STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:	CASE NO. 12,328
APPLICATION OF JOHN L. COX FOR AN UNORTHODOX OIL WELL LOCATION, LEA COUNTY, NEW MEXICO	ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: MARK ASHLEY, Hearing Examiner

January 20th, 2000

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, MARK ASHLEY, Hearing Examiner, on Thursday, January 20th, 2000, 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 20th, 2000
Examiner Hearing
CASE NO. 12,328

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E X H I B I T S

Applicant's	Identified	Admitted
Exhibit 1	6	22
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A P P E A R A N C E S

FOR THE DIVISION:

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By: WILLIAM F. CARR

* * *

WHEREUPON, the following proceedings were had at 9:26 a.m.:

EXAMINER ASHLEY: The Division calls Case 12,328.

MR. CARROLL: Application of John L. Cox for an unorthodox oil well location, Lea County, New Mexico.

EXAMINER ASHLEY: Call for appearances.

MR. CARR: May it please the Examiner, my name is William F. Carr with the Santa Fe law firm Campbell, Carr, Berge and Sheridan. We represent John L. Cox in this matter, and I have one witness.

EXAMINER ASHLEY: Additional appearances?

Will the witness please rise to be sworn in?

(Thereupon, the witness was sworn.)

EXAMINER ASHLEY: Mr. Carr?

MITCHELL E. CHENEY,

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

DIRECT EXAMINATION

BY MR. CARR:

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

A. Mitchell E. Cheney.

Q. Mr. Cheney, where do you reside?

A. Houston, Texas.

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

A. I'm an independent geologist, self-employed.

Q. And what is your relationship with John L. Cox?

A. John L. Cox purchased the prospect idea which this location is related to, from me.

Q. Have you previously testified before this Division?

A. Yes.

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

A. Yes.

Q. Are you familiar with the Application filed in this case on behalf of Mr. Cox?

A. Yes, I am.

Q. And are you familiar with the administrative application and the action taken thereon by the Division that has resulted in the matter being set for hearing?

A. Yes, I am.

Q. Have you made a geological study of the area which is the subject of this Application?

A. Yes.

Q. Are you prepared to share the results of that work with Mr. Ashley?

A. Yes.

MR. CARR: Mr. Ashley, we tender Mr. Cheney as an

expert witness in petroleum geology.

EXAMINER ASHLEY: Mr. Cheney is so qualified.

Q. (By Mr. Carr) Would you briefly state what it is that John L. Cox seeks with this Application?

A. We'd like to drill a well in the southwest corner of the northeast corner of Section 14, Township 12 South, 33 East, Lea County. It's an unorthodox location which we applied for December 21st, 1999. Our letter of application admittedly understates the geologic evidence that we really had to support this application.

At the time we wrote the letter we were operating under the terms and conditions of two or three years ago when I last applied for a joint application. I understand that during that time the policies regarding unorthodox locations have changed, and I'm here today to provide the additional evidence we need to justify this location.

Q. What is the name of the well which is the subject of this Application?

A. It's the John L. Cox 14 A Number 1.

Q. And what is its footage location in Section 14?

A. It's 1330 from the north line and 2530 from the east line of Section 14. And again, that's in the southwest of the northeast in Section 14.

Q. Mr. Cheney, is Cox Exhibit Number 1 a copy of the administrative application which was filed in this matter,

and attached to that as the last page of the exhibit, is that the Oil Conservation Division's letter indicating that the data submitted was insufficient and the case would be set for hearing?

A. Yes.

Q. Could you review the additional work that you have done since the last attempt to develop this acreage to try and evaluate the reservoir and select a well location?

A. Well, our first mapping effort was based on a 3-D survey we shot in 1996. That resulted in the drilling of the John L. Cox 14 Number 1, located in the southeast quarter of Section 14. We drilled that well and plugged it in June, 1997. The well came in 200 feet low, it was a velocity bust, we overran our AFE by 100 percent because we twisted off, lost 5000 feet of drill pipe. It was just a disaster.

It wasn't until June this year that I had the fortitude to go back and take a second look at this thing. At that time, we reloaded the data onto a higher powered work station. We brought to bear a more sophisticated 3-D interpretation program; it went from a 16-bit to a 32-bit system. We also integrated the velocity control that the dry hole provided, the John L. Cox 14, and there was some show information from a drill stem test we ran in that dry hole that we also integrated.

So in June we were able to use a new software program, a higher powered work station, we had better velocity control and a show in a shallower formation that we heretofore had not mapped. From June to November, we re-mapped it, tied it into nearby production and came up with a portfolio of new maps, at which time I submitted it to John L. Cox as a prospect idea. After some consideration, they decided to take the idea, and at that time they initiated the permit process.

And December 21st, of course, we filed our letter. We were turned down December 22nd, and here we are today.

Q. Would you go to what has been marked as Cox Exhibit Number 2 and identify that, please?

A. This is an orientation land plat. It focuses on Township 12 South, Range 33 East, and in yellow is highlighted Section 14. The red dot with the arrow next to it is our proposed location.

Q. Is the yellow acreage one State of New Mexico lease?

A. Yes.

Q. And when does that lease expire?

A. That lease expires in 11 days.

Q. Do you have a rig available to drill this well?

A. It's waiting right now.

Q. And you're paying for the rig as we sit here?
A. Standby time.
Q. Now, this location is an interior location within the State of New Mexico lease; is that correct?
A. Yes.
Q. On the dedicated 40 acres, it is only ten feet from the north line of that tract; is that right?
A. That's correct.
Q. It's 110 feet from the west line; is that also right?
A. Correct.
Q. Are there any offset operators that would be adversely affected by this unorthodox well location?
A. No.
Q. Is the working interest 100-percent common?
A. Yes.
Q. And the royalty and overrides are also 100-percent common?
A. Yes.
Q. There were no individuals to whom you had to provide notice of this Application --
A. No.
Q. -- is that correct?
Now, this location has been selected based on the data that you have recently acquired and the work you have

done integrating 3-D seismic into the other information you had on the formation?

A. Correct.

Q. What is the primary objective in this well?

A. The Pennsylvanian formation.

Q. And is that in the Undesignated Bagley-Pennsylvanian Pool?

A. Yes.

Q. As to well-location requirements and spacing requirements, is this acreage governed by statewide rules?

A. Yes.

MR. CARR: There are special pool rules, Mr. Examiner, in effect for the pool, but they do not address spacing or well-location requirements; they address basically the vertical intervals between the Bagley-Pennsylvanian Pool and other Bagley-Pennsylvanian pools in the area. It's a very old order, Order Number R-991.

Q. (By Mr. Carr) Mr. Cheney, are there secondary objectives in the well?

A. Yes, there are, shallower objectives in the Wolfcamp formation.

Q. Let's go to what has been marked for identification as John L. Cox Exhibit Number 3. This is your geologic montage, and it's a large exhibit. If you would take it and spread it out, I would like first to

identify the component parts of the exhibit, and then we'll work through it.

All right, Mr. Cheney, explain the various parts of this exhibit.

A. This is a geologic montage that demonstrates the prospect concept. It's what I showed John L. Cox to sell the prospect idea.

Across the top is a geologic well-log cross-section hung on a structural datum. And then there is a 3-D block diagram that puts this in a regional perspective. It also places this in a depositional environment for our primary objective. There is a structure map on top of the primary objective, the Cisco/Canyon interval. And then I've got two seismic lines on here, on the bottom right-hand side of the montage.

Q. Let's go to the depositional model and just start with that. Explain what that shows, and then move from there to the cross-section.

A. Okay. This is more of a cartoon that I've adapted from the literature for this prospect. It emplaces our primary objective in a depositional framework to give the viewer a sense of where we are geographically. We're in northern Lea County. Geologically, we're on the edge of the Tatum Basin. And we're on a trend with fields that have produced out of Pennsylvanian- and Wolfcamp-aged

reservoirs that ring the Tatum Basin. The age of the fields on this 3-D block diagram, as well as the primary objective, are Pennsylvanian.

The cross-section across the top goes from the north to the south. I'd like to draw your attention to the John L. Cox well on the right-hand side of the cross-section.

Q. Mr. Cheney, there's a trace for this cross-section on the structure map, is there not?

A. Yes, there is.

Q. Okay.

A. And the John L. Cox State 14 Number 1 is located on the structure map in the middle of the montage in the southeast quarter of Section 14. And that, again, is a well we drilled a couple years ago.

When we drilled that well, we encountered a show in the Pennsylvanian section. It's highlighted in red with that tall triangle there. And we drill stem tested it, it recovered three barrels of free oil, some filtrate and some formation water.

When we correlated that well into the field wells north in Bagley, we found that that interval roughly correlates to one of the main producing intervals in the Bagley field.

Now, as we move north along the cross-section,

the next well we encounter is the Amerada Petroleum C.R. Turner Number 1. It's a dry hole. I want to just briefly point out a couple of things about the Turner well in comparison to the John L. Cox well.

The interval between the blue marker and the orange marker, the Cisco to the Canyon, is roughly the same. The gamma-ray character is ratty, it's got some carbonate and some what I've interpreted to be shale. It's a mixed lithology section. They drill-stem tested the Turner well and recovered water.

Now, as you move north to the next well, the Western States Producing Company Simmon Number 1, a couple things happen. You gain structure, the Cisco/Canyon interval thickens, and you begin to see a change in lithology from a ratty, mixed lithology section to a more carbonate-dominated section. This well IP'd for 296 barrels a day from the Cisco/Canyon interval, 440,000 cubic feet of gas. It cum'd 11,000 barrels and 20 million cubic feet of gas.

As you can see on the cross-section, we move further north into the field, we gain a little bit of structure, and by the time we get to the last two wells on the cross-section, our Cisco/Canyon interval has thickened markedly from our John L. Cox well. The gamma-ray section has gone from a ratty, mixed lithology section to a nice

clean carbonate signature, and you can see by the perf'd intervals that we've developed porosity.

And so a lot of things have happened as we've made the trek from the John L. Cox well north all the way into the Bagley. We've thickened our interval, we've increased the carbonate percentage, we've developed porosity.

What the seismic in here has done is help us try and model what might be happening to the reservoir between Bagley and our Cox well.

The next two displays I want to -- or next two pieces of this montage I want to draw your attention to are these two seismic lines here. The first one, the John L. Cox 14 line, which is on the bottom right-hand side of the montage, is an east-west seismic line that goes through the John L. Cox well.

There is a blue marker and an orange marker that brackets a yellow-highlighted anomaly on this seismic line. The blue-orange interval is the Cisco/Canyon interval that we've just talked about on the well-log cross-section. The drill stem test would be right in the middle of that interval at the point of the John L. Cox well.

As we move west from that well, a couple things start to happen in that interval. We see a sag on the orange marker, we see the amplitude change from a high

amplitude black/white reflector to a dim low-amplitude reflector, and we see the incipient beginnings of structure on top of the blue, which is the Cisco marker.

We identified that anomaly when we went back and did this re-work and started to look at different seismic lines in this survey throughout the section and found this signature actually improves significantly to the north.

The place where we optimize that improvement is in this other seismic line I want to show you, and that's the proposed well seismic line. That's an east-west line that goes through our proposed location. Now, on this line there are all the same attributes I just pointed out on the Cox line, only they're a lot better developed. The sag is significantly more, the structural change from the off-reef facies to the reef facies is significant, and the amplitude signature is remarkable compared to the Cox line. And the isochron thickening is much thicker here.

These seismic attributes, I think, are correlative to a change in lithology and a change in porosity. And I think what it means is that we've gone from a mixed lithology section to a carbonate section, and that's what in part accounts for the amplitude anomaly. What sets up high-amplitude reflectors is change in lithology. If there's no change in lithology, there's no change in amplitude.

And then secondly, if porosity develops it slows down the velocity of the acoustic signal traveling through the rock. And my hope is, and our interpretation is that the reason we have this sag here is that we've developed some porosity in there, and that's what's caused this thing to sag on us, to give us an isochron thickening.

So these three attributes combined are what I've used to find our best location on this prospect.

Q. When you look at these attributes, isn't it possible that you have at this location reservoir that is comparable to what you have shown to the north on the cross-section, on the log to the left of the cross-section?

A. Yes.

Q. Now, you're talking about seismic attributes. You're looking for the best attributes when you're trying to pick a location; isn't that correct?

A. Yes.

Q. You've referenced three of them. What are those three?

A. The three attributes are structure, isochron thickening, which is the thickness of this carbonate buildup, and amplitude, which is the signature that I think is related to the lithology and development of porosity.

Q. Now, the first of those is structure. The structure map, the seismic structure map, is shown on

Exhibit Number 3, correct?

A. Yes.

Q. And what does that show you?

A. The structure map is contoured on a 10-foot interval. I've used the 3-D survey to generate this map, as well as surrounding well data, and so it's a fully integrated structure map.

The area highlighted in pink here is the area that I think is prospective. You'll see three darker pink -- or real prominent pink anomalies here, and those are the three highest structural points in the section. And the very highest structural point is where our proposed location is, and this is one of the three criteria that I've used to pick our location with.

Q. Are the other criteria shown on Exhibit Number 4?

A. Yes.

Q. Are you ready to go to that?

A. Yes, unless there are any questions on this.

EXAMINER ASHLEY: Not right now.

Q. (By Mr. Carr) Okay, let's take out John L. Cox Exhibit Number 4, and again I'd ask you to identify what it is, identify the component parts and then review it for Mr. Ashley.

A. This is the other seismic montage on the prospect. We've got three seismic lines on the bottom.

Two of them we've just reviewed, the seismic line going through the John L. Cox 14 well and then the seismic line going through the proposed well. And I've included a seismic line further to the north going through a dry hole, the Charles Turner well, which is there just for the purpose to demonstrate that we think this anomaly pushes up into the Bagley field.

At the top of the montage, I've got three maps on here. Starting at the left, I've got an isochron map, and an isopach and an amplitude map. And the point of this display is to demonstrate that the prospect doesn't rest solely on one attribute, on structure. On this particular prospect, the key ingredients were structure, reservoir development, which includes two features, really, the right facies and then porosity developed within that facies.

So the first map is the isochron map, and it measures the time interval between the blue marker, which is the top of the Cisco, and the orange marker, which is the top of the Canyon. And the thicker the time interval is, the better developed I think the reef is and the more prospective the acreage is.

And if you look on the contour map here, there are several nice anomalies in this long, linear trend that bisects the section. Again, our location is in one of the most prominent of those anomalies, of those features.

So now we've got a structure map with three or four bumps on it, an isochron map with three or four bumps on it, we've optimized both the isochron now and the structure map. When you convert the isochron to an isopach by multiplying velocity times the time, a couple of those nice features on the isopach get thinner.

At our location we expect to encounter 414 feet of thickness between the Canyon and the Cisco. The next anomaly to the south, by the number 14 there, is about 390 feet of thickness. The next anomaly is about 350 feet thick, and then downdip about 325. And so, based on the isopach map, there's only one location that exceeds 400 feet, and that's the location we've picked.

Now, the last attribute that I want to talk about is this attribute regarding amplitude, which I think is related to the amount of carbonate, the amount of reef we have, and porosity development. And what that tries to quantify is the amount of dimness we see, featureless, thick character that's so prominent on the proposed well line of seismic section here.

Now, on the amplitude map there's only one place to drill, and that's within the 5000-foot contour. And so when I sat down to pick this location a couple months ago, I looked at the structure and I wanted to pick the highest structural point, I wanted to get the best signature to

optimize what I thought was the reservoir, and then I wanted to optimize isochron thickening and isopach thickening.

And that's what this location does. There's no other location that comes close to optimizing these attributes like our proposed location does.

Now, if this thing comes in, you know, I'm optimistic we can drill four or five more locations. But right now our data set is production in Bagley two or three miles away and one dry hole in our section that made three barrels of free oil on a DST. So somewhere in between there is a minimum threshold for commercial production, and until we drill a well we aren't going to be able to calibrate that. And I don't know if this entire feature is productive or if our first well is going to find the only commercial well on this trend.

And so it's got to be based on the geologic attributes that I've tried to explain here.

Q. Mr. Cheney, in your opinion is this the absolute best possible place to drill a well to test the Pennsylvanian in this area?

A. Yes.

Q. There are no offset operators whose rights will be adversely affected by the unorthodox location; is that correct?

A. Yes.

Q. There are no owners. All working interest, all royalty is all common?

A. That's correct.

Q. If you're able to drill and make a successful well at this location, would it result in the recovery of hydrocarbons that otherwise might be left in the ground?

A. Yes.

Q. In your opinion, will approval of this Application be in the best interest of the conservation of oil and gas?

A. Certainly.

Q. Do you have a rig you're paying for right now?

A. Yes.

Q. Do you request that the order in this case be expedited?

A. I certainly do.

MR. CARR: Mr. Examiner, we would be happy to provide a draft order following the hearing in this matter if you desire.

EXAMINER ASHLEY: Yes, I would appreciate that.

Q. (By Mr. Carr) Mr. Cox -- Or Mr. Cheney, were John Cox Exhibits 1 through 4 prepared by you or compiled under your direction?

A. Yes.

MR. CARR: At this time, Mr. Ashley, we would move the admission into evidence of John L. Cox Exhibits 1 through 4.

EXAMINER ASHLEY: Exhibits 1 through 4 will be admitted as evidence.

MR. CARR: And that concludes my direct of Mr. Cheney.

EXAMINATION

BY EXAMINER ASHLEY:

Q. Mr. Cheney, can you tell me how far from an orthodox location this well is?

A. Well, I know we're ten feet, so it would be 220 and --

MR. CARR: 320.

THE WITNESS: And 220 and --

MR. CARR: 220 and 320, I believe. Yes.

THE WITNESS: There's something I might want to mention at this point. I forgot to mention it earlier. I drilled two wells in here with Mr. Cox. One of them was further south and not germane to this discussion today. But in both those wells we had difficulty keeping the wellbore straight. And in the last well we had to put a mud motor on it. These things -- I don't know if it's in proximity to a major fault off to the east on the maps here or what, but it's hard to keep our wellbore straight when

we drill these things.

And so the drilling contractor has committed to a 200-foot radius of deviation. And this location includes that kind of error. I tried real hard to spot our location in a legal location to prevent all this. When you add a 200-foot margin of error from drilling deviation and then you add on top of that a couple hundred feet to get us to a legal location, now we're moving up to 500 feet off of our target.

And so it's not just a matter of moving a couple hundred feet. We're already, quote, moving a couple hundred feet just vis-a-vis the margin of error in making sure we drill a straight hole. And when we push it over another couple hundred feet or more, that expands it out to almost 500 feet. And when you do that, when you draw a circular radius around our optimum location of 500 feet, we're out of the money, on the structure, on the isopach, on the isochron and the amplitude.

So I kind of tried to think through that end. What will it take to get us legal here? And I just felt like the risk was unacceptable.

Q. (By Examiner Ashley) It looks like for this to be a legal location you'd have to move to the east and to the south --

A. Yes.

Q. -- is that correct?

On the isopach map, if you move to the east, you might encounter more -- a different porous zone. But then on the structure map, which is Exhibit 3, it looks to me like if you move to the east you're going to be moving off the structure. Is that the way you see that?

A. Yes.

EXAMINER ASHLEY: I have nothing further. Thank you.

THE WITNESS: Thanks for your time.

MR. CARR: Mr. Examiner, that concludes our presentation in this case.

With your permission, I will submit a proposed order, depending on the length of today's hearing, either late this afternoon or tomorrow morning.

EXAMINER ASHLEY: I would appreciate that.

There being nothing further in this case, Case 12,328 will be taken under advisement.

(Thereupon, these proceedings were concluded at 10:00 a.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 12328, heard by me on 1-20-2000

Mark Ashley, 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 24th, 2000.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 2002