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:

APPLICATION OF APACHE CORPORATION FOR AN EXCEPTION TO DIVISION ORDER NOS. R-9922-E AND R-12121 TO PERMIT A THIRD WELL ON A WELL UNIT, EDDY COUNTY, NEW MEXICO — CASE NO. 14176

APPLICATION OF APACHE CORPORATION FOR AN EXCEPTION TO DIVISION ORDER NO. R-9922-E TO PERMIT A THIRD WELL ON A WELL UNIT, EDDY COUNTY, NEW MEXICO — CASE NO. 14177

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: DAVID K. BROOKS, Legal Examiner
TERRY G. WARNELL, Technical Examiner

August 21, 2008

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, DAVID K. BROOKS, Legal Examiner, TERRY G. WARNELL, Technical Examiner, on Thursday, August 21, 2008, at the New Mexico Energy, Minerals and Natural Resources Department, 1220 South Saint Francis Drive, Room 102, Santa Fe, New Mexico.

REPORTED BY: JOYCE D. CALVERT, P-03
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Examiner Hearing
CASE NO. 14176 & 14177

A P P E A R A N C E S

FOR THE APPLICANT:

James G. Bruce, Esq.
ATTORNEY AT LAW
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Santa Fe, New Mexico 87504

MR. BRUCE: Mr. Examiner, these next two cases we're going to ask that they be consolidated and I don't know if you wanted to take a break before we start these.

MR. BROOKS: They're going to take awhile, I take it?

MR. BRUCE: Well, they won't be as brief as my prior case.

MR. BROOKS: Okay. We'll take a ten-minute break.

[Recess taken from 10:25 a.m. to 10:33 a.m., and testimony continued as follows:]

MR. BROOKS: Okay. We're back on the record. We will call Case No. 14176, Application of Apache Corporation for an Exception to Division Order Nos. R-9922-E and R-12121 to Permit a Third Well on a Well Unit, Eddy County, New Mexico.

Call for appearances.

MR. BRUCE: Mr. Examiner, Jim Bruce of Santa Fe, representing the applicant. I have three witnesses.

And I would ask that this case be consolidated with the following case.

MR. BROOKS: Now, Mr. Carr entered an appearance for OXY, but I don't see anyone from his firm here.

MR. BRUCE: Yes. He did enter an appearance.

MR. BROOKS: Okay. Call No. 14177, Application for Apache Corporation for an Exception to Division Order No. R-9992-E to Permit a Third Well on a Well Unit, Eddy County, New Mexico.

Call for appearances.

MR. BRUCE: Mr. Examiner, Jim Bruce of Santa Fe, representing the applicant.

MR. BROOKS: Okay. And do you have -- these three witnesses will be testifying in the consolidated hearing?

MR. BRUCE: Yes sir.

MR. BROOKS: Very good. Cases Nos. 14176 and No. 14177 will be consolidated for purposes of hearing, and after they've been taken under advisement, the Division will make a consolidated order or separate orders.

Will the witnesses please identify themselves?

MR. BRINDLE: Paul Brindle.

MR. CLARK: Paul Clark. I reside in Oklahoma.

MR. CURTIS: Robert Curtis.

MR. BROOKS: Will the witnesses please stand and be sworn.

[Witnesses sworn.]

PAUL BRINDLE

after having been first duly sworn under oath, was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. BRUCE:

Q. Would you please state your name and city of residence.

A. Paul Brindle, Tulsa, Oklahoma.

Q. Who do you work for and in what capacity?

A. I work for Apache Corporation as a landman.

Q. Have you previously testified before the Division?

A. I have not.

Q. Would you please summarize your educational and employment background for the examiner.

A. I received a Bachelor's of Arts in economics from Gonzaga University in 1992 and a law degree from the University of Oklahoma in 1998. I subsequently passed the bar up in Idaho, worked for the City of Boise as assistant city attorney, then I worked for the Idaho Supreme Court as a clerk to Justice Daniel Eismann. And then I worked as a city attorney for the City of Garden City in Idaho.

Subsequently, approximately three years ago, I was hired by Apache Corporation as a landman.

Q. Are you familiar with the land matters regarding this application?

A. I am.

MR. BRUCE: Mr. Examiner, I tender Mr. Brindle as an expert petroleum landman.

MR. BROOKS: He is so qualified.

Q. (By Mr. Bruce): Mr. Brindle, could you identify Exhibit 1 for the Examiner?

A. Exhibit 1 is a land plat showing in yellow the

Indian Basin Upper Penn, Pennsylvania associated pool, and in blue is the Upper Penn gas pool.

Q. And are the well units we're here for today highlighted on this plat?

A. They are. They are highlighted in red in Section 36 and again in red in Section 2, and that is Section 36, 21 South, 23 East and Section 2, 22 South, 23 East.

MR. BRUCE: And Mr. Examiner, the first case, Case No. 14176, has to do with the Section 36 well, and the second case has to do with the Section 2 well.

MR. BROOKS: Okay.

Q. (By Mr. Bruce): Mr. Brindle, what is Exhibit 2?

A. Exhibit 2 is a copy of Order No. R-9922-E, which contracted the acreage out of the gas pool and moved it into the associated pool, which created sort of a buffer between the associated pool well units which adjoined the gas pool well units.

Q. And did this order limit the number of wells which could be drilled in the associated pool in this buffer area between the two pools?

A. It did. It limited the number of wells that could be drilled in those well units.

Q. And what was the basic reason for this buffer zone?

A. There's a higher allowable in the associated pool

than in the gas pool.

Q. What is Exhibit 3?

A. Exhibit No. 3 is a copy of order R-12121, and that one is a -- this order allowed two wells in the SE/4 of Section 36, 21 South, 23 East, wherein the previous order that we discussed, that 9922-E, had allowed only one per quarter section.

Q. Okay. So in the first order, you could have one well per quarter section and two wells in a half section?

A. Correct.

Q. And then this subsequent order for the W/2 of 36, it allowed two wells but they were both in one quarter section?

A. That is correct, in the two wells in the SW/4.

Q. And with respect to Section 36, why was that done? Why were two wells drilled in the same quarter section?

A. The previous operator, Kerr-McGee, it was their belief that the NW/4 was not productive -- or was a good prospect, so they put two in the SW/4.

Q. What does Apache now seek in these two cases?

A. Apache is seeking to drill a third well in the Section 2 -- or in the W/2 of Section 36, 21 South, 23 East and also a third well in the E/2 of Section 2, 22 South, 23 East.

Q. And with respect to the Section 36, this third well will be in the NW/4 where Kerr-McGee previously didn't want to drill; is that correct?

A. That is correct.

Q. Does Exhibit 1 also reflect the offset operators to these well units?

A. It does.

Q. Did Apache notify these offsets?

A. Yes, we did.

Q. Now, did Apache also notify the working interest owners in the well units which it operates?

A. Yes, we did, and also they are Marathon and OXY, and they're also offset operators.

Q. So it's a limited number of working interest owners out here?

A. That is correct.

Q. And are Exhibit 4 and 5 the affidavits of notice in these two cases?

A. They are.

Q. And these parties did all receive actual notice, did they not?

A. That is correct.

Q. Now, the Hearing Examiner mentioned that Mr. Carr, on behalf of OXY, entered an appearance. Has OXY -- OXY is not only an offset operator, it is an interest owner; is that correct?

A. Correct. They are an interest owner in Section 36, 21 South, 23 East.

Q. Have they objected to the drilling of the well?

A. They have not. We proposed the location, proposed the well, and they elected to participate in the well conditioned upon us getting approval from the State.

Q. Okay. Were Exhibits 1 through 5 prepared by you or under your supervision or compiled from company business records?

A. Yes.

Q. And in your opinion, is the granting of this application in the interest of conservation and the prevention of waste?

A. Yes.

MR. BRUCE: Mr. Examiner, I move the admission of Apache Exhibits 1 through 5.

MR. BROOKS: Exhibits 1 through 5 are admitted.

[Applicant's Exhibits 1 through 5 admitted into evidence.]

MR. BRUCE: I have nothing further of the witness.

EXAMINATION

BY MR. BROOKS:

Q. Okay. What is the spacing provided in the Indian Basin Upper Penn per gas pool?

A. It's one well per 160.

Q. It's based on 320-acre units with two wells per unit?

A. Yes, sir.

Q. And Indian Basin Upper Penn unit pool is spaced how?

A. I believe that is one -- it's the same. It's one 160 pacing, 328 units.

MR. BRUCE: Well, Mr. Examiner, it's 640-acre spacing.

MR. BROOKS: With four wells per unit?

MR. BRUCE: Well, you can have as many as you want because it's a prorated gas pool.

MR. BROOKS: Okay. And so the only limit, then, is the limit in these special orders?

MR. BRUCE: That is correct, Mr. Examiner. I think the allowable -- although our engineering witness will discuss gas production -- but the allowable in the gas pool is about six-and-a-half million a month, six-and-a-half million per day, and the allowable in the associated pool is 9.8 million a day --

MR. BROOKS: Okay.

MR. BRUCE: -- in gas.

MR. BROOKS: Very good. Mr. Warnell?

MR. WARNELL: No questions.

MR. BROOKS: Call your next witness.

MR. BRUCE: I call Mr. Curtis to the stand.

ROBERT E. CURTIS

after having been first duly sworn under oath,

was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. BRUCE:

Q. Would you please state your full name?

A. My name is Robert E. Curtis. I am an exploration geologist employed by Apache Corporation in Tulsa, Oklahoma.

Q. Have you previously testified before the Division?

A. Yes, I have.

Q. And were your credentials as an expert petroleum geologist accepted as a matter of record?

A. Yes.

Q. And are you familiar with the geology involved in this case?

A. Yes.

MR. BRUCE: Mr. Examiner, I tender Mr. Curtis as an expert petroleum geologist.

MR. BROOKS: So qualified.

Q. (By Mr. Bruce): Mr. Curtis, let's go through -- I think "run through" your exhibits is the right term.

A. Okay.

Q. Let's start with your Exhibit 6. Could you identify that for the Examiner?

A. Exhibit 6 is just a well data map near each well bore. It identifies the operator of the well, the well name and number to the right-hand side of the symbol. To the left-hand side is the last five digits of the API number. It sometimes gets a little confusing as to operator because some wells have been plugged and then subsequently different companies have bought leases, and the records still show that the original operator has that well, but, in fact, they're gone.

But with the API number, should the examiners need to check on any particular well, it will be easily located.

Q. And are the -- let's start with Section 36.

A. Yes. The W/2 of Section 36 is outlined in red. The Apache Corporation Lowe State No. 7 is identified with the red triangle.

Q. That's the proposed well?

A. That is the proposed well.

Q. And there are also -- we're asking for three wells per well unit, but there are already four wells. And I think you'll get into this, but let's just start off so we don't get confused. What are the status of the other four wells on this?

A. Working from the north down, the Lowe State No. 1, API #10342 is currently being plugged and abandoned. Apache purchased both of these leases from Kerr-McGee

approximately two years ago. Apache's corporate philosophy is to buy what other companies consider to be fields at the economic limit of their production, improve operations, decrease well costs or operating costs, and make the leases more profitable. And then also to drill additional wells that we think will tap compartmentalized reserves.

So the Lowe State -- the last time the Lowe State No. 1 -- the last time it produced consistently, actually, was 1985. There was a mechanical problem with the well as testified to by Kerr-McGee in Order R-12121. We unfortunately have not yet received the well file on this well, so we can't specifically address that situation.

But when we were going in to plug it, we did discover there was a casing leak well shallow, up above the Upper Penn. Lowe State No. 5 is currently producing. Lowe State No. 6 is the well for which our R-12121 had to be written. It's currently producing. The Lowe State No. 2 was plugged and abandoned prior to 2004. And there will be data on its date of last production on subsequent exhibits.

Q. So in Section 36, the three wells which you seek approval to produce at the same time are the Lowe State 5, 6 and 7 wells?

A. Yes.

Q. Okay. Let's do the same thing in Section 2.

A. Okay. Section 2, the well we seek approval to

produce would be the northernmost well, the Conoco State 11. The Conoco State 3 is a disposal well. Conoco State 6 is a producer, as is the Conoco State -- and that got a little bit over-posted -- No. 8 in the SE/4.

Q. And that's the API No. 32413?

A. Yes. So the three concurrently producing wells in that spacing unit would become the 6, 8, and the 11.

Q. Do you have anything further on this, Mr. Curtis?

A. I think not.

Q. Okay. Let's move to on your Exhibit 7. What does this reflect?

A. Exhibit 7 is the stratographic cross section running from just north of the Lowe State lease down through the Conoco State lease. It will be identified on the geologic exhibits. The top of the Upper Penn carbonate is depicted in the blue line. That's probably Cisco in age. The dashed line below it is just a correlation marker. It demonstrates that things are not layer cake in the reservoir. The brown line farther down is a shale marker.

And once again, it additionally demonstrates lack of conformity. Some of the issues that arise in evaluating the Upper Penn reservoir here in Indian Basin is that the initial wells were drilled in the mid-sixties and generally logged with only a bore hole compensated sonic log which will give a conservative view of porosity. Porosity in this reservoir is

composed of some intergranular, but then there's also a very large component of buggy porosity which the sonic log cannot see because of the physics of that tool. More modern neutron density logs image that porosity better, but even those logs do not see very far into the formation, so the net pay map I will submit later is probably a conservative estimate of the pay in the area.

The gamma ray curves on the left side of each log do show, you know, considerable variation. Each one of the small gamma ray spikes is probably a paleosole or tidal flat environment which could provide compartmentalization of these reservoirs. If one looks at the logs, it becomes readily apparent that, you know, yes, there could be substantial compartmentalization.

Q. Is it fair to say this is a complex reservoir?

A. Yes, sir.

Q. Let's move next to your Exhibit 8. What does this reflect?

A. Exhibit 8 is the Upper Penn cumulative production. Gas is in red, oil in green, water in blue. Unfortunately, my database doesn't necessarily recognize everything I do to some of the numbers. The legend says -- it is somewhat incorrect. The gas was reported in millions of cubic feet. The oil and water are reported in thousands of barrels. What this -- and then the production -- cumulative

production from each well bore is in the colored numbers below the symbol. Dates of first and last production are located directly above the well symbol. And again, operator and well name are to the right.

I have added cumulative production -- cumulative gas production -- figures from each stand-up 320, and they're in the bold red letters at the top of each 328-acre unit. It demonstrates there has been a lot of production in the area. Our Lowe State unit has cumed 30.7 BCF already. That's a nice number, but it's not by far the largest 320-acre area -- or 320-acre production in the area. The green ellipse centered on the four corners of 21 and 22 South, 23 and 24 East, penumbras out at 344 acres, which is essentially a half section. It has produced a cumulative 132.667 BCF since inception, and it's still producing over 1.8 million per day.

Generally, the initial wells are the largest producers. They were being drilled in the mid-sixties and generally cased with four-and-a-half or five-inch casing. There appears to be a water drive of some -- or a water influx of some degree coming up from the base of the formation. Once the water hit those older wells -- in a lot of cases, they had to be abandoned because the technology was not available to remove all the water necessary and well bore size was prohibitive.

Newer wells have been drilled and cased with

seven-inch casing, and in a lot of those wells submersible pumps have been installed, and 500 to 1,000 barrels of water per day is not at all unusual. But it also brings along a substantial amount of gas.

Q. What does next Exhibit No. 9 reflect?

A. Exhibit No. 9 is current daily production from the Upper Penn. Again, gas is red, oil green, water blue. And I once again have added the cumulative data production and placed that at the top. As previously stated, the allowable in the Upper Penn prorated gas pool is six-and-half million cubic feet per day. It is 9.8 million cubic feet per day, and the associated pool -- none of the 320-acre areas here anywhere approach those rates.

In the case of the Lowe State No. 7, something that may be of merit is the SW/4 of Section 25 has already had two Upper Penn producers, one of which was plugged and then side-tracked. As to the Conoco State No. 11, the SW/4 of the? SW/4 of Section 36 has already had two producers. Offsetting to the west, the W/2 of Section 2, even though it is in the prorated gas pool, has had five producers drilled into it already.

So in some real degree, both of our proposed locations have been put at a disadvantage compared to its offsets by the policies of the predecessor in title.

Q. And next, what does Exhibit 10 reflect?

A. Exhibit 10 is a structure map of the top of the Upper Pennsylvania carbonate. That is the blue line showing on the cross section, Exhibit No. 7. There is, you know, a certain amount of dip in the area. The two wells we're discussing today both seem to be on a little bit of a nose, so higher is usually better than lower in most reservoirs.

Q. Okay. Anything on this exhibit?

A. I don't believe so.

Q. Finally, let's discuss the net pay.

A. Okay. Exhibit No. 11 is net pay in the Upper Penn. In general, most Upper Penn wells in both pools have perforated intervals only between the Upper Penn carbonate and the marker I'd call the Upper Penn shale. There are a few wells that are perforated below the shale. Again, the early wells tended to perforate only the upper 1 to 200 feet of the Upper Penn carbonate. The few wells early on did perforate lower, but generally did not produce from those intervals. The later wells, however, have gone in and perforated the entire interval.

The net pay map is drawn on a combination of porosity values. This reflects cross plot porosity, neutron density cross plot porosity greater than 5 percent. The older wells where only sonic porosities were available, I chose 3 percent because, again, the physics of the sonic tool prevents it from seeing some of the bugs -- or all of the bugs -- that neutron

density tools would see. Also, in case of doubt as to how the isopach lines should trend, I kind of form-lined them off a cum gas -- cumulative gas recovery map from older wells prior to approximately 1990.

As Mr. Brindle stated in his testimony, R-12121 again, when Kerr-McGee testified, they stated they did not believe there were commercial reserves remaining in the NW/4 of Section 36, the location of our Lowe State No. 1. Our interpretation is different. When the Lowe State No. 1 went off line, for whatever reason, it was actually producing at a rate of 750,000 cubic feet a day which indicates there were still reservoir and pressure up there.

Following a northwest trending line, as most of the isopach lines do up in Section 26, the Marathon Indian Basin 1-C has a lot of pay and has also had a very large cumulative production as has the Marathon Indian Basin A-1 in Section 22. So it's Apache's contention that there are some compartmentalized reserves remaining up there that can only be recovered by a new well. One of our rationales for locating a well there was that it was a reasonable distance away from previous wells.

Also the Lowe State No. 1 -- if we refer back to the cross section, it is the second well from the left -- only perforated the upper part of the interval. The Conoco State No. 2 location -- or excuse me -- the Conoco State 11 in

Section 2 again is an appreciable distance from the previous wells. Some of its offsets again have not perforated the entire interval. So once again, we feel as though there should be compartmentalized reserves -- incremental reserves that we can only access with a new well bore.

Q. Okay. Were Exhibits 6 through 11 prepared by you or under your supervision?

A. Yes.

Q. And in your opinion, is the granting of both applications in the interest of conservation and prevention of waste?

A. Yes.

MR. BRUCE: Mr. Examiner, I move the admission of Exhibit 6 through 11.

MR. BROOKS: Exhibits 6 through 11 will be admitted.

[Applicant's Exhibits 6 through 11 admitted into evidence.]

MR. BRUCE: And one other thing I'd like to point out, Mr. Examiner, when Mr. Brindle and I were discussing the number of wells in the buffer zone area, it is one per quarter section. In the associated pool further to the east, it's two per quarter section. I just wanted to point that out for the record.

I have nothing further of the witness.

MR. BROOKS: Okay. Mr. Warnell, this is more your

area of expertise than mine, so why don't you take it first?

EXAMINATION

BY MR. WARNELL:

Q. Well, I don't have a whole lot. I was curious about any faulting out there. Any known faults?

A. On the map area, no. But two to four miles to the west there is a major down-to-the-basin fault, and it pretty well controls the westward extent of the prorated gas pool.

Q. And what kind of formation or bottom hole pressures are you expecting or are you seeing out there?

A. Mr. Clark will probably be able to expand on that, but what we have seen in the record and also industry papers would be 500 to 1,000 pounds, depending upon whether one was in the gas pool, the prorated gas pool or the associated pool. However, Apache recently took the submersible pump out after the Conoco State No. 6 located in the S/2 of the northeast of Section 2.

That well actually flowed for a while, indicating obviously higher pressure than 500 to 1,000 pounds, and also strongly suggesting, therefore, compartmentalization of some of these reserves.

Q. Okay. And then I'm curious on your cross section, that first well?

A. Yes.

Q. The Indian Basin 3-C?

A. The 3-C? Yes, sir. That was originally drilled by Devon. Then OXY bought out Devon and when the well went off and the well essentially watered out, they went in and drilled a directional well. So the perforations you see well down below the logged interval are from that directional well. And my software is not able to display a well log in a directional manner.

Q. Are there some well logs in there?

A. Yes. Yes, there are. And I have looked at it in net pay, and I believe it will show -- no, it's the 3-C, pardon me -- the original well bore that has the pay value on it.

MR. WARNELL: I have no further questions.

EXAMINATION

BY MR. BROOKS:

Q. Okay. I believe you testified that all of the gas proration units in this area are marginal in the sense that that term is used in gas prorating, that is, no unit is capable of producing its allowable.

A. No unit is currently producing anywhere near its allowable. I would hesitate to say they're not capable of it because I'm not a production engineer. But I would generally say, yes, sir.

Q. Okay. And what area are you talking about? All of these pools?

A. Definitely the mapped area.

Q. Yes.

A. I only added up cumulative production -- or excuse me -- daily production on the Exhibit 9. But I know that, you know, Apache does operate some wells to the west of the mapped area, and those also were not producing anywhere near the allowable.

Q. Thank you.

MR. BROOKS: That's all I have.

PAUL CLARK

after having been first duly sworn under oath, was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. BRUCE:

Q. Would you state your name for the record, please.

A. Paul Clark, and I reside in Tulsa, Oklahoma.

Q. And who do you work for?

A. I work for Apache Corporation.

Q. And what is your job with Apache?

A. I am a senior engineering advisor.

Q. Have you previously testified before the Division?

A. No, sir, I have not.

Q. Would you please summarize your educational and employment background for the Examiner?

A. I have a BS in chemical engineering from Oklahoma State University, which I received in 1979. I have an MBA degree from Oklahoma City University, which I received in 1991. I've got 30 years of industry experience, the last 11 with Apache Corporation.

Q. And have you conducted a study of the reservoir involved in these two cases?

A. Yes, I have, a very detailed study.

Q. Are you ready to present the results of that study?

A. Yes, sir, I am.

MR. BRUCE: Mr. Examiner, I tender Mr. Clark as an expert petroleum engineer.

MR. BROOKS: He's so qualified.

Q. (By Mr. Bruce): Mr. Clark, what does Exhibit 12 reflect?

A. Exhibit 12 is a summary for the entire Indian Basin field. It shows cumulative production numbers for the field and then it also breaks out those numbers for the gas pool and the associated gas pool up on the upper portion of the exhibit. In the lower half of the exhibit, it shows the current producing capabilities of the field and also the gas pool and the associated gas pool.

The things of significance that I would like to point out on this exhibit -- and some of this information was alluded

to by Mr. Curtis, our geologic expert -- is that there has been a lot of water influx into this reservoir over the life of the reservoir. And if you look at the GLR, which is the gas to liquid ratio, the cumulative recovery in the entire field, you will see that to date, for every three MCF of gas that's been produced, there's been one barrel of water that's been produced, so a very significant quantity of water.

If you look at the current production for the field, you'll see that for every 300 standard cubic feet of gas that's produced in the field, you produce one barrel of water. A lot of these wells are producing large volumes of water and we're having to use submersible pumps or other means to lift that water up out of the reservoir.

Q. Okay. And was does Exhibit 13 contain?

A. Exhibit 13 is a series of graphs, a summary of graphs. First page is a summary graph for the entire field. This is monthly data that's shown on the exhibit. The red is the gas production. The green is the oil production. The darker blue color is the water production. And the purple line is the gas/liquid ratio for the field.

And if you'll notice on the Exhibit No. 13, that approximately around the end of 1993, you'll see that the water production in this field began to increase dramatically, and you'll also see that the gas/liquid ratio started to decline in the field. The gas/liquid ratio was over 100,000 standard

cubic feet per barrel up until that point in time. And you can see that it has declined to an average gas/liquid ratio of 3,000 standard cubic feet per barrel today.

Q. And you said early '90s or '94, '95; is that the approximate time when development started in the associated pool?

A. Yes, sir. I believe that it is.

Q. Okay. Go ahead.

A. The second page of this exhibit shows the summary curve just for the gas pool. And you can also see, even in the gas pool, if you look at the point in time when the water production started to increase and the gas/liquid ratio started to come down, it was a little bit later, about a year later than the entire field. But you can see that the current gas/liquid ratio, even up in the gas pool, is now at about 3,000 standard cubic feet per barrels, so even the wells farther up structure in the field are producing a lot of water.

Q. And the final page?

A. The final page is the same information, a summary curve. But this is for the associated gas pool, and it shows the same information. It shows how the water production has increased in that reservoir as well. The current gas/liquid ratio in the associated gas pool is approximately 300 standard cubic feet per barrel. So those wells are producing a substantial volume of water per unit volume of gas that they're

recovering.

Q. Okay. Now, I think we're taking one exhibit out of order. Is your next exhibit that you're going to talk about No. 16?

A. Yes, sir.

Q. Okay. Go ahead.

A. Exhibit 16 is the structure map on top of the Upper Penn, which was previously talked about by Mr. Curtis. And also shown on Exhibit No. 16 is the cumulative gas/liquid ratio for each of the wells on the exhibit. It shows the initial production dates above each well, and then it shows the last date of production for each well.

For instance, specifically looking at the Lowe State unit in the west half of Section 36, the Lowe State No. 1, there's a 14 next to the well. That would mean that the cumulative gas/liquid ratio was 14,000 standard cubic feet per barrel. But that well stopped -- well, that well really hasn't produced anything since about 2003 -- I'm sorry -- yeah -- July of 2003. And the significance of this is you can see that even in the Lowe State unit that the wells in that unit have cumed a lot of water. And this is really the basis for our thinking that we have compartmentalized reserves left in these units due to the encroachment of water from the aquifer and the large volume of water that's being produced to date in these areas. We think that in order to recover the last remaining reserves

in these units, we need to drill some additional wells to get that gas.

Q. In looking at these ratios, if you're looking on the east side of this plat, although there are some high ratio wells, a lot of them are zero, one, two or three, right?

A. Yes, sir.

Q. And then if you look over at the old gas pool, they are, as a whole, their ratios are substantially higher?

A. Yes. If you look over on the very left-hand side of this exhibit, you can see further up structure there are some wells -- like in Section 3 and Section 10 -- where the gas/liquid ratios are still fairly high where the water has not quite reached that point in the field.

Q. Okay. Let's move on to your Exhibit 14. What does that reflect?

A. Exhibit 14 is just some pressure information shown for the grouping of wells that basically surround the two locations that Apache is requesting approval for. It shows the historical bottom hole pressure versus time for some wells in this area. The initial reservoir pressure in the field was a little bit under 3,000 pounds.

And I've shown a line -- I've shown on this exhibit a line where the water influx in the reservoir begins to significantly appear in the wells, as producing volumes of the wells. And most of this pressure data is based on shut-in

surface pressure for these wells, which has been converted to a bottom hole pressure assuming a gas column. And it's my opinion that since late 1993, due to the water production that these wells were producing, that much of this surface pressure data that was converted to bottom hole pressure is really not very accurate.

I believe that the bottom hole pressure that is in this pool is actually higher than what would be indicated by the pressure data you would see out on the public domain based on the calculated bottom hole pressures. I believe if you project the pressure information out to today, I think we're probably looking at an average bottom hole pressure of approximately 1,000 pounds, maybe 750 pounds in this area of the field.

Q. Would that be supported -- you have the yellow dot for the Lowe State 3 well?

A. Yes, sir. Exactly. That well did show that there was a higher pressure in the area, and I think it does support my belief that there is higher pressure.

Q. Now, that is not one of the wells that we're here for today, but it is in the E/2 of Section 36, adjoining the W/2 of the 36 well unit; is that correct?

A. Yes, that is correct.

Q. And the water influx is going from -- more or less -- east to west?

A. That would be my opinion, yes, sir.

Q. Finally, what does your Exhibit 15 reflect?

A. Exhibit 15 really is just a summary for the two units. And a lot of this information has been discussed by Mr. Curtis. It shows all of the wells that have produced in each one of the units. It shows the cumulative production, the current producing rates, and it also shows an estimated ultimate recovery for each one of the wells. As Mr. Curtis stated, the Lowe State No. 2 has already been plugged, and we're getting ready to plug the Lowe State No. 1.

And then down at the bottom of the first page, it shows the cumulative production for the 320-acre spacing unit and the current well capacity. And then it also shows my estimated ultimate recovery for the existing wells in that unit at 31.79 for the Lowe State unit. And then it shows the remaining allowable for that unit, which is 8,518 MCF a day.

Page 2 is the same information for the Conoco State unit, which is the E/2 of Section 2. There are actually three wells in that unit. The third well, the Conoco State No. 3, is a disposal well. It has never produced from the Upper Penn formation. It shows the two existing producing wells in that unit. And again, it shows the cumulative production for that unit down at the bottom and the current producing rate.

My estimated ultimate recovery for those two wells is 5.42 BCF. And the remaining allowable in this unit is 9,527

MCF a day.

Q. In your opinion, will the drilling of each of these two wells result in the recovery of reserves which would not otherwise be recovered?

A. In my opinion, it will, and primarily it's due to the fact that you have so much water that's encroached into the reservoir at this point in time. It's a -- I would classify the production in this portion of the field as de-watering operation currently. And it's my belief that these wells will recover additional gas that would not be recovered from the field.

Q. And also, by the Division allowing the production from these two additional wells, will there be any harm to the offsets?

A. No, sir. I don't believe there will be.

Q. Were Exhibits 12 through 16 prepared by you or under your supervision?

A. Yes, sir, they were.

Q. And in your opinion, is the granting of both applications in the interest of conservation and the prevention of waste?

A. I believe they will be.

MR. BRUCE: Mr. Examiner, I tender the admission of Apache's Exhibits 12 through 16.

MR. BROOKS: Exhibits 12 through 16 are admitted.

[Applicant's Exhibits 12 through 16 admitted into evidence.]

MR. BRUCE: And I have no further questions of the witness.

MR. BROOKS: Mr. Warnell?

EXAMINATION

BY MR. WARNELL:

Q. A couple of questions, Mr. Clark. You mentioned de-watering operation. Are you going with down hole submersible pumps, then?

A. Yes, sir. When we purchased these properties from Kerr-McGee, all of the existing wells in these two units did have submersible pumps in them. In a number of instances, currently, we have found that we've been able to remove the submersible pumps and put conventional pumping units on the wells to lift the volumes, which has substantially lowered our operating cost because of the electricity demands. And we've still been able to lift the volumes of water from these wells and not hurt the gas production. But most of the wells right in this area, it's my understanding, do have submersible pumps in them.

Q. And then we're talking fairly large amounts or volumes of produced waters here. Is all that water being injected back into the Conoco State No. 3?

A. I can't answer that question. Specifically, I

know that we're putting a substantial volume into that well. I can't say absolutely that all of our volume is going into that well, but I know that a substantial portion of it is. I think it's going into a deeper formation, maybe the Devonian.

Q. Okay.

MR. WARNELL: I have no other questions.

EXAMINATION

BY MR. BROOKS:

Q. Did you do any drainage area calculations on any of these wells?

A. I did look at some of the recoveries from the wells based on Mr. Curtis' isopach map. And as he said, we feel like that's a conservative view of the reservoir. And when I did that, it did show there was additional volumes of gas in each one of these sections that would not be recovered by the existing wells.

Q. What area -- how much area do you think each well drains in this area? Or do you have an opinion on that?

A. I haven't specifically made calculations for each one of the wells, but I would say that in the case of the Lowe State gas unit, that the four wells that have produced from that section have not drained the gas that was originally in place within that 320-acre unit. And the same thing would be true for the Conoco State unit.

Q. Were there three wells? Well, there are only two

existing wells?

A. Yeah, one is a disposal well. Yes, sir.

Q. Okay. Thank you.

MR. BRUCE: I have nothing further in this matter, Mr. Examiner.

MR. BROOKS: Very good. Case No. 14176 and 14177 will be taken under advisement.

These hearings will stand adjourned.

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 14176/14177 heard by me on 8-21-08.

David K. Brooks, Examiner
Oil Conservation Division

REPORTER'S CERTIFICATE

I, JOYCE D. CALVERT, Provisional Court Reporter for the State of New Mexico, do hereby certify that I reported the foregoing proceedings in stenographic shorthand and that the foregoing pages are a true and correct transcript of those proceedings and was reduced to printed form under my direct supervision.

I FURTHER CERTIFY that I am neither employed by nor related to any of the parties or attorneys in this case and that I have no interest in the final disposition of this proceeding.

DATED this 21st of August, 2008.

JOYCE D. CALVERT
New Mexico P-03
License Expires: 7/31/09

STATE OF NEW MEXICO)
)
COUNTY OF BERNALILLO)

I, JOYCE D. CALVERT, a New Mexico Provisional Reporter, working under the direction and direct supervision of Paul Baca, New Mexico CCR License Number 112, hereby certify that I reported the attached proceedings; that pages numbered 1-35 inclusive, are a true and correct transcript of my stenographic notes. On the date I reported these proceedings, I was the holder of Provisional License Number P-03.

Dated at Albuquerque, New Mexico, 21st day of August, 2008.

Joyce Calvert

Joyce D. Calvert
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Paul Baca

Paul Baca, RPR
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