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. 10953

APPLICATION OF AMOCO PRODUCTION COMPANY

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: David Catanach, Hearing Examiner

April 14, 1994

Santa Fe, New Mexico

This matter came on for hearing before the Oil Conservation Division on April 14, 1994, at Morgan Hall, State Land Office Building, 310 Old Santa Fe Trail, Santa Fe, New Mexico, before Deborah O'Bine, RPR, Certified Court Reporter No. 63, for the State of New Mexico.

I N D E X

April 14, 1994
Examiner Hearing
CASE NO. 10953

E X H I B I T S

A P P E A R A N C E S

FOR THE DIVISION: RAND L. CARROLL, ESQ.
General Counsel
Oil Conservation Commission
State Land Office Building
310 Old Santa Fe Trail
Santa Fe, New Mexico 87501

FOR THE APPLICANT: CAMPBELL, CARR, BERGE & SHERIDAN, P.A.
P.O. Box 2208
Santa Fe, New Mexico 87504
BY: WILLIAM F. CARR, ESQ.

EXAMINER CATANACH: Call the hearing back to order at this time. At this time I'll call Case 10953.

MR. CARROLL: Application of Amoco Production Company for a high angle/horizontal directional drilling pilot project, San Juan County, New Mexico.

EXAMINER CATANACH: Are there appearances in this case?

MR. CARR: May it please the examiner, my name is William F. Carr with the Santa Fe law firm, Campbell, Carr, Berge & Sheridan. We represent Amoco Production Company in this case, and I have four witnesses.

EXAMINER CATANACH: Any additional appearances? Will the witnesses please stand to be sworn in at this time?

(Witnesses sworn.)

MR. CARR: Mr. Examiner, our exhibits are contained in the exhibit booklet that I think has been passed out to everyone.

GARY WEITZ,

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

EXAMINATION

BY MR. CARR:

Q. Will your state your name for the record, please.

A. My name is Gary Weitz. Last name is spelled W-E-I-T-Z.

Q. Where do you reside?

A. Denver.

Q. By whom are you employed?

A. Amoco Production Company.

Q. What is your current position with Amoco?

A. A land negotiator.

Q. Have you previously testified before this Division?

A. Yes.

Q. At the time of that testimony, were your credentials as a landman accepted and made a matter of record?

A. Yes, they were.

Q. Are you familiar with the application filed in this case?

A. Yes, I am.

Q. Are you familiar with the status of the land surrounding this project area?

A. Yes, I am.

MR. CARR: Are the witness's qualifications acceptable?

EXAMINER CATANACH: They are.

Q. (BY MR. CARR) Mr. Weitz, would you briefly state what Amoco seeks with this application?

A. Yes. Amoco seeks approval to drill a directional drilling pilot project area or to establish a directional drilling pilot project area, Township 30 North, Range 8 West, in the east half of Section 28.

We seek further authority to drill a high angle/horizontal well on the project area. The well will be the Gartner "A" Well No. 2-R, and it will be in a standard location in the northeast quarter of Section 28. Surface location will be 1,860 feet from the east line and 790 feet from the north line.

We're also seeking special operating rules to permit the traverse of quarter and quarter-quarter section lines with a horizontal wellbore within the project area and also to drill within 790 feet of the outer boundary of the project area.

Q. In any event, the well will be at least a 790-foot setback from the outer boundary of the dedicated acreage?

A. Yes, it will.

Q. Could you identify what has been marked as Exhibit 1 in the exhibit booklet? It's right behind copies of the application and the legal ad.

A. Yes. Exhibit 1 is a land plat indicating the offset operators and also indicating the project area, the project area is to the east half of Section 28, and it's the bold outline. Also indicated there is the Gartner A2R well in the proposed surface location.

Also not shown on here is also the Gartner "A," which is located in the northeast quarter of Section 28, and the Gartner 2A, which is located in the southeast quarter of Section 28.

Q. Those are existing wells in the Blanco Mesaverde?

A. Yes, they are.

Q. And this 320-acre tract is a standard spacing unit in that particular pool?

A. Yes, it is.

Q. What is the ownership of the acreage which will be dedicated to this horizontal well?

A. The ownership is Amoco production 50 percent, Conoco, Inc., 50 percent.

Q. And it's common throughout the acreage?

A. Yes, it is.

Q. Was notice of this application provided to Meridian by certified mail?

A. Yes, it was.

Q. And that notice included a hearing date?

A. Yes, it did.

Q. Will Amoco also be calling geological and engineering witnesses to review the technical portions of this case?

A. Yes, we will.

MR. CARR: Mr. Examiner, at this time we'd move the admission of Amoco Exhibit No. 1.

EXAMINER CATANACH: Amoco Exhibit No. 1 will be admitted as evidence.

MR. CARR: That concludes my examination of Mr. Weitz.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Weitz, just a couple of things. Let me confirm that surface location as being 1,860 feet from the east line?

A. 1,850 feet from the east line.

Q. 1,850 feet?

A. Yes. And 790 from the north line.

Q. And is that a fee lease?

A. It's a federal lease.

Q. A federal lease.

Q. Is it a single federal lease?

A. Yes.

Q. Working interest ownership 50 percent Conoco and 50 percent Amoco?

A. Yes, it is.

EXAMINER CATANACH: I have nothing furthered.

MR. CARR: At this time, Mr. Catanach, we call Ira Pasternack.

IRA PASTERNACK,

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

EXAMINATION

BY MR. CARR:

Q. Would you state your name and place of residence?

A. My name is Ira Pasternack. I reside in Denver, Colorado.

Q. By whom are you employed and in what capacity?

A. I am employed by Amoco Production Company as a geologist.

Q. Have you previously testified before this

Division?

A. Yes, I have.

Q. At the time of that testimony, were your credentials as a geologist accepted and made a matter of record?

A. Yes, they were.

Q. Are you familiar with the application filed in this case on behalf of Amoco?

A. Yes, I am.

Q. Have you made a geological study of the area that is involved in this case?

A. Yes, I have.

MR. CARR: Are the witness's qualifications acceptable?

EXAMINER CATANACH: They are.

Q. (BY MR. CARR) Initially, could you tell us what the current development status is of the acreage to be dedicated to this well?

A. Yes, there are currently two wells, the Gartner A-2 and the Gartner 2-A.

Q. And the 2-A is located where?

A. In the southeast corner of Section 28.

Q. That is the direction towards which you're proposing to drill the proposed wells?

A. Yes, that's correct.

Q. Can you initially describe for Mr. Catanach the general characteristics of the Mesaverde formation in the area?

A. I've studied the reservoir development in this area and compared it to the production data and found that there's significant variations in the production that cannot be accounted for by simple variations in the reservoir development. Therefore, I attribute, at least in part, those production differences to be related to natural fracture systems that have locally enhanced the permeability.

Q. Let's go to what has been marked Amoco Exhibit No. 2. Would you identify this exhibit and then review the geological portion of it for the examiner?

A. Exhibit 2 is a cross-section and drilling plat for the horizontal well. On it are two logs located -- from wells that are located in the northwest quarter of the section and the southeast quarter of the section.

We've identified the Cliff House interval on this cross-section as the one that we're specifically targeting with a horizontal borehole with the yellow shading. That interval is approximately 60 to 70 feet in this area. As you can

see on the cross-section, and as I've mapped throughout some additional exhibits, that interval is present.

Q. If we look at the exhibit, there is a block in the sort of upper right-hand portion of it that is a schematic looking down on the tract?

A. That's correct.

Q. Generally, the dark-shaded area is the general azimuth for the horizontal portion of the well?

A. That's correct. That's our proposed target area.

Q. You're hoping then to intersect the fracture system with this wellbore?

A. That's correct.

Q. What information do you have on the fracture orientation in the area?

A. Well, if we go to the next exhibit, No. 3, we've constructed a structure map of the area. Again, this map is on the top of that Cliff House interval that was shaded yellow in the previous exhibit. And first of all, regional dip in this area is towards the northeast, but that dip is broken up by a series of northeast-trending anticlinal and synclinal noses. I believe that the fractures that

are present are related to these anticlinal and synclinal noses, that by orienting our horizontal borehole at the trajectory we're proposing, we should be able to cross one of the synclinal axes and hopefully encounter natural fractures that we believe are developed in association with that nose.

Q. Anything else to present in conjunction with Exhibit No. 3?

A. No.

Q. Could you just generally summarize your geologic conclusions for the examiner?

A. Again, the Cliff House interval that we've proposed to target in our horizontal well laterally continues through the area, and that we believe there are local enhancements and permeability attributed to natural fracture development and that the horizontal borehole would significantly improve the probability of encountering those natural fractures over conventional vertical completions. And that by orienting our trajectory as such, we hope to encounter those fractures and hopefully improve recovery in the area.

Q. Mr. Pasternack, did you prepare Exhibit 3?

A. Yes, I did.

Q. Did you prepare the geological portions of

Exhibit No. 2?

A. Yes, sir.

MR. CARR: At this time, Mr. Examiner, we would move the admission of those Exhibits 2 and 3.

EXAMINER CATANACH: Exhibits 2 and 3 will be admitted as evidence.

MR. CARR: That concludes my direct examination of this witness.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Pasternack, your fracture orientation would be in the northeast direction, wouldn't it?

A. That's correct.

Q. Along with the same line as the dip?

A. Yes. And parallel to the anticlinal and synclinal axes that we've mapped in the area.

Q. How did you determine that that was the case, that that was the direction of the fractures?

A. Additional pieces of evidence that we had in the area. Amoco drilled in 1993 a well in the northwest quarter of Section 27. It's not on this map. It's currently a Dakota producer.

In that well we did run a fracture identification log that indicated the orientation of fractures as the northeast.

Q. Is the Cliff House, is that the main producing interval in this area?

A. It is one of the producing intervals. The Point Lookout is also typically completed in this area.

Q. Why are you guys just targeting the Cliff House?

A. I can't say that there's a specific reason other than in this area, it is well-developed and continuous.

EXAMINER CATANACH: That's all I have of the witness, Mr. Carr.

MR. CARR: At this time, Mr. Catanach, we would call Bill Hawkins.

JAMES WILLIAM HAWKINS,

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

EXAMINATION

BY MR. CARR:

Q. State your name and place of residence.

A. James William Hawkins, Denver, Colorado.

Q. By whom are you employed and in what capacity?

A. Amoco Production Company as petroleum

engineer.

Q. Have you previously testified before this Division?

A. Yes, I have.

Q. At the time of that testimony, were your credentials as a petroleum engineer accepted and made a matter of record?

A. Yes.

Q. Are you familiar with the application filed in this case?

A. Yes, I am.

Q. And are you familiar with the proposed Gartner A Well No. 2R?

A. Yes, I am.

MR. CARR: Are the witness's qualifications acceptable?

EXAMINER CATANACH: They are.

Q. (BY MR. CARR) Has horizontal drilling in the area of this project been previously approved by the Division?

A. Not in this spacing unit, no, but in the general area it has previously been approved. Down in Section 34, there is a horizontal well in the Mesaverde.

Q. What is the reason for this particular

application?

A. The reason for this application is to hopefully help us encounter some fracture intensity in this area that will improve the ultimate recovery of the wellbores in the Mesaverde within this spacing unit.

Q. Is this a relatively low-pressured portion of the pool?

A. Yes, it is.

Q. Let's go to what has been marked as Amoco Exhibit No. 4. Would you identify this and review it for Mr. Catanach?

A. Yes. Exhibit No. 4 is a nine-section plat that shows the Mesaverde wells in the area. It also identifies the spacing unit for the Gartner A-2 and 2-A that we'll be drilling the horizontal well in, and it shows the cumulative productions through October of '93 for the wells in this area.

And as you can see, the majority of these wells are -- the older wells are probably 6 Bcf, 5 to 6 Bcf-type wells. The infill wells are about 2 Bcf type cumulative recovery, but there are a couple of notable exceptions.

Specifically, up in Section 22, the Howell K 2-A well is a 25.8 Bcf cum recovery well to date.

We believe that is evidence that there is some fracture intensity in this area that would lead to increased ultimate recoveries. And that's the type of improvement in production that we are seeking to find with our horizontal well.

Q. Do you believe under this acreage in fact there are hydrocarbons to be recovered and then to be developed with the horizontal wellbore?

A. Yes, we do.

Q. Do you expect there will be any drainage from the offsetting tracts if your proposal is granted and the well drilled?

A. I would anticipate that there would not be substantial drainage. As you can see, the wells surrounding the Howell K 2-A appear to be fairly indicative of the rest of the wells in the area. So I would say that they're not being adversely affected by that high cum production well.

Q. The well will, in any event, be at least a standard setback from the outer boundary of the spacing?

A. That's correct.

Q. Let's go to Exhibit No. 5. Would you identify and review that, please.

A. Yes. Exhibit 5 is a similar Exhibit to

the one in 4. What we're showing there are some expected ultimate recoveries from these wells just based on decline curve analysis.

And, again, you can see up in Section 22 the Howell K 2-A well is expected to have an ultimate recovery of about 44 Bcf, further indicating that there's good probability of fractures in this area.

Q. Let's go on now to Exhibit No. 6, your economic information. Would you review that?

A. Yes. Exhibit 6 is just an economic analysis for this horizontal well. We have a projected cost of about $725,000 for the horizontal well, expected recovery of 3 Bcf, with an initial potential of 1.4 million cubic feet per day, and this gives a present value of 0 of $1.3 million and a PW 15 of $297,000; rate of return, 34 percent.

And these are just some, I would say, reasonable expectations. We would hope that we would come out with something even substantially greater than this.

Q. In your opinion, will approval of this application be in the best interest of conservation, the prevention of waste, and the protection of correlative rights?

A. Yes.

Q. Were Exhibits 4 through 6 prepared by you or under your direction?

A. Yes, they were.

MR. CARR: At this time, Mr. Catanach, I move the admission of Amoco Exhibits 4 through 6.

EXAMINER CATANACH: Exhibits 4 through 6 will be admitted as evidence.

Q. (BY MR. CARR) And, Mr. Hawkins, Amoco will be calling the drilling engineer to review the actual drilling proposal; is that correct?

A. That's correct.

MR. CARR: That's all I have of this witness.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Hawkins, do you know what the A-2 is currently producing?

A. I think I have some information on that. Let me take a quick look. It looks like the average rate over the last year has been almost 3 million cubic feet per day.

Q. Do you know if the A-2 is perforated in all three of the producing zones?

A. I believe it's perforated in the Lewis Shale or the Chacra interval, somewhat above the

Cliff House, and I believe that was based on some shows that when it was drilled, they indicated they encountered some fractures and went in and completed in that interval. It's considered the Mesaverde, but it's not in the Cliff House or the Point Lookout.

Q. So there's probably a lot of potential for that northeast quarter for Mesaverde production?

A. In our spacing unit, you mean? We think there is, and we think that just the fact that there's a well so close in this proximity that has that kind of potential and expected recovery would indicate that we should be trying to evaluate our property for the same kind of a wellbore.

Q. Did Amoco drill that horizontal well in Section 34?

A. No. I believe that's a Meridian well.

Q. Do you know how that well turned out?

A. Right offhand, I don't, but I might have some information on that in my notes.

It's Section 34. I can't really tell if that's the No. 5, how No. 5 appears. It says that it's making about 350 Mcfd on average, but it may have had some improvement since that time.

Q. Mr. Hawkins, do you really know why the horizontal portion is just going to be limited to the

Cliff House?

A. Well, I think the reason we're higher up in the Mesaverde in this case is because of the production from the Howell K 2-A being up in the Lewis Shale above the Mesaverde interval, we felt like it was a better opportunity to encounter that fracture intensity in this area up in the upper portions of the Mesaverde, and that we're hoping to find some fractures in that vicinity; and if we still feel like we want to keep it into one of the main sand intervals in the event we don't encounter some of the fractures. So the Cliff House was the best resolution for those objectives.

Q. What are you guys going to do with the A-2?

A. Well, at this point, that well is producing only on compressor. It does not produce without that additional help. When we filed the application, we originally were planning to just replace that well with this horizontal well, but we may want to keep our options open a little bit and consider trying to produce that well also.

I think what we'll have to do is take a look at how the horizontal well turns out, and then come back to the Division on what our plans will be

with the A-2 well.

The A-2 well, from my understanding, produces about 200 Mcfd under compression and has not really produced during the last year. It will only produce with the current compression.

Q. I'm sorry, that's the A-2 well?

A. Yes.

Q. I thought you had testified -- earlier when I had asked you about the A-2, were you referring to the 2-A that was actually producing 3 million a day?

A. No, I'm sorry. That was the Howell K 2-A. I thought you were asking about the high productivity well. Our A-2 well has not been producing hardly anything at all.

Q. 200 Mcf per day?

A. Yes.

Q. Are you at this time asking for any special allowable considerations, or how do you propose to do the allowable for this unit?

A. Well, my understanding on these horizontal wells is that we are treating them as the well in the northeast quarter which has the highest deliverability would be used as the well from that quarter for its allowable calculation.

We would anticipate that the new horizontal well will be the well that contributes its deliverability to the allowable. But, as I said, we may want to keep that A-2 well, even though it's a very small producer, if there's no other alternatives for using that wellbore, we may want to try to continue, if it's economic, to produce it as a third well in the spacing unit but certainly not exceed the allowable for the spacing unit.

Q. I don't recall how we did it last time, or in previous cases we've used -- is it we've used the deliverability generally of the horizontal well?

A. Well, it's usually the higher deliverability. So that would be one of the wells in the spacing unit. And then you take the well from the other quarter section, I believe, for the other deliverability.

Q. And add them?

A. And add them.

Q. Do you know what the 2-A well is producing on the southeast quarter?

A. About 500 Mcfd.

EXAMINER CATANACH: I have nothing further, Mr. Carr.

MR. CARR: That's all we have of this

witness.

BRAD BILYEU,

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

EXAMINATION

BY CARR:

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

A. Brad Bilyeu, B-I-L-Y-E-U.

Q. Where do you reside?

A. Denver, Colorado.

Q. By whom are you employed?

A. By Amoco Production Company as a contract drilling engineer for the San Juan Basin.

Q. Mr. Bilyeu, have you previously testified before this Division?

A. No, sir.

Q. Would you briefly review your educational background and work experience for Mr. Catanach?

A. I have a B.S. Degree from the Montana School of Mines in 1963. I spent five years with major oil companies in Illinois and Wyoming, seven years with an independent in Wyoming and Colorado, primarily working in Wyoming, Utah, and Colorado.

And then in the last 20 years I've been an independent consultant for various oil companies, independents and majors, approximately 50 percent of the time was working with Amoco in the oversize area in the Four Corners.

Q. This work with Amoco has been as a drilling engineer?

A. Drilling engineer and supervisor and supervision, primarily.

Q. Have you testified in other states before regulatory agencies?

A. Yes, sir, in Wyoming and Colorado.

Q. Are you familiar with the application filed in this case on behalf of Amoco?

A. Yes.

Q. Are you familiar with the Gartner A-2R proposed well?

A. Yes.

MR. CARR: We would tender Mr. Bilyeu as an expert witness and drilling engineer.

EXAMINER CATANACH: Mr. Bilyeu is so qualified.

Q. (BY MR. CARR) Why don't we go, Mr. Bilyeu, to the portion of Exhibit No. 2 that contains the schematic for the horizontal wellbore. I would

ask you to refer to this exhibit, and using this exhibit, review Mr. Catanach exactly how Amoco proposes to drill this well?

A. We propose to drill a new well from grass roots as the existing A-2 well is mechanically unusable. We would set surface casing at approximately 300 to 400 feet, 11-/34 inch.

We would then drill with mud to approximately 3,175 or 150 feet into the Lewis Shale and set 8-5/8's intermediate casing. A 7-7/8 inch vertical hole would then be drilled to approximately 4,300 feet. We don't have a plat on the new location; so I don't know exactly the tops.

At any rate, at approximately 4,300 feet we would begin a 14 degree per 100 medium radius build with downhole motor and MWD equipment. We would be drilling with air and a nitrogen membrane unit at this time to prevent downhole combustion.

We would continue that radius to approximately 4,700 feet or 15 or 20 feet into the top of the Cliff House, a member of the Mesaverde, at which time we would have a horizontal displacement of approximately 400 feet from the vertical, and continue that in an approximate 135 to 145 degree azimuth throughout to stay within the legal drilling

window.

And we would carry that hole approximately 1,100 feet horizontally, giving a total displacement of approximately 1,500 feet in the hopes of encountering the anticipated fracture system.

If possible, we would probably direct it more towards the 149 degree azimuth, giving us additional legal window to drill in. At the end of the drilling, we would determine what type of completion production casing we would want to run, probably 5-1/2 inch liner or a 5-1/2 inch long string with a slotted bottom.

I am in the process of researching Meridian's horizontal wells, and we may wish to increase the size of the casing to 13-3/8, 9-5/8, such that we could set a 7 inch liner at the top of the Cliff House.

And our costs are predicated on this scenario. It would be an additional $100,000 or so to run the larger casing, but it may be necessary. We will determine that at a later date, I guess.

Q. At the conclusion of the drilling of this well, will Amoco run the directional survey on the well and provide a copy of that survey to the Oil Conservation Division?

A. Yes, sir.

Q. Was this portion of Exhibit No. 2 prepared by you?

A. Yes.

Q. How soon is Amoco hoping to commence this project?

A. Approximately 30 to 60 days after receiving approval from the Commission?

A. Do you have anything further to add to your testimony?

A. No.

MR. CARR: That concludes my direct examination of this witness. Exhibit 2 has previously been admitted into evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Bilyeu, have you drilled a horizontal well in the San Juan Basin?

A. No, sir, I have not.

Q. Have you drilled a horizontal well?

A. No, sir, I have not. I've drilled some high angle wells, 50 degrees, thereabouts.

Q. Are you aware of any mechanical problems that might be associated with drilling one of these wells?

A. I've researched to the best of my ability, and yes, there are -- can be mechanical problems, and that's one reason we didn't want to try and intersect the Point Lookout, I guess, in that we're afraid to drop the -- change the angle because of the friction involved there.

EXAMINER CATANACH: I have nothing further, Mr. Carr.

MR. CARR: That concludes our presentation in this case.

EXAMINER CATANACH: There being nothing further, Case 10953 will be taken under advisement.

CERTIFICATE OF REPORTER

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

I, Deborah O'Bine, Certified Shorthand Reporter and Notary Public, HEREBY CERTIFY that I caused my notes to be transcribed under my personal supervision, and that the foregoing transcript is a true and accurate record of the proceedings of said hearing.

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, May 4, 1994.

Deborah O'Bine

DEBORAH O'BINE
CCR No. 63

OFFICIAL SEAL
Deborah O'Bine
NOTARY PUBLIC
STATE OF NEW MEXICO
My Commission Expires: Oct. 19, 1994

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 10953, heard by me on April 14 1994.

David Catanach, Examiner
Oil Conservation Division