you --

HEARING EXAMINER: You don't think it's any kind of water expansion or any kind of side water, bottom water, anything --

THE WITNESS: I really don't. And the reason I'm saying that is because we're not talking about a single reservoir entity where water expansion can be providing energy, we're talking about so many little different reservoirs in a large common source supply and they're all going to function somewhat differently.

HEARING EXAMINER: Okay. So, yeah, this -- common source applies in something that is kind of a definition here that people use, but really, as a reservoir engineer, you would -- you're saying there's a bunch of little different reservoirs that you're contacting?

THE WITNESS: I would characterize this as many, many little discrete reservoirs in the very large Cherry Canyon package.

HEARING EXAMINER: Okay. Well, I'll pass it on to Mr. Warnell.

MR. WARNELL: No questions.

MR. BROOKS: No questions.

HEARING EXAMINER: Okay. Thanks a lot. I

appreciate you guys coming.

MR. KELLAHIN: Mr. Jones, that concludes our presentation in this case.

HEARING EXAMINER: Okay. We'll take Case 14300 under advisement.

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

_____, Examiner
Oil Conservation Division

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

REPORTER'S CERTIFICATE

I, PEGGY A. SEDILLO, Certified Court Reporter of the firm Paul Baca Professional Court Reporters do hereby certify that the foregoing transcript is a complete and accurate record of said proceedings as the same were recorded by me or under my supervision.

Dated at Albuquerque, New Mexico this 10th day of June, 2009.

PEGGY A. SEDILLO, CCR NO. 88
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