NEW MEXICO OIL CONSERVATION DIVISION

STATE OF NEW MEXICO

CASE NO. 10512

IN THE MATTER OF:

The Application of Phillips Petroleum Company for directional drilling and three unorthodox oil well locations, Lea County, New Mexico.

BEFORE:

MICHAEL E. STOGNER

Hearing Examiner

September 3, 1992

REPORTED BY:

DEBBIE VESTAL
Certified Shorthand Reporter
for the State of New Mexico

ORIGINAL

A P P E A R A N C E S

FOR THE NEW MEXICO OIL CONSERVATION DIVISION:

ROBERT G. STOVALL, ESQ.
General Counsel
State Land Office Building
Santa Fe, New Mexico 87504

EXAMINER STOGNER: Call the next case, No. 10512.

MR. STOVALL: Application of Phillips Petroleum Company for directional drilling in three unorthodox oil well locations, Lea County, New Mexico.

EXAMINER STOGNER: First, this case was heard on August 6, 1992. The applicant at that time proposed some changes in well locations that required readvertising in this particular matter.

At this time I'm going to call for any additional appearances, testimony, or evidence. There being none, this case will now be taken under advisement.

[And the proceedings were concluded.]

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 10512 heard by me on 3 Sept. 1992.

Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

I, Debbie Vestal, Certified Shorthand Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I caused my notes to be transcribed under my personal supervision; and that the foregoing is a true and accurate record of the proceedings.

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

WITNESS MY HAND AND SEAL OCTOBER 12, 1992.

Debbie Vestal

DEBBIE VESTAL, RPR
NEW MEXICO CSR NO. 3

NEW MEXICO OIL CONSERVATION DIVISION

STATE LAND OFFICE BUILDING

STATE OF NEW MEXICO

CASE NO. 10512

IN THE MATTER OF:

The Application of Phillips Petroleum Company for three unorthodox oil well locations, Lea County, New Mexico.

BEFORE:

MICHAEL E. STOGNER

Hearing Examiner

State Land Office Building

August 6, 1992

REPORTED BY:

DEBBIE VESTAL
Certified Shorthand Reporter
for the State of New Mexico

ORIGINAL

A P P E A R A N C E S

FOR THE APPLICANT:

KELLAHIN, KELLAHIN & AUBREY
Post Office Box 2265
Santa Fe, New Mexico 87504-2265
BY: **W. THOMAS KELLAHIN, ESQ.**
ELIZABETH HARRIS, ESQ.

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EXAMINER STOGNER: I'll call Case 10512, application of Phillips Petroleum Company for three unorthodox well locations, Lea County, New Mexico.

At this time I'll call for appearances.

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin, of Santa Fe, New Mexico, appearing in association with Elizabeth Harris, in-house counsel for Phillips Petroleum Company, residing in Odessa, Texas. We are appearing on behalf of the applicant in this case, and we have one witness.

EXAMINER STOGNER: Elizabeth Harris?

MR. KELLAHIN: Yes.

EXAMINER STOGNER: Any other appearances? Will the witness, please, stand and be sworn.

[The witness was duly sworn.]

EXAMINER STOGNER: Mr. Kellahin -- or who will actually be presenting this case?

MR. KELLAHIN: I will, Mr. Examiner.

EXAMINER STOGNER: Thank you.

MR. KELLAHIN: There's a preliminary matter with regards to this case, Mr. Examiner. It was originally docketed at the applicant's

request with a 50-foot radius flexibility provision. The applicant has subsequently staked each of the three wells and requests that you now delete the 50-foot radius tolerance within the requested application.

In addition, the expert will discuss with you the fact that the No. 10 well -- and when you look at the docket, the well in Unit J of Section 2 and the first well listed in the advertisement, that's the No. 10 well. The No. 10 well, because of surface limitations with a power line and a pipeline, must be relocated.

The surface location is now a standard location but will be drilled to the unorthodox bottom-hole location. My only point is that we will have to -- I think our best option is to put on the case and then readvertise it to pick up a Rule 111 deviation approval for the No. 10 well. I raise that with you now so that as we complete the presentation, at the end of the presentation, we can discuss how best to approach that issue.

The No. 11 well, which is in Unit N of 35, will be discussed and that location remains the same. The last well on the notice is referred to as the No. 12 well. And we'll use

those numbers as a shorthand way to identify them because all three of them are on all the same displays.

We have specific exhibits that will discuss the need for the directional drilling of the No. 10 well. And the expert will refer to those displays. But I raise it with you now so that you can see that issue as the evidence unfolds.

EXAMINER STOGNER: Mr. Kellahin, I'm glad you brought that up. I wasn't aware of these changes.

MR. KELLAHIN: And we weren't either until recently, Mr. Examiner.

EXAMINER STOGNER: And also there was some changes in Case No. 10523, which has to result in the readvertisement. And also I received a couple of administrative applications for some unorthodox well locations in this very area in which they were requesting a second well in an unprorated gas pool.

Obviously, Phillips Petroleum may be filing these applications somewhat prematurely. I will go ahead and hear the information in these cases today, in 10512 in particular with the

directional drilling.

Hopefully, your witness today will be prepared to present the directional drilling data and how this will be done. I will not allow it to be done administratively. We will readvertise 10512. We'll get everything letter perfect before an order will be issued in this particular case.

MR. KELLAHIN: That's our intent too, Mr. Examiner, is to make sure that the approvals are presented in a single order and that the evidence supports that approval.

EXAMINER STOGNER: Let me make sure I understand. The first well, in Unit J of Section 2, this is the well to be directionally drilled?

MR. KELLAHIN: Yes, sir.

EXAMINER STOGNER: Okay. Do you have the surface location, or will that be presented later?

MR. KELLAHIN: I've got a plat that will demonstrate that more efficiently than me describing it to you verbally.

EXAMINER STOGNER: With that I will delay what we're going to do on the readvertisement then, so you may continue, Mr.

Kellahin.

SCOTT C. BALKE

Having been duly sworn upon his oath, was examined and testified as follows:

EXAMINATION

BY KELLAHIN:

Q. All right, sir, will you, please, state your name and occupation?

A. Scott C. Balke. I'm a petroleum geologist with Phillips Petroleum.

Q. Mr. Balke, on prior occasions have you testified as a a petroleum geologist?

A. No, I have not.

Q. And you spell your last name B-a-l-k-e?

A. Correct.

Q. Mr. Balke, would you summarize for us your education?

A. I have a bachelor's degree from the University of Colorado, a master's degree from Oklahoma State University.

Q. In what year, sir?

A. Bachelor's degree was in 1982; master's, 1984. From 84 to 89 I worked for various oil companies, independent oil companies

in Oklahoma and Texas. In 89, I came on with Phillips and worked specifically southeast New Mexico.

Q. Are you familiar with what has been characterized as the South Four Lakes project of your company in Lea County, New Mexico, a portion of which is the subject of Case 10512?

A. Yes, I am.

Q. Did you do the geology and the interpretations of that geologic information for your company?

A. Yes, I did.

MR. KELLAHIN: We tender Mr. Balke as an expert petroleum geologist.

EXAMINER STOGNER: Mr. Balke is so qualified.

Q. (BY MR. KELLAHIN) Let me have you turn, sir, to what is marked as [redacted]. Identify the display for me.

A. What you have here is the outline in green of the South Four Lakes Unit. The yellow is acreage that Phillips owns 100 percent. As you can see within the wells themselves, there are currently two producing wells, and one is a disposal well. The producing wells are the No. 2

and the No. 9. The disposal well is the No. 6.

Acreage across the unit is undivided royalty, 100 percent Phillips. And production, as you can see, the oil is up on top with gas just directly below it with our well locations, No. 10, 11, and 12 in the green circles. The 80-acre proration units are also outlined with the thin black line.

Q. When we look at the display, the turquoise outline --

A. Yes.

Q. -- represents what?

A. The South Four Lakes Unit boundary.

Q. And that unit is unitization of what formation?

A. Formations from Devonian -- from the surface down to the Devonian.

Q. The production within the unit that is characterized as the Four Lakes Pennsylvanian Pool covers what Pennsylvanian formation?

A. Covers two distinct reservoirs, the BO "C".

Q. Within the Four Lakes Pennsylvanian Pool and the unitization of that interval, what are the primary Pennsylvanian formations that are

productive in the unit?

A. There's two primary ones. One, "O", which is Pennsylvanian age, located at about 10,000 feet; the other one we referred to is Ranger Lakes, also referred to as Cisco, also a Pennsylvanian carbonate, located about 10,250 feet.

Q. Within the unit area, the royalty overrides and working interests are all identical as we move from location to location within the unit area?

A. That's correct.

Q. The plat identifies in the turquoise open circles three locations, and there is well numbers by each of those locations. What do those represent?

A. The wells 10, 11, and 12 are representative of unorthodox locations which we wish to pursue.

Q. In pursuing further development of the pool, what has caused you to believe that you cannot appropriately locate these wells at standard locations?

A. We have several structural maps based upon a 3-D seismic survey that we took over the

unit itself. We also have a continuing 3-D seismic survey, which trends down to our Ranger Lakes Unit. Phillips owns 100 percent. We both have a specific and regional picture based upon seismic and subsurface interpretation.

Q. When you're putting together a geologic package of information, what are the key geologic parameters or points that caused to you conclude that the unorthodox location in each of these spacing units was preferable to the closest standard location?

A. Our seismic and our subsurface information were our two key elements in justifying our unorthodox location. If you refer to our seismic --

Q. We'll come to that in just a second.

A. Okay.

Q. I was trying to get an overview of the critical geologic points that moved each of the locations.

A. Specifically seismic and stratigraphic. We would like to be in a favorable seismic or structural framework. This is a structural trap. We'd like to be higher on the structure, which will be higher also in the

oil column of the reservoirs themselves, which should give us a more favorable commercial location.

Q. When we look at this display, there are tracts outlined that include the three locations?

A. Yes.

Q. They appear to be about 80 acres in size?

A. That's correct.

Q. Do those represented the 80-acre spacing units that apply for the Four Lakes-Pennsylvanian Pool?

A. That is correct.

Q. When we look at the location, just without looking at the actual footages, they appear to be moving towards other operations within the same unit?

A. That's correct.

Q. So none of those locations are moving or encroaching towards offsetting owners or operators?

A. That is correct.

Q. With that background now let's look at the structure map that you have prepared and have marked as Exhibit No. 2. Before we discuss the

specific details, give us an understanding of how to read the display.

A. Mr. Examiner, if you would refer to Exhibit No. 2, the locations, the unorthodox locations are identified by a red circle with the well name above it. The red "Xs" are the orthodox locations to give you a reference of why we're justifying these unorthodox locations.

Q. The "Xs" would be an approximation of the closest standard locations that would be choices within each of those spacing units for a well?

A. That's correct.

Q. For example, let's take the No. 12 well, which is in the southwest quarter of Section 35. Give us a summary of why the unorthodox location is preferable over the two closest standard locations.

A. Each color represents a different contour interval. The contour intervals are based upon 40 feet. If, for example the South Four Lakes No. 12, if we were to drill the orthodox location to the northwest, we would actually be approximately 100 to 120 feet down-dip from our unorthodox location.

If we were to drill the orthodox location to the southwest, we would be approximately 75 to 80 feet off structure. Our unorthodox location allows us to gain this structure and still be within the reservoirs of both C and the Ranger Lakes.

Q. Tell me how you generated the structure map.

A. Structure map was based upon a 3-D seismic survey which we took. The 3-D survey was outlined with lines running north-south and east to west. Spacing between these lines were somewhere between 250 and 300 feet.

The marker that we used within the seismic is a very key marker, which we've used to map many Penn horizons throughout the Tatum Basin. We call it a Penn Red. It's just a very anomalous seismic event which we found to indicate structure and subsurface.

Q. The 3-D seismic methodology has the ability to use varying grid sizes?

A. That's correct.

Q. And once you select an appropriate grid size, conduct the survey, then that information helps you generate a structure map such as we're

looking at here?

A. That is correct.

Q. What provided the information to satisfy you that the grid size was appropriate?

A. We have the No. 8 well, which is located in the northeast-northeast of Section 2. That was drilled in 1986. We have a modern sonic log, which we used to create a synthetic seismic seismogram. That well, along with the other wells in the field, we used to correlate with our seismic picture.

The other wells in the field, however, are very old, did not have any modern logs. But the No. 8 provided very good correlation with our seismic.

Q. In trying to maximize the oil recovery in the pool and minimize the risk, is there a water component to the analysis that needs to be addressed?

A. Yes, there is. The No. 2 well is currently producing out of the Penn. It is producing some water. When these wells were plugged and abandoned, they were producing excessive amounts of water.

We feel, based upon our latest

drilling, which was the No. 9 in Section 35, we drilled that last year, put it on production September of 91, that well on the log has not indicated any water, that production has not -- the water production is less than 18 barrels a day. We feel that this is not within the oil-water or at least within the water lake. We feel that the oil-water contact should be somewhere around 5620 and 5660.

Q. **In addition to maximizing the opportunity to recover oil for the unit, these locations then will minimize the risk of encountering the water portion of the reservoir?**

A. That's correct.

Q. In positioning the wells in the unit and moving to the unorthodox location, do you have any sense geologically that you're crowding your wells too close together?

A. Not at this time, no, I don't.

Q. Okay. Let's turn now to the specifics of the survey information. Let me direct your attention, first of all, to Exhibit No. 3. And that's a copy of the Division Form C-102 that specifically addresses what we call well No. 10. Let's talk about this one.

The place to start, I think, Mr. Balke, is to have you describe the background that caused the surface location, which is advertised in the docket at 2200 feet from the south line and 1980 feet from the east line, to be relocated.

And when we look at the display and look at Unit letter J, there are two well dots?

A. Uh-huh.

Q. What's the significance of those two dots?

A. The dot to the north -- which is right near Warn Petroleum Company's pipeline. As you can see a diagram, a blown-up diagram in the northwest quarter of that diagram, we need to stay a distance away from the pipeline. And that's why we moved from our unorthodox location, which is located to the north, the one directly to the south.

The open circle to the south is the location that was moved because of safety reasons due to the pipeline, and it is our surface location. However, our bottom-hole location we would still like to see located to the north.

Q. When you look at the display and look

in the northwest quarter of the survey plat for the section, there is an inset?

A. Uh-huh.

Q. What does that inset show?

A. The inset shows no scale.

Q. Okay. But that is a diagrammatic representation of what was discovered in the field when the well was staked?

A. Correct.

Q. At the time the original application was filed by Phillips, the actual survey work had not yet been done in the field?

A. That's correct.

Q. Describe for me if we go to the -- let me strike that. A standard location for this pool is a well located within 150 feet of the center of either 40-acre tract within the 80-acre spacing unit?

A. That is correct.

Q. So by moving the surface location, are you now at a standard surface location for this pool?

A. That is correct.

Q. How do you propose to accomplish the drilling at a modified surface location and

achieve the bottom-hole location that you desire to achieve in the reservoir?

A. We will drill a vertical well past the Abo, the base of the Abo, which is around 8500 feet. From 8500 feet down to the TD of probably 10,400 feet, we will drill a deviated hole.

Q. Okay. The vertical interval is sufficient that you can accomplish in conventional steering technology the directional drilling of a well that will have a surface displacement of approximately 150 feet?

A. That's correct. And we will also take surveys along.

Q. Okay. Typically in deviated wells the Division affords the applicant an opportunity to hit a bottom-hole target. And because of depth and the economy of trying to hit a specific point, if the Division approves a 50-foot radius target around the bottom-hole location as now requested, is that an adequate target to hit in this reservoir at this depth?

A. Yes, it is.

Q. Based upon your knowledge are we using anything other than conventional directional drilling methodology to achieve the objective and

avoid the surface restrictions that we have found that preclude the location that you originally sought?

A. To the best of my knowledge, we always use a conventional means.

Q. Okay. Let's turn now to some of the other wells. When we look at the next display, which is Exhibit No. 4, identify and describe that for us.

A. Exhibit No. 4 describes well No. 11, which is in letter "N" of section 30 -- excuse me, Section 2, which if you -- Mr. Examiner, if you refer to Exhibit 2, you also see it on the plat there.

Q. And this represents the staked location?

A. This is a staked location. There should be no changes to this one.

Q. And this one conforms to the advertised location in the docket, and we can now delete the request for the 50-foot radius around that well?

A. That's correct.

Q. Okay. Let's turn now to the last well, which is the No. 12 well, and have you identify and describe Exhibit No. 5.

A. This is located in Section 35. It's letter "F." It is also in a -- this has also been staked. It should not be changed.

Q. So we can also delete the 50-foot radius around well No. 12, and it matches the advertised requested location for the well and is properly staked?

A. That's correct.

Q. Let's turn now, sir, to some of your other supporting geologic information concerning your application. Specifically I'd like you to unfold Exhibit No. 6.

Q. Before we describe the details and conclusions, tell us what we're looking at.

A. Mr. Examiner, what you're looking at in Exhibit No. 6 is a net thickness isopach with a porosity cutoff of 4 percent of the [redacted] Lakes-Cisco interval. This interval is the interval that is around 10,250 feet. It is the most prolific zone of the two Pennsylvanian zones.

Again you see within green the unit outline; within yellow, Phillips' acreage along with the unit. Each contour has its own particular color. Contour interval is five feet.

Q. How do you use this information, Mr. Balke, to support your conclusion that the optimum location for these additional wells is at the requested unorthodox locations?

A. What I wish to show on this is that the reservoir does -- is continuous across the structure. The reservoir within the locations will have a commercial thickness. We relate this back to Exhibit No. 2, which is our structure map, and that will show us the optimum location both with thickness and the correct and most favorable structure location.

Q. Let me direct your attention now to Exhibit No. 7. When we look at 6 and now move into 7, what is the difference?

A. Mr. Examiner, Exhibit No. 7 is the isopach of porosity. We don't want to -- we don't foresee any porosity pinch-outs. What we want to be is still within the same porous reservoir, again within the same structural position. This is an isopach of porosity greater than 4 percent. Contour interval is 8 percent.

So what we want to do is stay in the most favorable thickness, still having porosity and still being structurally in the most

favorable position.

Q. So as you begin to build your reservoir and look at the different geologic components to that reservoir -- we have moved from structure, to thickness, to porosity -- what else do you do?

A. That will, from our understanding of this field, from our history, has been giving us favorable, productive, drillable locations.

Q. So you take the three, combine them, looking at each component and matching the optimum location, when you look at each of those items?

A. That is correct.

Q. And having done so, then it's caused you to conclude that for each of these spacing units, the unorthodox location has substantial opportunities that the closest standard location doesn't provide?

A. That is correct.

Q. All right. Having looked at the Cisco, let's now turn to the other primary producing interval in this pool, which is the Bough C, and you've gone through the same methodology for that portion of the reservoir?

A. That is correct.

Q. Without further explanation then, let's go to the conclusions that you draw from each of those displays starting with Exhibit No. 8.

A. Mr. Examiner, Exhibit No. 8 displays again the reservoir being present across the structure. Exhibit No. 9 will also display how the porosity does not pinch out across the structure. We have a very consistent reservoir across the structure, which when we can show that the reservoir is present, then we need to show where's the correct and most favorable position to drill the location.

So in combination with both Bough "C" maps, Ranger Lakes-Cisco maps, we now can say that the reservoir is present without any porosity pinch-outs, without any kind of permeability problems, and we will reference back to Exhibit 2 showing the structural location.

Q. Moving from Exhibit 8 let's go to the final geologic display, Exhibit 9, and tell us how that fits into your analysis.

A. Again this is porosity on the Bough "C," porosity greater than 4 percent. Each contour interval indicates 2 percent porosity. You see porosity being present, commercial porosity being

present across the structure.

Q. The challenge then for you as a geologist is to take each map, integrate it with the other maps, and then pick the best location within that spacing unit?

A. That is correct.

Q. If you look at an individual map by itself, it will not give you a complete picture by which you can judge the best location.

A. That is correct. You may have wells that have commercial thickness, porosity, however be low on structure and be noncommercial locations.

Q. And with a reservoir of this complexity, then you've got to use all these devices and tools to minimize the risk of staying out of the water, get you in the best structural position in the reservoir with the greatest thickness and the greatest porosity?

A. That is correct.

Q. Do you believe that you can ultimately conclude that these locations satisfy that objective?

A. Yes, I can.

Q. Were Exhibits 1 through 9 prepared by

you?

A. Yes, they were.

Q. Let me have you identify for the record what we've marked as Exhibit No. 10. What is that, sir?

A. This is approval for the following unorthodox locations, which we stated.

Q. As we've already discussed with you, your knowledge of the ownership causes you to conclude that each of these locations are simply moving towards interest owners within the same unit?

A. That is correct.

Q. And you have -- Phillips has sent the Commissioner of Public Lands, as an interest owner, notification of these locations, and they have given you a waiver with regards to these locations?

A. Yes.

MR. KELLAHIN: That concludes our presentation of Balke. We move the introduction of Exhibits 1 through 10.

EXAMINER STOGNER: Exhibits 1 through 10 will be admitted into evidence.

EXAMINER STOGNER: Geologically

speaking, the evidence, I must say, is quite clear. Due to some glitches, I feel, sometimes in our own system, not being able to authorize these administratively, you have to come to hearing and get geological exceptions in these particular instances; however, in doing this geological work and actually having your field people going out there and seeing if the location is applicable, things do need to correspond.

MR. KELLAHIN: We understand the problems we've created for ourselves, Mr. Examiner. Ms. Harris and Mr. Balke and I are working together to avoid those in the future. She appreciates, I'm sure, your comments that under a unit concept, it's unfortunate we don't have a method to approve this kind of thing administratively.

In the future we'll take better care of staking our locations before we involve your energy to approve these things through the agency.

EXAMINER STOGNER: And in the future perhaps cases like this can be alluded to and any changes in the general rules, which will allow some administrative procedures. I'm sure you'll

help me remember such instances as this.

MR. KELLAHIN: I'm sure Phillips would support that and would actively pursue it, Mr. Examiner.

EXAMINER STOGNER: With that readvertisement will be necessary for the September 3 -- I'm getting confused.

MR. KELLAHIN: Yes, sir, September 3.

EXAMINER STOGNER: September 3, yes, in which I will place in there additional exceptions for the directional drilling. Other than that, I have no other questions of this witness.

[A discussion was held off the record.]

EXAMINER STOGNER: Would you like to take a little break?

MR. KELLAHIN: We're okay, Mr. Examiner. We can do this outside the record.

EXAMINER STOGNER: With that, if there's nothing further in Case No. 10512 -- Mr. Balke, you may be excused -- we'll take note of the exhibits today and readvertise this case. And I don't see it necessary to have your witness back here on the 3rd. And an order will be issued after that is called then.

MR. KELLAHIN: All right, sir.

[And the proceedings were concluded.]

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 10512, heard by me on 10 August 1992.

Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

I, Debbie Vestal, Certified Shorthand Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I caused my notes to be transcribed under my personal supervision; and that the foregoing is a true and accurate record of the proceedings.

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

WITNESS MY HAND AND SEAL AUGUST 17, 1992.

Debbie Vestal

DEBBIE VESTAL, RPR
NEW MEXICO CSR NO. 3