STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

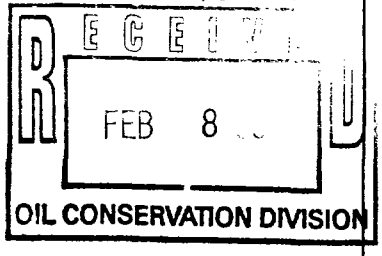
OIL CONSERVATION DIVISION

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

APPLICATION OF OXY USA, INC., FOR AN UNORTHODOX GAS WELL LOCATION AND SIMULTANEOUS DEDICATION, EDDY COUNTY, NEW MEXICO

CASE NO. 11,455

ORIGINAL



REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: DAVID R. CATANACH, Hearing Examiner

January 25th, 1996

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, DAVID R. CATANACH, Hearing Examiner, on Thursday, January 25th, 1996, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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I N D E X

January 25th, 1996
Examiner Hearing
CASE NO. 11,455

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A P P E A R A N C E S

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* * *

WHEREUPON, the following proceedings were had at 9:55 a.m.:

EXAMINER CATANACH: Let me call the hearing back to order, and at this time we'll call Case 11,455.

MR. CARROLL: Application of Oxy USA, INC., for an unorthodox gas well location and simultaneous dedication, Eddy County, New Mexico.

EXAMINER CATANACH: Are there appearances in this case?

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin and Kellahin, appearing on behalf of the Applicant, and I have three witnesses. Two of the witnesses have been previously sworn and qualified as experts, and I have an additional witness to be sworn.

EXAMINER CATANACH: Okay, can we swear in the additional witness at this time?

(Thereupon, the witness was sworn.)

MR. KELLAHIN: Mr. Examiner, with your permission, I would request that Mr. Doty, who qualified as a geologic expert in the prior case, continue as a sworn expert with his qualifications accepted.

EXAMINER CATANACH: Yes, sir, that would be fine.

BOB DOTY,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Doty, let's turn to your exhibits, sir, and look at what we've marked as Oxy Exhibit Number 1.

A. Yes, sir, if I may refer to Exhibit 1, this is a map that shows the zones of production surrounding what we are calling our NBFD equity unit, NBFD being North Burton Flat drilling unit.

While we're here, in 1994 we acquired a 3-D seismic survey over this area, and we identified an untested anticline. Its location, the high point of the anticline, occurs at the crosshairs of Sections 10, 11, 14 and 15 on Exhibit 1. We felt like the best way to test that structure was with an equity unit whereby all the working interest was shared and the benefit of that structure, and we have formed that.

Also, the reason why we are here, we are requesting an unorthodox location for all zones, Wolfcamp and deeper. We feel like we have objectives that include Wolfcamp, Strawn, Atoka, Morrow and Devonian.

And we are also requesting approval to produce a second well in the Wolfcamp and the Morrow on the west-half

320-acre spacing unit in the west half of Section 11.

Currently within the NBFD unit there are five active wells, four of which produce from the Wolfcamp, and one of which produces from the Morrow.

Q. All right, let's take a moment and specify what we're asking the Examiner to address within the context of this hearing.

A. Yes, sir. You'll notice the location for the NBFD Number 1.

Q. Yes, sir, it's in the west half of 11?

A. Yes, sir, and it's unorthodox for a gas 320-acre spacing unit, and that is the only way we can test the structure. We cannot test the structure with an orthodox location.

We also feel like there are unique reserves in the Morrow and Wolfcamp, necessitating us to have approval to produce a second well from either of those zones at that location, to produce reserves that cannot be produced from any of the existing wells.

Q. Let's make sure we all have the same understanding as to the applicable OCD rules with regards to this location. The west-half dedication is a standard 320-acre spacing unit for all deep gas reservoirs below the top of the Wolfcamp?

A. Yes, sir.

Q. There are no special or unusual circumstances here with regards to a spacing unit size for those gas formations?

A. No, sir.

Q. With regards to well locations, for all those formations, a standard location, as recently amended, then, by the Commission, as of the order the other day, would be 660 from the side boundary and 1650 from the end line, so you're not within that target, are you?

A. No, sir.

Q. The white target you've outlined in your spacing unit would be the former standard window of 1980 by 660?

A. Yes, sir.

Q. All right. So we need a wellbore exception location as to all the deep gas reservoirs.

And then with regards to the existing wells, the well in the north portion of the spacing unit is your Government "AB" Number 5, and that's currently a Morrow producer?

A. Yes, sir.

Q. This is a Morrow reservoir that is a nonprorated gas pool?

A. Right.

Q. So this would potentially be a second Morrow well in the spacing unit?

A. Yes, sir.

Q. And then finally the Wolfcamp well, which is the one in the northeast of the southeast of this -- of -- I'm in the wrong half section. It would be the northeast of the southwest of Section 11. The Government "AB" 1 is currently a Wolfcamp well in the North Burton Flat-Wolfcamp Gas Pool?

A. Yes, sir.

Q. All right. So you would need simultaneous dedication of the proposed well with that Wolfcamp well in order to produce them concurrently?

A. Yes, sir.

Q. And as to the Wolfcamp, that also is not a prorated gas pool?

A. Right.

Q. All right. Within the equity area, which is the four 320-acre spacing units outlined by the black dashed line, you've identified the other wells, and those are Wolfcamp wells?

A. Yes, they're all active Wolfcamp wells.

Q. All right. You've set the context of what you're seeking. Let's look at the geologic data that's driven you to that conclusion, and let's start with the Devonian.

If you'll look at Exhibit Number 2, then, identify what we're looking at, give us the major geologic

points of why this is important, and then we'll talk about the details.

A. Yes, sir. This is a Devonian structure map, based on a 3-D seismic data which we acquired in this area. There are no Devonian penetrations in the map area. It's truly a wildcat zone. And none of the wells, none of the existing wells, have penetrated this structure.

We're calling it the NBFD anticline. It appears that it's faulted on the eastern side, there's about 200 feet of structural relief on the structure at the Devonian level, and it covers around 250 or so acres. It's a truly unique feature in this area. It's the most pronounced feature on the seismic data set that we acquired.

You'll notice south of the NBFD structure, NBFD anticline on Exhibit 2, there's a structural nose which continues to the south. I am calling this the Carlsbad anticline. It's a major structural trend that's clearly evident on the Morrow "A" Structure mapping horizon that extends for tens of miles south of the City of Carlsbad.

So from a geologic standpoint, this makes perfect sense that that would be localized, pronounced, unique features along that structural trend. You just have to find it, and this is one of them that we've encountered with the 3-D.

Q. Seismic line 130 is shown on the exhibit display,

Exhibit 2, in what fashion?

A. Yes, sir, seismic line 130 is from the 3-D data set, and it is included as Exhibit Number 3.

Q. All right. When we look at this 3-D area, would the 3-D area of investigation by the seismic study include a sufficient area that you have mapped, Sections 10, 11, 14 and 15?

A. Yes, sir.

Q. Are you and the geophysicist employed to analyze the seismic data satisfied that appropriate means of data gathering were executed?

A. Yes, sir.

Q. And was, in your opinion, that data properly analyzed and compiled?

A. Yes, sir.

Q. Were the appropriate parameters and values by which you judge this material utilized?

A. Yes, sir.

Q. And as a result of all this processing, do you now have a conclusion with regards to the position of this Devonian structural feature as you've interpreted it?

A. Yes, sir.

Q. And is that interpretation displayed for us on Exhibit Number 2?

A. Yes, sir, it is.

Q. Let me ask you some questions first, before we look at the actual seismic data.

Are there any existing wells in any of the reservoirs that penetrate and produce out of this structural feature?

A. No, sir.

Q. So when the Examiner looks at a Devonian, Wolfcamp or anything else, we're going to find the existing wellbores have never had the opportunity to access what you're targeting here?

A. That is correct.

Q. Okay. Let's look now at Exhibit Number 3, and help us understand what you have concluded.

A. Yes, sir. Exhibit Number 3 is a line from the 3-D seismic data set. Marked on this exhibit is the location for the Government NBFD Number 1, which will be our test well.

Also marked is the Devonian horizon in green at the base of the section. You'll notice there's a question mark there. That's simply because we have no penetrations of Devonian that's included on the data set, so that's our best estimate of where the Devonian probably is.

The Morrow "A" mapping horizon is in yellow. That has been our main mapping horizon for this area, just because we have the well control also to give us more

confidence in the velocities and so forth. Also included in blue is the Canyon mapping horizon.

You'll notice that the Wolfcamp also has a question mark. The data quality was pretty good throughout this entire area, certainly sufficient for a structural mapping to determine the geometry of the structures. However, it really wasn't good enough for any stratigraphic-type work, and that's due to the near-surface cave and karst problems in this area.

So the Wolfcamp zone we weren't able to identify, but it's close enough to the Canyon that we feel like the structure derived from the Canyon is a very good estimate for the geometry of the Wolfcamp surface.

Q. When you look at this geometry and map it on Exhibit Number 2, describe for us why you've chosen this proposed unorthodox location, as opposed to some other location within this structural feature.

A. Yes, sir. We feel like in order to maximize recoveries, we would need to be at the highest point in the Devonian. Also, we have some evidence, which I'll get to in a minute, which seems to indicate the likelihood of an aquifer in the Devonian that would require us to maximize recoveries by achieving the highest structural position possible.

I have included an estimated productive limit for

the Devonian, which is simply the closing contour for that structure, which is a reasonable estimate in the absence of any other data.

Q. As you map these various reservoirs, describe for us which reservoirs you are packaging with regards to this opportunity within the structural feature.

A. Yes, sir. We feel like we have sufficient risk in this project that requires us to economically justify the project to include value and reserve potential from the Devonian, which is an absolute wildcat without any penetrations in the entire map area, the Morrow, which we believe has unique reserves associated with this location that cannot be recovered from any other orthodox location or existing wells, and the Wolfcamp, which again we believe have unique reserves that cannot be recovered from any of the existing wells or at an orthodox location.

There is also the potential for Strawn, Atoka, Upper Pennsylvanian, which would be Canyon, depending upon your terminology. However, the producing characteristics of those zones isn't really sufficient to map a precise opportunity for those zones. So -- There is a likelihood that those zones could be productive. We are talking about a very unique feature, and there's a long history of fantastic oil and gas recovery from localized pronounced structural features.

Q. As we look at this structural feature, which has been identified in the Devonian, you've mapped the top of the Devonian or identified it on Exhibit Number 3. Are the relationships of each of these other reservoirs going to be identical in terms of structural position as you move towards the surface?

A. In general, the structure will be broader as you move upsection. The greatest relief will be on the deepest horizons. In fact, the Devonian is probably faulted, and that fault probably dies out into a fold as you move upstructure.

For the most part, the high appears to occur at the same location, very close to the crosshairs of the meeting of the four sections there.

Q. Why have you chosen not to put the well at the intersection of these four section boundaries?

A. Well, we felt logistically from a standpoint of surface damages and keeping the pad all on the same surface lease, and also just to ensure that we're not going to cross the lease boundary, et cetera, that this was a reasonable compromise to achieve the maximum structural position at a location that's most convenient for the operations of the lease.

Q. When we deal with these four 320-acre spacing units within the equity area, are we dealing with federal

leases in all instances?

A. Yes, sir, they're all federal leases. And the equity unit involves all new wells produced from Wolfcamp on down.

Q. All right. Let's turn to Exhibit Number 4 and have you give us a better understanding of this geologic feature.

A. Yes, sir. Mr. Examiner, the purpose of this exhibit is just to display the remarkable nature of this feature. This is a 3-D net diagram which is derived from the Devonian structure map. It's a view looking from the southwest to the northeast. So if you're orienting Exhibit 2, which is the Devonian structure map, and look from the southwest to the northeast, this is the 3-D view that you would see, and this is --

Q. Let's take a moment --

A. Yes, sir.

Q. -- and make sure we're all with you now.

Our point of view on Exhibit Number 4, if you'll find the box, if we find the south orientation, we're standing on this south line at the bottom of the display?

A. We're standing on the southwest corner of the map, of Exhibit 2 --

Q. All right.

A. -- the Devonian structure map.

Q. And we're looking towards the northeast?

A. Looking towards the northeast, yes, sir.

Q. And as we do so, you've identified for us on this illustration the Carlsbad anticline?

A. Yes, sir, this is that long, pervasive structural feature that goes for miles down south of the City of Carlsbad. And you can see that gentle fold and then the NBFD anticline, which is clearly the northern terminus of this entire structural feature.

And on the entire data set this is the most pronounced -- actually, it was the only anticline that appeared on this data set.

But the quality of the data is very good for this kind of mapping. We have a high degree of confidence that this seismic response is reflecting true geometry and an untested anticline.

Q. Describe for us how this display is generated.

A. This is a computer-generated display that is able to take the structure map in digital form and form a view from any sort of direction that can give you a visual impact of the feature, relative to the surrounding structures.

Q. All right. What data went into generating the display?

A. This data was specifically generated from Exhibit

2 structure, so it's that map turned into a relief diagram.

Q. What's the significance of the color code?

A. The color code reflects structural elevations. I don't know specifically -- I don't have that printed out on the map. But for example, the change from blue to purple is a structural elevation. Probably from blue to purple is around 8950. That appears to be the closing contour.

Also, you can see the wells spotted on the map, on the 3-D diagram, and none of the wells penetrate this feature.

Q. I know we're going to come to it in a minute with more detail, but give us a general understanding of how this structural feature is formed in terms of geologic time.

A. Well, it's at a unique position at the northern end of the Carlsbad anticline. The Carlsbad anticline is a long structural trend.

Generally, long structural trends like this have some element of sideways or strike-slip motion, and these features are formed from response of continental collision, closing of the Gulf of Mexico in Permian time. And that creates space problems that -- The crust has to react, and it reacts along these deep-seated, long, linear features.

And this is one of those features, that when you get slight bends in these long, linear faults and you move

them sideways a little bit, you have sudden pop-ups. They're called flower structures. This is probably a flower structure, and the very deep seismic quality doesn't really allow us to identify that kind of resolution. It would result from just having too much rock material in a squeezed space, which causes it all to move vertically. It's a pretty well understood model.

Q. Let's focus again on the Devonian. Can you take us back and demonstrate to us any comparisons or analogies with other Devonian reservoirs?

A. Yes, sir, I would like to refer to the next exhibit, if I may, Exhibit 5.

Q. Exhibit 5.

A. Yes, sir. This is Exhibit 5, which is a locator map of some key Devonian wells in the area.

You'll notice in red the Oxy Number 1 NBFD, our proposed location.

Also about four miles to the northeast of that is the nearest Devonian penetration, the Sun State "Q" Number 1. That's marked in blue on Exhibit 5.

This is a very old well; it was drilled in the Fifties. And it did penetrate the Devonian, it drill stem tested the top of the Devonian and recovered around 350 MCF on a DST.

They then drilled deeper into the Devonian and

DST'd again and recovered a full string of water. This is a -- And then they set pipe and attempted a completion and flowed gas at a rate of 1.2 million a day.

This is very significant to us. It tells us several things. First of all, it tells us we have gas in the reservoir. We have a sufficient a wildcat aspect to this, and that's an important thing to have some confidence in.

Also, it tells us that we probably have excellent reservoir development. The logs that were run on this well are old induction logs. There's virtually nothing you can do with them from a reservoir description standpoint. But the test is very indicative that to recover a full string of water is an excellent sign that there's reservoir development in the Devonian.

Also, it tells us that there's quite a good chance that there's an active aquifer, which leads us to our conclusion that we must be at the highest point on the NBFD anticline in order to maximize the recovery.

Q. Let's look at Exhibit 6 and have you continue with your comparison.

A. Yes, sir, Exhibit 6 is a structure map of the Shugart-Devonian field. It's located -- I'm sorry, I'm moving back and forth. If you move back to Exhibit 5, you'll notice marked about 20 miles to the north and east

of the NBFD the Greenwood Number 1 and the Greenwood Number 3. They produce from the Shugart-Devonian field, which is the nearest production analog for us. That's virtually a one-well field from the Greenwood Number 1. And Exhibit Number 6 is a structure map on that Devonian surface.

And you'll note that the structure looks very similar to the NBFD anticline. It is a bit bigger, it has maybe 300 to 400 feet of relief, as opposed to our 200 feet of relief. Also, there's larger areal extent. It might be around 600 acres, thereabouts, as opposed to our 250 acres. But it does look very similar to our feature.

That one well, which is marked in red on Exhibit Number 6, drained the entire structure, and it produced greater than 18 billion cubic feet of gas and over a million barrels of condensate.

We feel like this is a viable production analogy, from which we can include -- that our NBFD structure has comparable-type reserve potential, possibly scaled down somewhat to account for the lower structural relief and lower areal extent.

Also, it seems to indicate the potential for our well draining the entire structure with one well, which again was our reasoning in forming the equity unit.

Q. Before we leave the Devonian topic and move to the Morrow, summarize for us your conclusions about the

Devonian with regards to why it's necessary to locate it as you've proposed.

A. Yes, sir. We feel as if we've identified a very unique untested anticline within existing pools. We feel like there's a significant potential for substantial Devonian reserves in this structure.

We feel like it can only be tested at an unorthodox location due to the likelihood of an active aquifer, and also the chance of being downdip on this structure. We feel like it's most important to be at the very highest point, and we also feel like that we're looking at a wildcat situation with the Devonian reservoir that requires backup from shallower zones to economically justify the project.

Therefore, the Devonian potential can only be tested, and those reserves recovered, from the unorthodox location, and they cannot be recovered from any existing well.

Q. As you move towards the surface, the next reservoir that you have considered is the Morrow?

A. Yes, sir.

Q. When we look at the Morrow, generally the regulators consider the Morrow as a single pool, but we all know it has multiple subdivisions. With regards to your study, which of the portions of the Morrow pool did you

analyze and determine had some prospective opportunity?

A. I've analyzed a particular sand in the lower Morrow "A" as a sand which would have substantial reserve potential on the structure, which cannot be recovered from any of the existing wells or from any well drilled on an orthodox location.

Q. Let's turn to Exhibit 7. This is your Morrow structure map?

A. Yes, sir. This is a Morrow "A" structure map, again based on the 3-D seismic data. The NBFD anticline is clearly visible in the same location with the high point at the crosshairs of the four sections within the equity unit. Also --

Q. Why are you considering structural information with regards to the Morrow reservoir?

A. Yes, sir, the particular sand that I'm identifying as having excellent potential for substantial reserves on the structure is the Morrow "A" sand, which is commonly wet throughout this entire area. It is the best reservoir development that you can encounter, but it's -- For the most part, it is wet.

Q. Help us understand the deposition here. We often have cases before the Division that deal with more typical Morrow channel sand development that does not have a structural component to it.

A. Yes, sir, if I might also ask that you refer to Exhibit 8, which is Cross-Section A-A', as marked on Exhibit 7, that might facilitate discussion here.

I have marked on -- This is a structural cross-section, by the way, that's hung on a structural datum, and you'll notice a number of sands that are discontinuous, that are colored in yellow, and they occur within the Morrow "C", Morrow "B" and upper part of the Morrow "A" on this cross-section. Those are the common stratigraphic traps throughout this area.

Well performance from the Morrow, within and around the NBFD equity unit has been very poor, and probably the existence of the structure wouldn't really benefit these stratigraphic reservoirs very much. They are, for the most part, poor permeability reservoirs.

The reservoir that I'd like to really draw your attention to, however, is the lower Morrow "A", and it's marked as "Morrow 'A' Sand" on cross-section A-A', on the well to the left. It's that very big, thick sand that's colored in blue as being water bearing. That's our Government "AC" Number 1 on Exhibit 7 in Section 15.

That is a sand that I've tried to depict the overall geometry of that sand in the brown shading. The brown shading indicates areas where that particular sand is greater than 20 feet thick. The high -- The thickest on

this map is 80 feet thick in Section 9 to the northwest. I felt like the well density really didn't allow me to further detail how thick that sand would be, other than to say that if I'm within the brown, chances are that it's certainly greater than 20 feet thick and could be as high as 80.

You'll note that that sand is also present as we -- Well, let me see. As we go to the eastern side of this cross-section at location A', the Government "AB" 5, the sand is absent at that location.

The next well to the left on the cross-section is the Government "AB" 1. This is an important well. It's located in the NBFD unit, in the west half of Section 11, and that's no longer active in the Morrow, by the way. The Government "AB" 5 in the Section 11 is the active Morrow well in the NBFD unit. This other well is currently active in the Wolfcamp. And it had that sand present, it had 28 feet of that sand present, and it had a gas-water contact present based on electric log calculations. That well performed very poorly, made 158 million cubic feet from the total Morrow, which included several of the stratigraphic traps up above it.

But it's very indicative, which says that probably that sand does cover over the -- is present over the NBFD structure. In general, the source direction for

the sands is from the west or north. And having a sand out there at that location is, to me, highly indicative that probably the sand channel flowed over the structure to that well, which the conclusion is, the structure was probably not present at the time of Morrow deposition and is a later feature, and that ties in with the overall plate-tectonics setting of a Permian-age movement on a structure.

Therefore, in this particular sand I've also colored on Exhibit Number 7, the map -- The wells that produce from this sand are in red. And the wells that are wet in this sand, either from actual tests or from log analysis calculation, are in blue.

There are a few producing wells from this sand which are difficult to explain. It appears that when you get closer to the edge of this sand, in the 20-foot range, there are localized stratigraphic traps that can trap gas downdip to water.

But for the most part, our objective is this very thick, very porous sand, which only produces -- it produces way to the south, farther south on the Carlsbad anticline, and it's a superb producer in that area.

So for us to have the opportunity to actually get this fantastic reservoir out of the water and to have it gas saturated offers a great opportunity for substantially recovery, which can only be recovered at the unorthodox

location, it cannot be recovered by any of the existing wells.

Q. Let me ask you why the well in Section 14, the Oxy Government "T" 1 --

A. Yes, sir.

Q. -- you've got 12 feet.

A. Yes, sir.

Q. I'm sorry, what's the -- What's the number? That's the thickness?

A. That's 12 feet of thickness of that sand.

Q. Of this particular sand. Why can't that wellbore recover the gas within this feature that you're trying to target?

A. That well perforated this particular sand, which was very thin at that location, in one of the localized stratigraphic traps, along with several other of the yellow sands, of the stratigraphic traps and the Morrow up the hole, recovered very little sand. It really wasn't in the great, porous, thick Morrow "A" sand that we're after. It would --

Q. All right. So in the north half of 14, that well at that location has no opportunity to produce the Morrow within this structural feature?

A. None whatsoever. This -- we are after -- When you look at the sands, particularly on cross-section A-A',

at the "AC" 1 location, that left-hand well, that's the kind of sand we're after. Those are the sands that occur all in that major brown band, and also occur at the "AB" 1 in Section 11.

That's an entirely different kind of a potential than the thin little stratigraphic fingers in the "T" Number 1, which, by the way, is no longer active in the Morrow; it's a Wolfcamp well also.

Q. Let's go to the gas spacing unit in the Morrow for which you're seeking the proposed location.

A. Yes, sir.

Q. If you start on A' on the cross-section, Exhibit 8, that well, as you've identified it, simply has no opportunity in this Morrow A at that location?

A. No, there's a remnant of that sand present, and we did perforate it, we fired a shot right in that sand. It's a tight little stringer that again is out of the major thick sand, with the aquifer associated with it. So it has no chance at all of recovering those reserves.

Q. As we move down the cross-section to the next wellbore after A', it's going to be the Government "AB" 1, which is the second Morrow penetration in this spacing unit, and when you look at the cross-section, you find better sand thickness in that existing well, but it appears to be wet?

A. Yes, sir, and that's based on clear log calculations. We did perforate the very top of that sand, along with several of the yellow sands above, and it was a very poor performer, 158 million. We did not perforate the best part of the sand, the best porosity, because it is wet.

Q. So in your opinion, is there any opportunity that the Government "AB" 1 well could drain this Morrow gas out of this feature within this spacing unit?

A. I don't think any of the recovery came from that lower Morrow "A" sand. So -- I don't think it drained any of the Morrow "A" sand, even though there is some perforations. That's just a value judgment, based on the quality of the pay that's been hit in the wellbore.

Q. All right. Now, remember the Devonian 3-D discussion. Tie the Morrow structure and your interpretation back to your Devonian 3-D.

A. Yes, the proposed location, the unorthodox location, is in an excellent position to recover the lower Morrow "A" sands that can only be recovered on that structure, and it also is at an excellent location for the Devonian structure also.

We do feel like that the risks associated with these different reservoirs require us to stack the potential in order to achieve an economically viable

project.

Q. When you go back to Exhibit 3, the 3-D seismic data, you can actually see the Morrow structure feature, can you not?

A. You can see the geometry of the structural feature, but you can't detect the presence or absence of sand. The quality of the data doesn't allow that.

So based on this interpretation, we are going to be high and out of the water.

Q. If the Division approves your unorthodox location as to the Devonian, will that same location give you an equivalent position in the Morrow that is the best position in the Morrow for this well?

A. Yes, sir, within the already stated confines of operational ease of drilling and so forth. The absolute crosshair is the absolute high, but we feel like we're -- we just prefer just to be stepped back a little bit. We're still very high on the structure.

Q. Summarize, then, for us your conclusions with regards to the Morrow "A" opportunity for this well location, and then we'll go into the Wolfcamp.

A. Yes, sir. We feel like the Morrow "A" production in the area has been from the discontinuous stratigraphic traps in the "C", "B" and upper "A" portions of the reservoir, and that we have a unique opportunity for the

best reservoir development to finally be out of the water at the NBFD anticline, and substantial reserves that can be recovered from that unorthodox location that cannot be recovered from any other well or any other orthodox location.

Q. All right, let's go to the Wolfcamp. If you'll turn to Exhibit 9 and give us a moment to organize our displays and unfold Exhibit 9, we'll talk about the Wolfcamp.

A. Yes, sir. Exhibit 9, it's a structure map of the lower Wolfcamp carbonate, and this is actually based on the Canyon 3-D seismic horizon, because the geometry of the Morrow really wasn't possible from the data, but the Canyon was close enough. And so it's a reasonable and common practice to extrapolate from your nearest good seismic horizon.

The data on this map, the red numbers are clean carbonate thickness, and of course the black numbers are structural position. Also marked is cross-section B-B'.

We're in the North Burton Flat-Wolfcamp here, which is an excellent Wolfcamp field.

Q. All right, let's take a moment now before we discuss the details, and let's find all of our current wellbores within the equity area that are in the Wolfcamp.

A. Yes, sir. We'll start in Section 11, the

Government "AB" Number 1.

Q. That's a former Morrow well; it's now a Wolfcamp well?

A. It's now a Wolfcamp well, yes, sir. The "AB" 5 is not a Wolfcamp well; that's a Morrow well. So that's the only well in the equity unit in Section 11.

Adjacent, in Section 10, the Government "AB" 2 is also a Wolfcamp completion.

To the south in Section 15, the Government "T" Number 2 is a Wolfcamp completion.

And likewise, and to the east in Section 14, the Government "T" Number 1 is a Wolfcamp completion.

And you'll note that none of these penetrations have penetrated the NBFD anticline.

Q. In your opinion, have you located a Wolfcamp reservoir, at least some portion of a Wolfcamp reservoir, that represents unique reserves?

A. Yes, sir.

Q. Now, let's talk about the Wolfcamp.

A. Okay.

Q. When we're talking about the Wolfcamp, we are talking about multiple layered reservoirs, each one independent of the other?

A. Yes, sir.

Q. There is no communication in a vertical sense

with these reservoirs, except through existing reservoirs that may have penetrated those zones?

A. Yes, sir, that's my opinion, based on log character, where we do have vertical barriers present on logs that separate individual porosity zones.

Q. All right, let's come to that in a minute. Have you help us understand now this structural anticline which you've identified and described for the Devonian and how it fits together with the Wolfcamp. And if you'll do that by turning to Exhibit 10, I think it will help illustrate what you've concluded about the Wolfcamp.

A. Yes, sir, there's a wealth of information on Exhibit 10 that I need to explain.

First of all, the areas in blue are -- what this map is showing is the Wolfcamp production over a regional area, so all the wells that are colored in blue are Wolfcamp completions.

Also posted on the map are cumulative production from these Wolfcamp zones, with gas being in red and oil or condensate being in green.

I've outlined the area of the North Burton Flat Wolfcamp as that blue pod in the center of the map in Township 20-28, where the best Wolfcamp production occurs. There really isn't much comparable. Wolfcamp for the most part is localized in small carbonate buildups with the

exception of North Burton Flat Wolfcamp. It is unique in its extent and its production characteristics throughout this subregional area.

I've also identified in red the Carlsbad anticlinal trend. That is a clear series of structural highs and noses, extending south from the City of Carlsbad, several miles north, and terminating abruptly right at the NBFD anticline. I have excellent well control to show that that entire trend does terminate there, and also the seismic control indicates the same thing.

Q. Let's talk about how this anticline was formed within the Wolfcamp time interval. The Wolfcamp reservoir that contains the hydrocarbons is a carbonate reservoir, is it not?

A. Yes, sir, it's a limestone, and it's deposited as carbonate buildups, probably algal material, maybe several other different kinds of organism.

Q. Each of these Wolfcamp carbonate reservoirs will have the storage capacity for the hydrocarbons. In this instance, we're dealing with gas. As we move up to the next hydrocarbon reservoir, carbonate reservoir of Wolfcamp, what separates the reservoir?

A. It's separated probably by a shaly carbonate, which is a drowning sequence. It's a series of sea-level changes that are resulting in stacked reservoir

development.

Q. All right. Am I correct in understanding that deposition is such that those reservoirs, the carbonate Wolfcamp reservoirs, are stacked vertically, and then the anticline is created and it wraps those reservoirs, layers -- it drapes them over a feature?

A. Yes, actually, the anticline is probably active while the Wolfcamp is being deposited, and that's creating a bathymetry or a shallower sea-level position, which is the maximum area for the organisms to grow.

Q. All right, let's leave Exhibit 10 for a moment. We'll come back to that. Let's go to the illustration, Exhibit 11, so that we can make sure this depositional illustration is clear.

A. Yes, sir, this is the depositional model that I've developed that explains the production and the reservoir development for North Burton Flat Wolfcamp.

If you'll notice at the very bottom of this exhibit, marked Time Number 1, this display shows the Carlsbad/North Burton Flat deep anticline, creating a subtle bathymetry on the sea floor, and that's the controlling factor for carbonate development. That's where the algal plates develop and where the associated organisms in symbiotic relationship with the algae grow. And that's a very common, well documented geologic process that on

subtle bathymetric highs, that's where the reefs grow.

A very slight sea level drop will result in freshwater leaching of that carbonate buildup, which is illustrated by the red zone in the Time 1 diagram, and that's creating exceptional porosity, which North Burton Flat has.

Several of the other Wolfcamp fields out here have very scattered porosity, similar to the material to the north. But North Burton flat has exceptional porosity development, which is probably cavernous-type porosity developed from freshwater leaching of the carbonate mound.

In Time 2, which is the next diagram up, there's a sudden sea-level rise which drowns the carbonate buildup, covers it with thin shaly carbonate. This creates a vertical barrier to flow from the exceptional porosity beneath it.

In Time 3, the clean carbonate development is re-established again on the bathymetric high, and the process begins all over again. Any minor sea-level drop will again leach the limestone, resulting in exceptional cavernous porosity.

Then finally the upper section, this cycle repeats several times with maximum reservoir development occurring over the NBFD anticline, and that remains untested.

I've tried to demonstrate the probable extent of the North Burton Flat Wolfcamp development as on the flanks of NBFD anticlinal structure, where we have one of these exceptional porosity zones developed. The model predicts that the maximum bathymetry which occurs on the NBFD anticline -- that many more of these carbonate developments should occur and should contain unique reserves within them.

Q. Let's take this illustration and make it site-specific now with your Wolfcamp cross-section. Let's turn to Exhibit 12 and have you show me why each of these existing Wolfcamp wells in the equity area are not going to be able to get all the gas that is stored within this unique structural feature.

A. Yes, sir, this is structural cross-section B-B', which is marked on the Exhibit 9 Wolfcamp structure map, going from west to east, and this is in a bit more complex manner showing how this model was developed and showing the evidence for this model.

If you'll notice, on the eastern side of the cross-section, at the Government "AC" Number 2 location, at the B' portion of the cross-section, most of the Wolfcamp in that log is very shaly, with the exception of one specific carbonate mound that's colored blue on the cross-section.

As you go to the west, towards the Carlsbad anticline --

Q. Now, I'm following the horizontal red shading that leads me through to a caption that says "North Burton Flat WC Pay".

A. Yes, sir.

Q. All right. I'm looking at the first well that's been fully perforated in the Government "AB" 3. As I move to the next well, the "AB" 2, what's happened?

A. Okay, I can start from that direction. Okay, from the "AB" Number 3, you'll notice -- This is actually still within the field. You'll notice the exceptional porosity that occurs in what's labeled the North Burton Flat Wolfcamp pay.

Underneath that exceptional porosity, you'll notice very shaly material. That's the material colored in gray, at around a depth of 9200 above and below that, and then another mound beneath that of tight limestone shaded blue, starting at around 9220, and then several cycles of the shaly carbonate and the clean carbonate.

As you go to the east, to the Government "AB" Number 2, you'll notice that the shaly material around 9200 feet has indeed become clean carbonate, and that's the whole basis of the model. As we move towards the Carlsbad anticline, we are in the area that was the shallowest water

for the longest period of time and was within the area of clean carbonate generation for the longest period of time, and also the exceptional porosity continues to exist in the North Burton Flat Wolfcamp pay.

Q. All right, now as you move across -- go upstructure, you follow the North Burton Flat "WC" pay across the proposed location of the crest of this feature.

A. Yes.

Q. You come down the crest on the other side, on the east side of this feature, you're moving down to the Government "T" 1?

A. Yes, sir. And you can see that the buildup that contains the North Burton Flat Wolfcamp pay is still present, and that porosity is still exceptional in that well.

If I could ask you to look above that, you'll see a thin blue clean carbonate that's tight at around 9190.

And then above that is a very shaly section. That shaly section from around 9160 down to the blue, that's equivalent to the section in the Government "AB" Number 2 on the other side of the proposed well that occurs at around 9070 or so.

You'll notice that in the Government "AB" 2, that all consists of clean carbonate. The time-equivalent rock that was deposited at the same time of that clean

carbonate, the time-equivalent rock in the "T" Number 1 was all shaly carbonate. And that's what happens when you move off the Carlsbad anticline; you get into deeper water, shalier material, and you're just basically off the reef.

Q. When you look at this North Burton Flat WC pay, this is the conventional Wolfcamp gas pay that's being produced by the gas wells within the equity area that produce out of the Wolfcamp?

A. Yes, sir, that's -- Yes, sir.

Q. What are you attempting to achieve with the proposed unorthodox well location that you can't obtain with these existing wells?

A. We're trying to achieve new pay, and that's illustrated on the NBFD Unit Number 1 Well on the Cross-section.

Q. And how is that shown?

A. That's shown as new Wolfcamp pay in red in at least three different carbonate mounds. This is something that's predicted by the model. The model makes perfect sense, that we understand the controls for carbonate development and we understand the controls for porosity development. And the controls are simply to be at the landward extent of the Carlsbad anticline.

And the reason for that -- If I can refer back to Exhibit 10, which is the exhibit that has all the Wolfcamp

production of the subregional area, there's -- on the northern part of that map I've illustrated the Permian depositional strike. That's showing the trend of the shoreline.

I don't know where the shoreline really was. It was moving back and forth in Wolfcamp time. This was tectonically a very active time, when sea-level rise and sea-level fall was quite active. I do know, however, that landward direction was to the northwest and seaward direction was to the southeast.

So the controlling factor for North Burton Flat Wolfcamp is the landward extent of the Carlsbad anticlinal trend. That's where the shallowest water would have been, and that's where the maximum generation for carbonate development and porosity creation would have been. That's a clear observation from the data that I have both in a regional sense and in a local sense, across cross-section B-B'.

The logical prediction that the model allows is, the absolute maximum carbonate development should occur at the absolute maximum landward extent and absolute maximum structural elevation of the Carlsbad anticline, which is the NBFD anticline, and it's untested.

Q. Having described the structure of the feature, have you also given us a map to show us its thickness?

A. Yes, sir, this is the conclusion of the prediction, based on the model. It is Exhibit Number 13, and it shows the lower Wolfcamp clean carbonate isopach.

You'll notice the Carlsbad anticline that's been mapped up from the south, and it's pretty clear from the data that that is the controlling factor for the position of the carbonate mound.

And what I have predicted, based on the presence of the NBFD anticline as the northern extent of that Carlsbad feature, is that we will encounter new reservoir rock on the NBFD feature, new clean carbonate, that many of the shaly carbonates that occur on the flanks will be cleaner at that anticlinal feature and will be porous.

And the blue outline is just an estimate based on the model of where we may encounter new reservoir rock.

Q. When you define this dashed blue line --

A. Yes, sir.

Q. -- that's an indication that none of the existing wellbores are positioned such that they could access the reservoir above that line?

A. That's correct.

Q. And so you'll need a new well within the blue dashed line in order to have a chance for these unique Wolfcamp reserves?

A. Yes, sir.

Q. Within that feature, then, as identified by the dashed blue line, why have you chosen this particular location?

A. This location is chosen, really, in order to stack the Devonian and Morrow objectives in a position where we can test all three of the objectives as one location. Again, we feel like the risk is sufficient that we need to economically justify the well with reserves from all three objectives.

Q. Give us your summary conclusion with regards to the geology, Mr. Doty.

A. Okay. In regards to the Wolfcamp, here's what I know. I know that the Wolfcamp buildup was controlled by the Carlsbad anticline. I also know that the Wolfcamp reservoir development is maximized at the landward extent of the Carlsbad anticline. Further, I know that the NBFD anticline is the landward extent of the Carlsbad anticline.

Based on those three observations, I can predict that the Wolfcamp reservoir development is maximized at the NBFD anticline. This anticline is untested for these new reserves, these reserves cannot be produced from any of the existing wells nor at any orthodox location.

Therefore, we feel like we have identified a very unique structural feature that has an excellent production analog at Shugart, that has the potential for unique

reserves in the Devonian, Morrow and Wolfcamp, that cannot be recovered from any existing well, must be at the unorthodox location, and has sufficient risk for us to require to have the potential to produce from all those zones in order to economically justify the attempt at recovering those reserves.

MR. KELLAHIN: That concludes my examination of Mr. Doty.

We move the introduction of his Exhibits 1 through 13.

EXAMINER CATANACH: Exhibits 1 through 13 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Doty, is it your testimony, in your opinion, that this structure is virtually continuous in all three of these formations?

A. Yes, sir.

Q. When did this structure develop, in your opinion?

A. I know it was active during Wolfcamp time, but I know because of the association of the -- its effect on the deposition, so that tells me that there was some element of -- It was active during Wolfcamp time.

I also know that it was active after Bone Spring time, because it does deform the Bone Spring surface.

Commonly, these structures are active episodically throughout geologic time, because they are located on very old, deep-seated structures that any sort of a space problem is solved by movement on an old feature, rather than creating a new feature.

So what I can tell you is, I know it was active during the Wolfcamp because it controlled Wolfcamp deposition, and I know it was also active after the Bone Spring because it deforms the Bone Spring.

Commonly in the Permian Basin, the major tectonic episodes are considered to have been started in the Mississippian and continued on through -- with a maximum at the Wolfcamp and continued on somewhat into the Permian, of the Permian.

I don't think it was active during the Morrow time, though. Otherwise, the sand wouldn't have been deposited across. It's unlikely the sand would have been deposited across.

Q. On your Exhibit Number 2, you show seismic line 130.

A. Yes, sir.

Q. How many more seismic lines were run in that area?

A. It's a volume of data, sir. It covers this entire map area with a data point every 330 feet. So you

can -- with 3-D data, you can make a seismic line just go anywhere.

I picked -- I chose one that went through the location. But throughout the data volume you can see that structure line to the north and south. So the way the data is shot, you can pick an orientation and generate a line from it.

Q. Are you satisfied that -- the minus-8750 contour line, is that the -- that you've got it mapped -- the northern limit of that contour, that you've got it correctly mapped? Are you satisfied to that?

A. It's a question of velocity control. We know in time what that high point will be, and we take our best estimates of the velocities of the rocks above, and probably within a 50-foot margin of error, probably less than a 50-foot margin of error, we're correct.

At the Devonian level we have no penetrations whatsoever, so this is based on the Morrow "A" mapping surface.

What I can conclude is probably for the Morrow "A" structure surface, which is Exhibit 7, that minus-7700-foot contour is probably correct within 20-some-odd feet.

The Devonian, again I have no penetrations, I have no data to estimate the velocities, so we're assuming that the velocities don't change from the Morrow to the

Devonian. So I have no data to give you an estimate on my confidence in that.

I do know, though, that if the Morrow "A" was deformed into an anticline, that the Devonian must be also. It's mechanically not feasible for an upper zone to be deformed and the lower zone not to be deformed.

Q. But you're satisfied that the proposed well location represents in the general vicinity of the top of that structure?

A. Yes, sir, that's an excellent conclusion right there, yes, sir.

Q. The Devonian structure you identified four miles to the northeast --

A. Yes, sir.

Q. -- that's a separate structure?

A. That -- I don't know if that's on a structure or not. All I have is that one well location. That well -- The field was never developed, that gas was never produced, there was no Devonian completion.

I have a well that, on the Morrow "A" mapping horizon, appears to be on regional dip, that did encounter gas. So there's probably some very small structure there, but it was never produced and never developed.

Q. Well, is it your belief that that's not in any form in communication with this structure? Can you make

that --

A. I have no earthly idea. I can't imagine how it could be.

Q. How can you determine from that well that, first of all, that your structure is going to have gas and water?

A. All I can conclude from that well is, that well had an active aquifer in it, and it also had hydrocarbons in the reservoir.

For a wildcat zone like this, some of the things you worry about is, is there any source rock where the maturation -- timing all correct and so forth? Is it CO_2?

I was encouraged that they drill stem tested it and then set pipe. I don't have any gas analysis. But since they drill stem tested it in the Fifties, they probably didn't set pipe for CO_2; they probably set pipe for burnable gas. I'm very encouraged by that.

And I'm encouraged by the water recovery that says this is not tight-as-a-drum-type rock. I'm inferring the possible presence of an aquifer, because that well appeared to have a strong aquifer with gas on top.

For a wildcat zone, I really can't do much else. Actually, this is -- oh, probably pretty strong, and for instance, that's a lot better than most other wildcats you drill as far as what might be down there.

Q. Is it your opinion that this one well will drain

this entire Devonian structure?

A. That's based on the analogy with the Shugart field, and that's without any reservoir properties on this feature, et cetera. That's our first stab, yes, sir. Because a similar-looking structure appeared to be drained by one well, 20 miles away.

Q. Are you satisfied that your structure -- that the limits of the reservoir are correctly mapped on your -- are on your map?

A. In the absence of any other data, I'm forced to conclude that the entire structure will be filled to spill point. So I've identified spill point.

It's possible that the trapping -- the seal is insufficient, that, you know, you could have less of a gas column. I -- Again, that's something we'll just have to find out when we drill it, but...

There is a Woodford shale above the Devonian, which normally, in a regional sense, allows sufficient seal to allow for a reservoir to be filled to spill point. I think it's a good first guess, yes, sir.

Q. Okay. The faults you have mapped, that's a sealing fault; there shouldn't be any production on the downthrown side of that fault?

A. Downthrown-side production in the Permian Basin is really rare. I don't know of any in the Devonian.

Maybe -- I think down in the very -- in the Valverde Basin there's a little bit. But I would be greatly surprised if there would be any downthrown production.

Of course, it's commonly not tested too, so...

Q. Let's see, the Government "AB" 5, that's the current Morrow producer, right?

A. Yes, sir.

Q. That is not producing from what you targeted as being the Morrow "A" sandstone?

A. It is perforated. There is maybe, I don't know, half a foot or so. If I can refer to Exhibit Number 8, the cross-section, that well is on the cross-section. You'll note the --

Q. Just a second.

A. Yes, sir, it's on the right side of the cross-section at the A' location. You'll notice the perforations are marked in black on the gamma-ray side of the track, the log track, and they start at around 11,150, thereabouts, the top perforation. There's six sands in yellow that are perforated.

Down at the lower Morrow "A" sand, that sand is just about gone. We have a perforation in that sand. I don't think the sand is there. I think the gas is recovered from the yellow sand. But indeed, there is one shot fired in a stray remnant of what might be the very

edge of that sand.

The absence of that sand is kind of unusual in that little area right there. You'll notice "AB" 5 and on down, there's a funny withdrawal point there, but there's no sand.

I've mapped the sand as a zero on that location.

Q. What do you guys intend to perforate in the Morrow?

A. Our intention is to produce the Devonian, if we get an excellent Devonian well. If we don't, how does the Morrow look? If we don't, how does the Wolfcamp look? And so forth.

Our main objective in the Morrow is that lower Morrow "A" sand. We're not that excited about the producing characteristics of the stratigraphic sands in this immediate area. They just haven't performed. We're talking about, you know, 150 million, half a B, that kind of potential, in this immediate area.

And we're excited about possibly getting that big, fat sand out of the water. That could be big. There's wells in the south Carlsbad field that are along this southern extent of the Carlsbad anticline that produce from this sand and are big wells. But that's just never been able to be achieved up in the northern part, and the Morrow cums reflect that in this immediate area.

Q. Mr. Doty, are you saying that the upper sands will not be perforated or produced in this well?

A. If that's all we're stuck with, then we're desperately trying to pay out the well, pay out our investment. That's our ultimate -- Next to a dry hole, we're going to do our best to pay out our investment. That's not our objective, though.

Q. Okay, and the Wolfcamp -- I guess what you're saying is, there's going to be some zones on that structure that are not present in the main portion of that Wolfcamp pool?

A. Yes, sir, that's what the model predicts, that's what I'm predicting.

Q. Is that -- Is the main producing interval in the Burton Flat Wolfcamp, is that easily correlatable across the field?

A. Throughout the northern part of the field, within the area of the NBFD unit, it is.

And there are some stringers below, which I haven't really emphasized. The "T" Number 1, for example, has some of those minor porosity zones, which I predict will correlate into an exceptional porosity zone up on the structure.

I haven't emphasized those minor porosity zones because that's really not our objective. We're really

trying to encounter some new exceptional porosity zones.

Q. In between the pay zones, you've got -- is it shale that's the barrier to flow between those?

A. I'm saying it's shaly carbonate. That's what it appears to be on the logs and on mud logs. When you log through this on mud logs, it's a black, limy shale or a shaly lime, whatever you want to call it.

But it's the deeper-water equivalent to the buildup rocks.

Q. What is Oxy's intent with respect to producing the Wolfcamp interval?

A. Again, it just depends on what we encounter. Our primary objective is the Devonian. That's what we want to do.

But if we fail, we're going to desperately try and pay out our investment for ourselves and our working interest owners. If we're at that point, we're in trouble.

Q. Okay. That would include perforating the main interval that's being produced in the Burton Flat field?

A. It may include that, if that's -- if the worst case happens, yes, sir.

Q. In the Morrow "A" and in the new Wolfcamp interval, pay intervals, that you hope to encounter, would the well at your proposed location, do you feel, effectively drain that entire structure?

A. I think the Morrow well will, because I know -- Well, I know I have a water leg in that sand. I really don't know on the Wolfcamp.

Q. Is your equity unit as to all three zones, or is it -- It's just to the Devonian?

A. No, sir, it's from -- everything from the Wolfcamp on down.

All new wells in that entire unit, 1280 -- Well, let's see. I don't know what it is, equity unit. Any new well produced from the Wolfcamp on down, which would include Devonian.

Q. And that would include, like I say, the main producing interval in the Wolfcamp --

A. Yes, sir.

Q. -- Burton Flat-Wolfcamp?

A. Yes sir, it would. But it doesn't affect the existing wells.

Q. I see.

A. So for example, in Sections 10 and 11, it's 100 percent Oxy.

Any new well from any of those zones will be shared equally by the owners of the equity unit.

EXAMINER CATANACH: Okay. I think that's all I have, Mr. Kellahin.

MR. KELLAHIN: Okay, thank you.

MICHAEL KOVARIK,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Kovarik, did you conduct an engineering analysis and an economic study with regards to the well we're discussing in this case?

A. Yes, I did.

Q. Is your methodology similar to that for which you testified in the prior case, 11,453?

A. Yes, it is similar to that.

Q. Let's go through the process, then. If you'll start with Exhibit 14, identify for us on the data sheet what we're seeing.

A. Exhibit 14 is an informational reservoir data sheet that shows, if we can start from the top, the pool name of the pools involved in and around the North Burton Flat Deep unit. We have the North Burton Flat-Wolfcamp, Burton Flat-Morrow and Burton Flat-Devonian, if you will, which really doesn't exist yet.

We have approximate depths for each of the zones we expect to encounter in the NBFD Number 1, date of first production in those pools, cumulative gas and oil production, number of active wells, current gas rates and

drive mechanisms from those reservoirs.

One point I'd like to note. For the production numbers for the North Burton Flat-Wolfcamp, the production numbers reflect the entire pool, also the active wells. However, in the Burton Flat-Morrow, the production figures and number of wells reflect just those wells in the vicinity of the NBFD Number 1.

Q. These are the three targeted reservoirs that Mr. Doty has identified in his testimony?

A. Yes, they are.

Q. When we look at these three reservoirs, the primary historically produced reservoir is the Wolfcamp in this immediate area?

A. Can you repeat your question?

Q. Yeah, in the Wolfcamp --

A. Yes.

Q. -- that's the primary reservoir. We don't have a Devonian production in the unit --

A. Exactly --

Q. -- equity unit?

A. -- right, yes.

Q. We have had some Morrow production in here, but the primary producing reservoir has been the Wolfcamp?

A. Yes, that's true.

Q. That's been identified as the North Burton Flat-

Wolfcamp Gas Pool?

A. That's right.

Q. Give us a quick historical summary with regards to what's happened in that pool.

A. The North Burton Flat-Wolfcamp pool was discovered in approximately 1974. It's a retrograde condensate pool. Field rules were set in 1975, I believe, 320-acre well spacing and 1.5 MMCF per day allowables per well. The --

Q. What was the basis for doing that?

A. The basis for doing that was to keep control of reservoir pressure, such that -- Cities, at the time, who was the operator, was looking at the possibility of gas injection to recover higher volumes of liquids from the reservoir.

Q. We were at a point in time in the life of the reservoir where you were able to conclude that your pressure was above the dew point?

A. The pressure they -- Cities Service concluded that the original reservoir pressure was above the dew point early on in the life of the field, and they were studying the possibility of doing a gas injection project to recover additional liquids.

Q. Did that ever come about?

A. It never came about. They determined it was

uneconomical to do that.

Q. And once the pressure was reduced below the dew point, then, it's been acting and operating like it was simply a depletion-drive reservoir?

A. It is a depletion-drive reservoir. It's on primary production and has been ever since it was discovered.

Q. All right. Let's go to Exhibit 15 and set up the parameters for your volumetrics, beginning here with the Morrow.

A. Exhibit 15 is a table which shows the reservoir rock and fluid properties that went into the volumetric calculation for Morrow reserves.

I'd like to point out that these calculations would be for the Morrow "A", based on offsetting wells from the NBFD Number 1.

Q. Are you satisfied you used reasonable reservoir parameters and values for your volumetrics in the Morrow "A"?

A. Yes, based on the offsetting wells, I believe we've used reasonable estimates for the rock and fluid properties.

Q. All right, you've also considered Morrow production histories?

A. Yes.

Q. Let's look at Exhibit 16 and have you identify what you have compiled and submitted as a multiple-page Exhibit 16.

A. Exhibit 16, the first page is -- are two summary tables of producing well production in and around the NBFD Number 1.

The first table you see is the Morrow production in the NBFD area. There are ten wells which are in the immediate vicinity of the equity area and inside the equity area.

The first column shows the well names, then to the right their cumulative production, and ultimate recovery following that, and their status as either active or inactive.

Q. If they're still active, have you forecast an ultimate recovery?

A. Yes, I have.

Q. And what method did you use?

A. I used decline curve analysis. Those results are attached to the first page of Exhibit 16.

Q. When we move down to the Wolfcamp, have you gone about that in a similar way?

A. Yes, in the exact similar way.

Q. All right. What then did you do?

A. Well, I've got total production, total ultimate

recovery for ten wells surrounding the NBFD Number 1.

Q. Okay, and you've got those numbers, you've got your volumetric parameters.

Did you look for analogs that might be useful to helping you analyze reserve potential for your economics for the Devonian?

A. I did look for analogs for the Devonian, yes.

Q. And what did you decide to use?

A. I decided to use the Shugart analogy that Mr. Doty spoke of, which is 20 miles to the north, northeast -- or northeast of our location.

Q. All right. Let's turn now to Exhibit 17 and look at your reserve calculation summary page.

A. The reserves calculations by analogy summary page, the first part of that shows how I went about using the Devonian Shugart as an analogy to our NBFD area.

The Devonian Shugart, the Greenwood unit, produced almost 19 BCF and over a million barrels of condensate. The Shugart producing area is approximately 800 acres. The NBFD approximate producing area, based off of our mapping, is approximately 250 acres or approximately 31 percent of that of Shugart. The analogy -- The analog reserves, then, that I used for NBFD is simply a ratio of producing area of NBFD to the Shugart area, such that if I take 31 percent times 18.7 BCF, the possible NBFD Devonian

analogous reserves would be 5.8 BCF and 318,000 barrels of condensate or oil.

In the Morrow, similarly, we have wells offsetting the NBFD Number 1, a total of ten of them. 14.5 BCF ultimate recovery. Divide that number by 10. An average well would make 1.4 BCF.

And similarly for the Wolfcamp, there are four wells directly offsetting the NBFD location. Their ultimate recovery, 14.8 BCF, divided by 4, is 3.7 BCF.

Q. Let's turn to Exhibit 18 and have you show us the reserves that you assigned to these various reservoirs and used in your economic summary.

A. Okay. I have two estimates of reserves. Each have their merits and their pitfalls.

In the Devonian, I had to come up with the reserve estimate using either volumetrics or analogy. We didn't have any measurements in the Devonian to calculate volumetrics. We don't know exactly how many net feet of pay we're going to get, because we don't have any control out there in the Devonian. So I felt that a volumetric estimate would be of no use, and I therefore used just the analogous well, my analog well, as the target reserves for the Devonian, target unrisked reserves for the Devonian.

In the Morrow, on the other hand, most of the production surrounding our NBFD, as Mr. Doty noted, is in

the Morrow "B". It's not in that clean, fat Morrow "A" section that we're going for in the very unique structure that the model shows there's a likelihood to be. Therefore, analogy for the Morrow didn't seem to be appropriate to use. I therefore used a volumetric estimate, that's marked as Exhibit 15, of 4.6 BCF, as the target reserves for that fat Morrow "A" sand.

In the Wolfcamp, we have a study ongoing right now, which concerns Wolfcamp volumetrics. It's not completed right now. I didn't want to use incomplete information, which can lead to erroneous results. And besides, the Wolfcamp zone that we're targeting -- or zones, would have different rock properties than the zones which are currently producing. Therefore, I felt that using rock and fluid properties from currently producing Wolfcamp wasn't applicable.

I therefore said that a well drilled on structure, on the structure we expect to see, would behave similarly to one of the wells currently producing. I therefore used analogy for the Wolfcamp target base case reserve estimate.

Q. Once you have selected and satisfied yourself about the ultimate gas recovery per reservoir, what then did you do?

A. I used those reserve estimates to perform

economic analyses --

Q. At this point --

A. -- on each of the zones.

Q. At this point, then, you're starting with an ultimate recovery that's a gross number for which no risk has been assigned?

A. That's exactly right.

Q. No one drills under that situation, do they?

A. I certainly would not be able to recommend investing capital on an unrisked basis for a rank wildcat well, no.

Q. What method did you utilize, then, to assign categories of risk to the reservoirs?

A. I categorized the different zones. If we can look at Exhibit 19, across from "Devonian", on top of Exhibit 19, the reserve category is possible undeveloped. Morrow is probable undeveloped; it has, I feel, a little bit less risk than the Devonian, because there is Morrow "A" in the area. There isn't as much reservoir risk as there is in the Devonian. The Devonian is strictly -- not strictly, but for the most part, 3-D seismic, which lends itself into its own risk. The Morrow is less risky, I felt.

The Wolfcamp is possible undeveloped, which is -- I felt was very risky.

Q. Let's leave 19 for a moment and have you turn to Exhibit 20, to show the evaluation criteria for the risk adjustment. If you'll look at the bottom of that summary sheet and identify for the Examiner the source of this criteria.

A. The source of this criteria is from an SPEE -- Society of Petroleum Evaluation Engineers -- survey of bankers, consultants and oil producers from July of 1995.

Q. The complete text of that survey was submitted in the prior case, 11,453?

A. Yes, it was.

Q. And this is simply the summary page out of that same exhibit?

A. This is page 1 out of that exhibit, yeah.

Q. All right. And without reading them, you can see at the bottom of the display, if you're looking at risk adjustments, the probability of success with the greatest risk is possible undeveloped?

A. Yes, it is.

Q. At the bottom?

A. Yes, it is.

Q. And so it receives the smallest percentage?

A. It receives the highest risk, yes.

Q. Highest risk, lowest percentage. And when you do the math, then, it will subtract greater volumes of target

gas out of the analysis?

A. Yes, it will.

Q. All right, let's go back to the analysis and complete your discussion on Exhibit 19.

A. Okay.

Q. You've got the Devonian, you've given us the target reserves, you have assigned a category of risk to those reserves, you've got the numerical equivalent of that risk, you then finish the calculation and you get a net present value column. What does that show you?

A. That net present value at 15 percent, for the Devonian, for example, I assumed drilling a Devonian well on a stand-alone case. Using those risk reserves, multiplying the risk factor times the reserves, I get a risk production stream. Using $720,000 Devonian completion cost, the net present value of that project is a minus $456,000, giving you a negative rate of return.

Similarly for the Morrow, if you assume drilling a Morrow well using probable undeveloped risk factor of almost 20 percent and $655,000 capital cost, the net present value of that project at 15 percent is minus $151,000, a negative rate of return.

And similar numbers for the Wolfcamp on the same basis.

Q. When you put a negative present value for each of

these reservoirs, in each instance, that causes you to conclude that you could not recommend to your management the drilling of a Devonian as a stand-alone well?

A. That's correct.

Q. And you could also not recommend drilling the Morrow as a stand-alone well?

A. That's correct.

Q. And in fact, you could not combine those two and do it?

A. That's correct.

Q. You need all three of those to justify it?

A. You need all three of the zones to justify drilling this well in this location.

Q. And so when you get down to the shaded line here, where it says "Expected Value Risked Case", what are you communicating to us?

A. What the "Expected Value Risked Case" portion shows is that if you add the values, the risked values, from each of the three zones together, and if Oxy is able to realize those values, using capital cost for drilling the deepest zone that we're going for, then we do have economic justification for doing this project, such that we have a 27.6-percent rate of return and a positive net present value at 15 percent of $223,000.

Q. All right, sir, let's turn to Exhibit Number 21

and have you identify that for the record.

A. Exhibit 21 is a plat showing the field limits of North Burton Flat-Wolfcamp Gas Pool.

Q. When we look at the stippled or the shaded area, that corresponds to what the Division shows as the current pool boundary for the North Burton Flat-Wolfcamp Gas Pool?

A. Yes, sir, that's my understanding, yes.

Q. And the wells as shown here represent what?

A. The wells shown here are the active Wolfcamp North Burton Flat wells.

Q. When we look at Exhibit Number 22, what are you showing here?

A. Exhibit 22 is a production -- historical production curve for the total North Burton Flat-Wolfcamp Pool. Oil is the green dashed line, gas production is annotated by the red solid line, and water production by the blue dotted line on the bottom of the plot.

Q. Do you concur as an engineer with Mr. Doty's conclusion that this is the best opportunity for the interest owners within the equity area to have a chance to produce reserves out of the Devonian, the Morrow and the Wolfcamp?

A. Yes, I do, absolutely.

Q. In your opinion, would those reserves be unique as to that wellbore?

A. The way our geological model is structured, yes, those would be unique.

Q. Do you have any engineering data or information that is contrary to or inconsistent with Mr. Doty's geologic interpretation?

A. No, I do not.

MR. KELLAHIN: That concludes my examination.

Let me see, how many exhibits do we have? 14 through 22, Mr. Examiner.

That concludes my examination of Mr. Kovarik.

We move the introduction of his Exhibits 14 through 22.

EXAMINER CATANACH: 14 through 22 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Just for clarification, your reserve estimates for the Devonian, that includes the entire structure; is that correct?

A. As best we could estimate right now, yes, it would.

Q. Okay. The -- And the same goes for the Morrow and the Wolfcamp?

A. Yes, those are -- That's my best estimate for reserves on that structure, yes.

Q. Okay. Does your Morrow estimate -- what -- Does that include only the "A" sand?

A. That would include only the "A" sand, yes.

Q. Okay. And the Wolfcamp estimate would include only what you consider to be new pay in the Wolfcamp?

A. Yes.

EXAMINER CATANACH: Okay. I think that's it, Mr. Kellahin.

MR. KELLAHIN: Call at this time Mr. Kent Woolley. Mr. Woolley spells his last name W-o-o-l-l-e-y.

KENT WOOLLEY,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A. Full name is Thomas Kent Woolley. I'm a landman employed by Oxy USA, Inc.

Q. Mr. Woolley, on prior occasions have you qualified as an expert in the field of petroleum land matters before the Division?

A. No, I have not.

Q. Summarize for us your education, employment and experience that qualifies you on that topic.

A. I have a bachelor's of business administration with Western State College in Colorado. I've got 18 years of experience as a landman, working for Oxy, other companies including Texas Petroleum, and I've also worked as an independent landman.

Q. Are you familiar with and knowledgeable about federal oil and gas leases?

A. Yes, I am.

Q. And those are the oil and gas leases that affect the land transactions with regards to this equity agreement, does it not?

A. That is correct.

Q. And you're familiar with the joint operating agreements that are utilized in this particular area as well as within the industry?

A. I am.

Q. Are you familiar with the federal communitization and unitization agreements and procedures?

A. I am.

Q. We tender Mr. -- Are you also knowledgeable about the ownership within the equity area?

A. Yes, I am.

Q. As well as the offsetting operators to the equity area?

A. That's correct.

MR. KELLAHIN: We tender Mr. Woolley as an expert landman.

EXAMINER CATANACH: He is so qualified.

Q. (By Mr. Kellahin) Let's start with Exhibit Number 23, Mr. Woolley. Describe for us what you've shown on this exhibit.

A. Exhibit 23 is a plat that shows the working interest owners in the west half of Section 11, east half of Section 10 and the north half of Sections 14 and 15, Township 20 South, Range 28 East.

Q. Let's start with Section 11. Let's look at the spacing unit in the west half of 11. There are existing wells in that spacing unit. Who is the operator?

A. Oxy USA is the operator of the wells.

Q. The working interest ownership is held 100 percent by Oxy?

A. A hundred percent by Oxy.

Q. As we move over into the next spacing unit to the west, the east half of 10, again, that's another federal property, oil and gas lease?

A. That's correct.

Q. And the operator of that existing well is what company?

A. That's Oxy USA, 100 percent.

Q. And the caption shows that the working interest

owner is also Oxy?

A. That's correct.

Q. All right. Move down into the north half of 15 and describe for us who's the operator of that spacing unit.

A. The north half of 15 is also Oxy USA. Other parties in the north half of 15 are described.

I might make note of the fact that Pennzoil has recently sold their interest to UMC.

Q. Okay. As we move over on into the north half of 14 --

A. Oxy.

Q. -- Oxy, again, is the operator. And the working interest ownership is divided as you've shown in your information?

A. That is correct, with Pennzoil also now having sold to UMC.

Q. All right. This is a unique circumstance for you as a landman, I would expect, Mr. Woolley?

A. Yes, it is. Because of the location of the proposed well and its proximity to the section lines of 10, 14 and 15, we had a concern over the correlative rights of the offsetting parties, and we therefore proposed an equity agreement in the form of an operating agreement covering the east half of 10, west half of 11, and the north half of

Sections 14 and 15, from the top of the Wolfcamp to the base of the Devonian.

Q. One option would have been to simply drill this well as an additional well in its own spacing unit, subject to the normal conventional solutions of having that well in that spacing unit?

A. That's correct.

Q. And not to have shared either the cost or the proceeds with anyone else, other than the owners of that spacing unit?

A. Yes, sir.

Q. Your technical people were concerned that that might lead to drilling of unnecessary wells offsetting that well; was that not one of their concerns?

A. That is correct.

Q. In order to solve that, what have you done, then, with regards to this equity agreement?

A. We've proposed the equity agreement with the working interest owners in the other sections. And I think our Exhibit --

Q. -- 24 --

A. -- 24 includes our proposal letters and also responses from all of the parties.

All of the parties involved have agreed to participate, with the exception of Kerr-McGee, and they

have agreed to make an assignment and sell their interest to Oxy.

Q. So the end result of that transaction is that all interest owners have voluntarily committed in some fashion to the equity agreement?

A. That is correct.

Q. The mechanics of the equity agreement are to be governed by an operating agreement?

A. That is correct.

Q. And that operating agreement will not cover existing wells that are currently within the equity agreement area?

A. That is right.

Q. All right. Have you obtained the consent of the Bureau of Land Management to approve this project under this concept?

A. We have.

Q. In your opinion, Mr. Woolley, would approval of this Application be in the best interests of conservation, the prevention of waste and the protection of correlative rights?

A. Yes, sir.

Q. And does your Exhibit 24 show the joinder of all the interest owners affected?

A. It does.

MR. KELLAHIN: That concludes my examination of Mr. Woolley.

We move the introduction of his Exhibits 23 and 24.

EXAMINER CATANACH: Exhibits 23 and 24 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Woolley, within the equity unit, do you have the breakdown of what the interest would be after combining all these?

A. Yes, it's shown in -- It's shown on the second page of Exhibit 23 -- excuse me, Exhibit 24.

Q. Okay. It's my understanding that these are -- Are they four separate federal leases?

A. They are four separate federal leases, yes, sir.

Q. Do you have anything in writing from the BLM?

MR. KELLAHIN: I might address that for you, Mr. Examiner. I believe Mr. Woolley, as well as Mr. Foppiano, have had verbal communications with Armando Lopez. I have attempted to confirm that in writing. I have faxed him all the details about this request and have asked for written confirmation.

I believe that the federal hiatus on budgeting has caused a delay in getting a written confirmation from

Mr. Lopez. But we have made that request, and I have a copy of the letter.

Also, for your information, Mr. Examiner, we have been in contact with the Tax and Revenue technical people in their audit and compliance section with regards to how to code this well on the ONGARD system so that there will be no misunderstanding of how this is to be done.

We're waiting for Mr. Valdean to confirm our understanding and believe that this can be accommodated by ONGARD. And if you care to hear the details, I'd be happy to tell you.

EXAMINER CATANACH: I'm curious to know, did you talk to anybody with the OCD in terms of --

MR. KELLAHIN: Yes --

EXAMINER CATANACH: -- ONGARD?

MR. KELLAHIN: -- we talked to Ed Martin at some length. It was his opinion that this -- that was an acceptable method of coding this well. We have confirmed that with Kurt McFall of Tax and Rev, and he was going to get written confirmation from Mr. Valdean.

As you know, Mr. Examiner, ONGARD would presume that this new well would have a property code in such a way that it would presume that production and taxes were being distributed and paid as if this was in the west half of 11. And because that's not happening, there's a way, without

changing the suffixes under the PUN identification system, to put a note on their computer screen that will log this as an exception and cause them to go to some other source to determine that in fact production taxes and revenues are being shared under the 1280 equity area. Everybody believes that that can be done.

EXAMINER CATANACH: Within the ONGARD system you'll still enter the dedicated acreage as being the west half --

MR. KELLAHIN: Yes, sir, with a footnote as to this well showing that there's a special exception dealing with the well.

EXAMINER CATANACH: Mr. Kellahin, is it your opinion that we need not address any of those issues in any order the Division enters?

MR. KELLAHIN: That is my opinion and belief, Mr. Examiner.

EXAMINER CATANACH: Okay.

Q. (By Examiner Catanach) Just one more question, Mr. Woolley. Do you believe that this equity agreement protects all the interest owners within that area?

A. Yes, I do.

EXAMINER CATANACH: Okay, I have nothing further of the witness.

MR. KELLAHIN: That concludes our presentation,

Mr. Examiner.

EXAMINER CATANACH: Mr. Kellahin, just a second. I guess we didn't get into the offset operator notification. Was that an issue in this case?

MR. KELLAHIN: It wasn't an issue in this case. If I may take a moment and find the certificate, I believe it's submitted to you and in front of you. I'm looking for my copy.

I believe that Mr. Foppiano and I made the judgment that there was no need to notify any operators surrounding the outer boundary of the equity area. What we were asking you was for a wellbore location exception and the simultaneous dedication.

All the parties within the equity agreement, the working interest owners, are on this list, and so we've notified, pursuant to your notice rule, the offset, which was Oxy, and we went ahead and notified the other working interest owners that would have the right to drill, and we have their unanimous consent.

EXAMINER CATANACH: Oxy is the operator in Section 14 and 15, right?

MR. KELLAHIN: Yes, sir.

EXAMINER CATANACH: Is that correct?

Okay. That's all I have. The witness may be excused.

Anything further?

MR. KELLAHIN: No, sir. Thank you.

EXAMINER CATANACH: There being nothing further in this case, Case 11,455 will be taken under advisement.

(Thereupon, these proceedings were concluded at 11:40 a.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 11455, heard by me on May 23 1996.

David R. Catanach, Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

I, Steven T. Brenner, Certified Court Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I transcribed my notes; and that the foregoing is a true and accurate record of the proceedings.

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

WITNESS MY HAND AND SEAL January 31st, 1996.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998