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 15437
(cont'd from Feb 4, 2016)

APPLICATION OF CAZA PETROLEUM, INC., FOR A NONSTANDARD OIL SPACING AND PRORATION UNIT AND COMPULSORY POOLING, LEA COUNTY, NEW MEXICO.

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

March 3, 2016

Santa Fe, New Mexico

BEFORE: SCOTT DAWSON, CHIEF EXAMINER
MICHAEL McMILLAN, EXAMINER
DAVID BROOKS, LEGAL EXAMINER

This matter came on for hearing before the New Mexico Oil Conservation Division, SCOTT DAWSON, Chief Examiner, MICHAEL McMILLAN, Examiner, and DAVID BROOKS, Legal Examiner, on March 3, 2016, at the New Mexico Energy, Minerals, and Natural Resources Department, Wendell Chino Building, 1220 South St. Francis Drive, Porter Hall, Room 102, Santa Fe, New Mexico.

REPORTED BY: ELLEN H. ALLANIC
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I N D E X

CASE NUMBER 15437 CALLED

CAZA PETROLEUM, INC.
CASE-IN-CHIEF:

CASE NUMBER 15437 CALLED
LEGACY RESERVES, L.P.
CASE-IN-CHIEF:

WITNESS CLAY ROBERTS

WITNESS KEITH E. McKAMEY

WITNESS CRAIG SPARKMAN

C L O S I N G S T A T E M E N T S

I N D E X O F E X H I B I T S

CAZA PETROLEUM, INC.

Offered and Admitted

I N D E X O F E X H I B I T S

Legacy Reserves, L.P.

Offered and Admitted

(Time noted 9:02 a.m.)

EXAMINER DAWSON: And now we will move on to case 15437, Application of Caza Petroleum, Inc., for a Nonstandard Oil Spacing and Proration Unit and Compulsory Pooling, Lea County, New Mexico.

Call for appearances.

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

EXAMINER DAWSON: Okay. The witnesses please stand, identify yourselves, and be sworn in by the court reporter.

MR. BROWN: Jay Brown.

MR. SAM: Anthony Sam.

MR. ALBRO: Richard Albro.

MR. CARROLL: Richard Carroll.

MS. MUNDS-DRY: Mr. Hearing Examiner, I would also like to enter an appearance, please.

EXAMINER DAWSON: Okay.

MS. MUNDS-DRY: Ocean Munds-Dry for COG Operating, LLC. I have no witnesses this morning.

EXAMINER DAWSON: Okay. Thank you.

MR. LARSON: Mr. Examiner, Gary Larson at the Santa Fe office of Hinkle Shanor. I have three witnesses.

EXAMINER DAWSON: Okay.
MR. LARSON: I'm appearing on behalf of Legacy Reserves, LP.
EXAMINER DAWSON: Okay.
MR. LARSON: Should my witnesses be sworn in as well?
EXAMINER DAWSON: Yes, please. Would your witnesses please stand, identify yourself, and be sworn in by the court reporter.
MR. McKAMEY: Keith McKamey. I'm the head geologist with Legacy Reserves, LP.
MR. SPARKMAN: Craig Sparkman, operations engineer.
MR. ROBERTS: Clay Roberts, landman.
(WHEREUPON, seven presenting witnesses were administered the oath.)
EXAMINER DAWSON: Mr. Bruce, you may proceed when you're ready.

JOHN E. BROWN

having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. BRUCE:

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

A. John E. Brown, The Woodlands, Texas.
Q. Who do you work for and in what capacity?
A. Caza Petroleum. I'm the land manager.
Q. Have you previously testified before the Division?
A. I have.
Q. And were your credentials as an expert petroleum geologist accepted -- as a landman accepted as a matter of record.
A. They were.
Q. And does your area of responsibility at Caza include this area of southeast New Mexico?
A. It does.
Q. And are you familiar with the land matters involved in this application?
A. I am.
MR. BRUCE: Mr. Examiner, I move the admission of Mr. Brown as an expert petroleum landman.
EXAMINER DAWSON: Any objections?
MR. LARSON: No objection.
EXAMINER DAWSON: No objections?
MS. MUNDS-DRY: No objections.
EXAMINER DAWSON: Okay. He is so admitted.
Q. Mr. Brown, could you identify Exhibit 1 for the Examiner and briefly describe what Caza seeks in this

case.

A. Exhibit 1 is a plat from Midland Maps showing the location of section 19. Outlined in yellow is Caza State Lease BV-1758, covering the east half and southwest quarters of section 19.

It would show Legacy's Bureau of Land Management lease covering the northwest quarter of section 19. It shows Caza's existing Igloo 19 State 2H Well, which is in the east half, east half of section 19.

Q. And this is at Township 20 South, Range 35 East?

A. Yes, it is.

Q. And you seek to force pool the west half, west half of section 19?

A. That's correct.

Q. And what formation is proposed to be tested by the proposed well?

A. The Bone Spring.

Q. Who do you seek to pool?

A. Legacy.

Q. And they own -- I think you said they own the northwest quarter of section 19 --

A. That's correct.

Q. What are Exhibits 2 and 3?

A. Exhibit 2 is Caza's well proposal of November 5, 2015, proposing the Igloo 7H Well as a

Second Bone Spring test in the west half, west half of section 19.

Q. And could you describe in a little more detail your contacts and discussions with Legacy including Exhibit 3?

A. Caza had telephone conferences with Legacy at the approximate time of the well proposal shortly after the hearing was set and again last week. Exhibit 3 is an e-mail to Legacy from Caza expressing desire to discuss and reach a mutually beneficial solution in order to avoid the hearing.

Q. At this point the parties have not reached any agreement?

A. That's correct.

Q. In your opinion has Caza made a good faith effort to obtain the voluntary joinder of Legacy in this well?

A. Yes.

Q. If you'd refer back to Exhibit 2, the second page of Exhibit 2, would you identify that for the Examiner.

A. This is Caza's AFE showing drilling and completion costs for the Igloo 7H Well.

Q. And what is the total cost of the well?

A. $5,019,362.

Q. And is that cost in line with the cost of other horizontal wells drilled to this depth in this area of New Mexico?

A. Yes, it is.

Q. Do you request that Caza Operating be appointed operator of the well?

A. Yes.

Q. And that is Caza Petroleum's operating entity?

A. Yes, it is.

Q. Do you have a recommendation for the amounts which Caza should be paid for supervision and administrative expenses?

A. $7,500 drilling and '$7,500' a month producing.

Q. And are these amounts equivalent to those normally charged by Caza and other operators in this area for wells of this depth?

A. Yes, they are.

Q. Do you request that the overhead rates -- are these -- do you request that the overhead rates be adjusted periodically and provided by the Copas accounting procedure?

A. Yes.

Q. And do you request the maximum cost plus 200 percent risk charge in the event Legacy goes nonconsent to the well?

A. Yes, we do.
Q. And is Exhibit 4 simply my affidavit of notice to Legacy Reserves, LP?
A. Yes, it is along with proof of mailing.
Q. And what is Exhibit 5?
A. Exhibit 5 is a list of the offset operators, working interest owners, and the description of their lands that are offsetting the proposed unit.
Q. And was notice given to all those parties as shown by Exhibit 6?
A. Yes, it was.
Q. And what is Exhibit 19?
A. Exhibit 19 is a series of letters from Yates Petroleum Corporation and some of its internal entities supporting Caza's position in this application.
There are letters from Yates Petroleum Corporation, from Abo Petroleum Corporation, MYCO Industries, and Sharbo Energy, LLC.
Q. Let's go back to Exhibit 1 just for a little while, Mr. Brown. You mention that in looking at section 19 in the east half, east half Caza has drilled a Bone Spring well --
A. That's correct.
Q. -- stand-up well?
A. That's correct.

Q. What Bone Spring zone is that in?
A. It's in the Second. I'm sorry. It's the Third.
Q. In looking at the other wells in the east half, is Caza looking at drilling stand-up Second and Third Bone Spring wells in the east half?
A. Yes, it is.
Q. And does Caza have technical witnesses discussing the reasons for the stand-up Bone Spring wells?
A. Yes, we do.
Q. If Caza's application is unapproved, do you believe that Caza's correlative rights will be harmed by such denial?
A. Yes, we do.
Q. What would happen to the southwest quarter of section 19 if you cannot drill a one-mile lateral to the north?
A. Well, we feel that half mile laterals are uneconomic. So the southwest quarter would become stranded.
Q. And down to the south, there are already existing Bone Spring wells, correct?
A. That's correct.
Q. So you could not drill to the south?
A. That's correct.
Q. And will Caza's witnesses discuss why 80-acre

laterals are not feasible?

A. Yes, they will.

Q. Were Exhibits 1 through 6 and 19 either prepared by you or under your direction or compiled from company business records?

A. Yes, they were.

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

A. Absolutely.

MR. BRUCE: Mr. Examiner, I move the admission of Exhibits 1 through 6 and 19.

EXAMINER DAWSON: Any objections?

MR. LARSON: No objection.

EXAMINER DAWSON: Any objections?

MS. MUNDS-DRY: No objections.

MR. BRUCE: And I pass the witness to Mr. Larson.

CROSS EXAMINATION

BY MR. LARSON:

Q. Good morning, Mr. Brown.

A. Good morning.

EXAMINER DAWSON: If you let me go ahead and admit Exhibits 1, 2, 3, 4, 5, 6 and 19 to the record.

(Caza Petroleum, Inc.'s, Exhibits 1 through 6 and Exhibit 19 were offered and admitted.)

EXAMINER DAWSON: Go ahead, Mr. Larson. I'm sorry.

Q. I believe you mentioned that the northwest quarter of section 19 is part of the --

A. I didn't mention that but we understand it to be so.

Q. And do you know whether that's a federal unit?

A. It's my understanding that it is.

Q. And have you or anybody at Caza communicated with the BLM about operation of the well that you're proposing?

A. We filed a well permit. Our engineer will be testifying to that.

Q. So do you know whether the BLM will allow Caza to operate the well because its within unit acreage?

A. I haven't been involved in those conversations.

Q. Understood.

Directing your attention to Caza Exhibit 1, has Caza submitted to the OCD well permit applications in southwest quarter of 19?

A. All the permits are done through our operations department. And I would defer to the operations department for the submittal of permits.

Q. Understood. Thank you, sir.

MR. LARSON: I pass the witness.

EXAMINER DAWSON: Ms. Munds-Dry, any questions?

MS. MUNDS-DRY: If I could just follow up.

CROSS-EXAMINATION

BY MS. MUNDS-DRY:

Q. Do you have someone in operations here today who could testify as to they could ease in the southwest quarter?

A. Yes, we do.

MS. MUNDS-DRY: Thank you. That's all I have.

EXAMINER DAWSON: Okay. Do you have any questions, Mr. McMillan.

EXAMINER McMILLAN: Just go ahead.

EXAMINER DAWSON: Okay. Do you have any questions?

MR. BROOKS: No questions.

EXAMINATION BY EXAMINER DAWSON

EXAMINER DAWSON: My question is the operating costs for while you're drilling, $7,500 --

THE WITNESS: Yes.

EXAMINER DAWSON: And the producing cost?

THE WITNESS: $750.

EXAMINER DAWSON: I thought you said $7,500. But $750, okay. I just wanted to clarify that. That's all the questions I have. Thank you.

THE WITNESS: You're welcome.

EXAMINER McMILLAN: I have questions.

EXAMINATION BY EXAMINER McMILLAN

EXAMINER McMILLAN: The first thing you said, you said the AFE was 5.3 million right?

THE WITNESS: (No verbal response.)

EXAMINER McMILLAN: But, then, when I look at your AFE, I see that it's 5.019 --

THE WITNESS: I thought I said 5.019 --

EXAMINER DAWSON: I think you might have said 5.019362.

EXAMINER McMILLAN: Okay. That's fine.

THE WITNESS: It's awfully small on this.

EXAMINER DAWSON: Okay.

EXAMINER McMILLAN: And the next question I have is the existing C-102 essentially is to the west half of the southwest quarter, and I don't see it in the C-102.

THE WITNESS: Again, I'll defer that to the operations.

EXAMINER McMILLAN: Are there any unlocated interests?

THE WITNESS: No.
EXAMINER McMILLAN: Any depth severances within the Bone Spring?
THE WITNESS: No.
EXAMINER McMILLAN: Anything to pool?
THE WITNESS: (No verbal response.)
EXAMINER McMILLAN: And what's the pool code number?
THE WITNESS: I'll defer that to the operations.
EXAMINER McMILLAN: And will the project area be standard?
THE WITNESS: Yes.
EXAMINER McMILLAN: And the well status?
THE WITNESS: It's proposed at this time.
EXAMINER McMILLAN: I don't have any more questions.
EXAMINER DAWSON: Okay.
MR. BROOKS: Scott, excuse me. I'd like to ask -- this may not be the right witness to ask this question.

EXAMINATION BY MR. BROOKS

MR. BROOKS: The Bone Spring most places is at least three different identified sands. Is this -- are you targeting -- first of all, are these

multilateral horizontals that look like -- you have two arrows coming forth from your point here on this map, Exhibit 1. So I was wondering if you're drilling more than one lateral on these --

THE WITNESS: No. These would be single lateral wells.

MR. BROOKS: Okay. So is the Bone Spring -- does it exhibit its usual three distinct sands in this area or is --

THE WITNESS: I'll defer that to the geologic testimony.

MR. BROOKS: I thought it might be a better question for the --

EXAMINER DAWSON: The geologist might be better to answer those questions.

MR. BROOKS: Clearly. Okay.

MR. BRUCE: Mr. McMillan, the nearest offsetting well that was producing is over immediately to the west in section 24. And that was designated by the Division as the South Lea Bone Spring Pool, Pool Code 37580.

EXAMINER McMILLAN: Okay.

MR. BRUCE: Anyway, I don't know if that's the right one, but it's the nearest one that I could find.

EXAMINER McMILLAN: Thank you.
EXAMINER DAWSON: Do you have any near term lease expirations in this acreage of the proposed well?
THE WITNESS: Our lease expires December 1st of this year.
EXAMINER DAWSON: Okay. And you have an APD? Has the BLM approved your APD or has it been filed?
THE WITNESS: No, I'll defer to engineering.
EXAMINER DAWSON: Okay. That's all the questions I have. Thank you.
At this point, we are going to take a ten-minute break. We'll be back at 9:25 a.m.
(Brief recess.)
EXAMINER DAWSON: We are going to go ahead and open the record again. Regarding case Nos. 15438, 15439, and 15440, these are all Devon Energy Production Company, LP, cases; to correct the record, we will continue these cases to March 17th, 2016. I believe there were some dates that were wrong before, so we're going to continue those to March 17th.
And we will go back now on the record to case No. 15437, and you may continue now, Mr. Bruce.
MR. BRUCE: One point of clarification,

Mr. Examiner. The lease that Caza operates -- a little confusion. The lease's primary term ends December 1 of this year, but the lease is HVP because of the Bone Spring well in the east half, east half of section 19.

EXAMINER DAWSON: Okay. Thank you.

RICHARD CARROLL

having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. BRUCE:

Q. Can you please state your name and city of residence for the record.

A. Richard Carroll, The Woodlands, Texas.

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

A. I work for Caza Petroleum. I am a senior geologist.

Q. Have you previously testified before the Division?

A. I have not.

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

A. I have a bachelor of science degree from the University of Texas at Austin with a minor in petroleum engineering. I also have worked in the business since 1980 as a petroleum geologist.

And I am a certified petroleum geologist by the American Association of Petroleum Geologists and a certified professional geologist in the state of Texas.

Q. And, just briefly, what companies have you worked for, what parts of the country?

A. I've worked for Agip Petroleum Company, Italian National Oil Company. I worked in multiple basins in the U.S., from California to the Permian Basin to Alaska and south Texas.

Then I went to Ultramar Oil and Gas, where I worked primarily south Texas and southern Louisiana. I also did some work for Ultramar Oil and Gas in the Permian Basin after we shut down our Midland office.

After that, I went to work for TransTexas Gas Corporation focusing primarily in south Texas. After that, I went to work for Mobil Oil Corporation, again focusing primarily on south Texas.

I then went to Exxon Mobile Corporation where I worked on projects again primarily along the Texas/Louisiana coastline.

Following that I was at Dominion Exploration and Production, where I worked on projects from the Permian Basin to south Texas and the upper Texas coast.

Following that, Sanchez Oil and Gas Corporation,

where I worked in multiple different basins from the Uwento Basin to Kansas to Illinois Basin to the south Texas Basin to the Permian Basin, the Delaware Basin.

And then I went to work for Caza Petroleum about a year and a half ago, and I've been focusing primarily on the Delaware Basin, southeast New Mexico since then.

Q. And are you familiar with the geologic matters involved in this application?

A. Yes, sir, I am.

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

EXAMINER DAWSON: Any objections?

MS. MUNDS-DRY: No objection.

MR. LARSON: No objection.

EXAMINER DAWSON: He is so admitted.

Q. Mr. Carroll, could you identify Exhibit 7 for the Examiner.

A. Yes, sir. Exhibit 7 is a base map or location map showing our acreage and section 19; also, showing the presently permitted wells or the wells that Caza has put in for permits on in section 19.

It also shows all of the additional wells in the section, including wells that have been -- that the permits have expired on or been dropped. It also

locates the operator of those wells along with the final five digits of the API number.

Q. A little bit later we may come back to this exhibit. But specifically to the southwest of section 19 and section 25 there are some Nearburg wells that are lay-down wells. What is the status of those permits?

A. The permit, the status of the permit on 40723 is that those permits have expired. They've been dropped. 41090, that one I'm not sure about at this time. But I know the one at 40723 was dropped.

Q. But Nearburg has drilled stand-up Bone Spring wells in that --

A. Yes, sir. They've drilled two stand-up Bone Spring wells in that section, and they have a third permitted.

Q. Okay. Let's move on now to Exhibit 8. What is that?

A. And, gentlemen, I know these are rather big maps, but they are much easier to see things on when they get this size.

Exhibit No. 8 is a structure map made on the top of the Second Bone Spring Sand and TVD subC, so total vertical depth subC.

Q. And in which direction does the structure dip?

A. Throughout most of the map, you've got a dip basically from the northwest down to the southeast. You can actually see just to the south of section 19 where you develop a low spot in the Second Bone Spring Sand structure.

I know we don't have an Exhibit here for it, but that same low spot exists in the Third Bone Spring structure and the First Bone Spring structure.

Off to the east of our acreage, the dip has rolled a little bit, and it actually dips from the northeast to the southwest.

Q. And what is Exhibit 9?

A. By the way, I would go ahead and mention, on both of these maps, I've left the locations of the cross sections we'll be showing you. I've marked on them both with the A, B or A, A Prime and B, B Prime across the exhibits. And you will see those again on the next map.

The next map, this is Exhibit 9, it is actually a structure map and TVD subC of our target point or our target horizons within the Second Bone Spring Sand.

Q. It looks like the structure is a little more compressed there; it dips more steeply?

A. Yes, sir. And our target interval is towards the base of the Second Bone Spring Sand, thereby allowing us whenever we go ahead and stimulate the well to go ahead

and get more frac height up, because it's actually -- the Second Bone Springs' lime lies directly below it, where we won't be actually fracking anything into that lime very much. So it gives us much more height on the frac.

Q. You're proposing north, south wells; is it easier to stay in zone better with north, south horizontal wells due to this structure?

A. Yes, sir. And, in fact, if you notice on the far east side of section 19, there is a Caza producing well there. That was our Igloo 19.

We drilled that well from the north to the south. Because of the rather steepening dip as you reach the south of that lease block, it became very difficult to go ahead and keep the well in zone. And it was a Third Bone Springs well, by the way; we drilled it towards the base of the Third Bone Springs.

The bit has a tendency to want to walk up section. And with this dip being so steep coming back down to the south, we had a great deal of trouble keeping it in zone.

We did manage to keep it in zone, and it's been a very good well for us.

In addition, I would point out that if you look back over to the west side of section 19, you'll notice

that the structure there is much more gentle.

So it's the hole basically developing in section 30 immediately to the south of us that kind of causes that structural anomaly that makes that -- that gives the dip -- that gives such a high rate of dip in that -- in the southern part of 19.

Q. And is it Caza's intention to drill a Second Bone Spring and Third Bone Spring well in each 160 acre non-standard well unit across section 19?

A. Yes, sir. In fact, the wells you'll see here, they're going to be labeled 42356, would be a Second Bone Springs well; and then you'll have 42357, will be a Third Bone Springs well; 42358, a Second Bone Springs well; 42359, a Third Bone Springs well; 42360, a Second Bone Springs well; 42380, that would be a Third Bone Springs well; and then 42361, a Second Bone Spring test.

Q. Let's move on to the cross sections --

(Ambient noise.)

A. Again, I would go ahead and bring your attention to the A, A Prime, going north, south; and the B, B Prime, going east, west, because those will relate to the cross sections we'll be showing there --

Q. Two sets of cross sections, you need one for the structural cross section and one for the Second Bone

Spring --

A. Yes, sir.

Q. Let's start with 10 and 11. Why don't you just --

A. Section 10, it is my A, A Prime cross section. That would be a north, south oriented cross section going from the top of the Russ Land hydride all the way down through the Wolfcamp section.

It doesn't go all the way through the Wolfcamp section because we're primarily going ahead and focusing on the Second Bone Springs.

You can also see there a dashed red line. That marks our target interval within the Second Bone Springs.

Then if you go to Exhibit No. 11, in Exhibit No. 11, I simply show it so that you could look more closely at the section of interest, zoomed in to that Second Bone Spring section -- I'm sorry. Section 11 is my B, B Prime, which is the east, west oriented structural section, again, focusing on the same formations that I mentioned before in section A to A Prime.

It just gives an overall viewpoint of the entire sequence -- throughout that section there will be drilling.

Q. And then do Exhibits 12 and 13 allow the Examiner to zoom in in more of the target zone?

A. Yes, sir. Those two exhibits were specifically framed so you're basically looking at from the top of the Bone Spring section to what we've got labeled on here as the Bone Spring, Glorieta; down through the Third Bone Spring.

And on a few of the wells you actually see the tops of the Wolfcamp via the structure. This way you can actually see the logs a little bit better.

I would also mention that the logs here on each of these wells are a resistivity, gamma ray, resistivity log on the left; and a density neutron log on the right. So you'll be able to actually look and see porosities within those sections and resistivities through the section, and using the gamma rays, et cetera, be able to identify the carbonate sections more.

Q. On these maps, the Second Bone Spring target is just slightly below the middle of the entire Second Bone Spring; is that correct?

A. Yes, sir.

Q. Okay.

A. And you can see the Second -- the top of the Second Bone Spring is in purple. The base of the Second Bone Spring sand or what I refer to as the Second Bone

Spring lime is in blue.

And that would be the same in both A to A Prime cross section, Exhibit No. 12, and B to B Prime, Exhibit No. 13.

Q. And based on these cross sections, is the Second Bone Spring target continuous across the area of the --

A. Yes, sir, it is. The Second Bone Spring target is a very continuous section across the area that these cross sections cover.

Q. Okay. Let's move to your Exhibit 14. What is that?

A. Exhibit 14 is an isopach of the Second Bone Spring. And the definition of that interval is from the purple line I showed you on the cross sections before the top of Second Bone Spring sand to the blue line at the base or what I call the Second Bone Spring lime.

Q. And is the thickness of the Second Bone Spring fairly even along the path of the wellbore?

A. It does thin a little bit as you go to the north. In fact, on the map, you will notice that there is a thin just in sections 13 and in 24, where the actual -- that Second Bone Spring section actually goes down to about 445 feet.

You can see, as you move back out to the west, that section does increase to over 550 feet.

But, all in all, it remains fairly stable.

Q. Would you expect each quarter, quarter section in the proposed well unit to be productive in the Bone Spring Formation?

A. Yes, sir, I would.

Q. And is there any faulting or any other geological issues out here which would prevent the drilling of a horizontal well?

A. No, sir, there are not to my knowledge.

Q. And would you expect horizontal drilling to be the most efficient method of developing this acreage?

A. Yes, sir, very much so.

Q. And will the next witness discuss recovery of reserves?

A. Yes, sir.

Q. And, briefly, a couple of final exhibits. What is Exhibit 15?

A. Exhibit 15 is a geologic prognosis. Whenever I go through -- to go ahead and plan the wellbore for the Igloo State 7H, which is on the far -- it would be the far west half of the west half of section 19. It goes through my position of where the landing point will be, surface location, bottom hole location, anticipated objectives, depths, the amount of, more or less, up/down we're going to have to deal with when we're

drilling it. I'm not exactly sure how you'd want me to put that.

But this one, in this particular case, will be at about a 77-foot toe-up direction, so it will hit at the heel or the landing point. And then we'll actually gain about 77 feet of structure as we drill to the north.

It then goes on, and it goes to my estimated tops for the formations at zero feet vertical section and their TVD subC.

And then other well plans such as where we'd be setting casing, typical mud programs, what kind of logging programs, any potential zones that might also be productive and any potential sections that might be of hazard while drilling.

Q. And then Exhibit 17, is that simply the horizontal drilling plan for the well?

A. Yes, sir. This is the horizontal drilling plan for the Igloo 19 State Federal 7H based on the data that I provided, the Mojo Standard Plan from our geologic prognosis.

Q. And will the producing interval of the wellbore be at standard or orthodox locations?

A. Yes, sir.

Q. Go back to Exhibit 7, the area plat. Now looking

at the map, outside of section 19 or partly outside of section 19 to the west and northwest, those are legacy wells, are they not?

A. Yes, sir.

Q. And all of their planned wells are stand-up wells?

A. Yes, sir.

Q. Whether Second or Third Bone Spring?

A. Yes, sir, that is correct.

Q. Now looking in -- Mr. Larson may ask you something about the 80-acre laterals that were permitted down in the southwest quarter of section 19. Will the next witness address those --

A. Yes, sir, he will be addressing those.

Q. Caza does not want to drill 80-acre laterals?

A. No, sir, we do not.

Q. Is it Caza's belief that those wells would be uneconomic?

A. At these particular oil prices, yes, sir, that is my understanding.

Q. But looking over into section 14, you've got to the west, northwest, you've got a Mewbourne 80-acre lateral. What is the status of that?

A. That 80-acre Mewbourne lateral in section 14, that permit has expired or been dropped.

Q. Has been dropped by Mewbourne?
A. Yes, sir.
Q. So they're not drilling that well?
A. No, sir.
Q. Looking at it, it looks like they were foreclosed from drilling because of the Legacy well to the north.
A. Yes, sir, that may very well be the truth. There are two Legacy wells that are permitted there. And one of them, according to what information we have, has been drilled.
Q. Okay. And then Legacy, if you look up north to section 18, Legacy has planned a mile and a half lateral, which would be the west half, west half of section 18 and the west half, northwest quarter of section 19?
A. Yes, sir.
Q. If that well was drilled and you could not drill a mile lateral, would you drill the southwest quarter for the Second and Third Bone Springs?
A. No, sir. As I think we've stated before, in our opinion, it would be uneconomic to drill it at this time.
Q. Okay. Were Exhibits 7 through 15 prepared by you or under your supervision?
A. Yes, sir, they were.

Q. And was the drilling prognosis, Exhibit 17, compiled from company business records?
A. Yes, sir, it was.
Q. And in your opinion is the granting of Caza's application in the interests of conservation and the prevention of waste?
A. Yes, sir, it is.
MR. BRUCE: Mr. Examiner, I would move the admission of Caza Exhibits 7 through 15 and Exhibit 17.
EXAMINER DAWSON: Any objections?
MS. MUNDS-DRY: No objection.
MR. LARSON: No objection.
EXAMINER DAWSON: Caza Exhibits 7 through 15 and Exhibit 17 are so admitted.
(Caza Petroleum, Inc.'s, Exhibits 7 through 15 and Exhibit 17 were offered and admitted.)
MR. BRUCE: I pass the witness.
EXAMINER DAWSON: Mr. Larson.

CROSS EXAMINATION

BY MR. LARSON:
Q. Good morning, Mr. Carroll.
A. Good morning.
Q. Referring to your Exhibit No. 7 --
A. Yes, sir.
Q. -- you have four Cimarex test wells indicated

there?

A. Yes, sir.

Q. Have you looked at the production records for those wells?

A. Yes, sir, we have.

Q. And what was your conclusion based on looking at the data?

A. That they were not as good wells as the stand-up north, south wells that were drilled in the same area. And our next witness will be actually addressing exactly that point.

Q. Okay. You say drilled in the area; which particular north, south wells are you referring to?

A. The wells immediately on this part of the map. Right around -- the wells to the south, I believe the COG and the Nearburg wells.

But Mr. Sam will have the display showing exactly which wells we're referring to and the production statistics on each of those.

Q. So I should ask him questions about the economics of those Cimarex wells?

A. I believe he's probably much more -- much better to end up asking those questions of.

Q. I understand you. Moving up into the yellow-highlighted area.

A. Yes, sir.
Q. Is there any reason why Caza couldn't drill an east, west mile lateral on the First Bone Spring?
A. An east, west first mile lateral in the First Bone Spring?
Q. The south half of 19 in the First Bone Spring.
A. No, sir. There's no reason we couldn't to my knowledge.
Q. And I'd ask you the same question about the Third Bone Spring.
A. The Third Bone Spring we would not be able to drill a mile lateral going -- oriented east, west in the south half of section 19 because of interference with the Caza well that's already there that's producing from the Third Bone Spring.

So we would have to cut that well considerably short so that we wouldn't have interference between those two wells.

But, again, the drilling and production data is probably best handled by our engineer.
Q. Okay. And if I understood Mr. Bruce's question correctly, you answered in the affirmative that your proposed north, south well in the west half, west half would be productive in each quarter, quarter?
A. Yes, sir.

Q. Do you have any opinion as to whether there would be differing production levels in each quarter, quarter as you go north to south?

A. No, sir. And I'm not sure -- again, this would be a question that would probably be best answered by an engineer. But I'm not sure that we'd have -- I'll leave it at that, that I think it would be a question best answered by an engineer.

Q. Thank you.

MR. LARSON: I pass the witness.

MS. MUNDS-DRY: I don't have any questions. Thank you.

EXAMINER DAWSON: Questions, Mr. Bruce?

MR. BROOKS: The notice in this case says that it will be dedicated to the Igloo 19 State Well No. 7H. And that is to be in which Bone Springs location?

THE WITNESS: The 7H is to be a Second Bone Spring completion.

MR. BROOKS: But you then contemplate that you will subsequently propose a Third Bone Spring well in the same project area?

THE WITNESS: Yes, sir. In fact, that Third Bone Spring well, if you look to the map, would be -- I believe that would be -- the Third Bone Spring well would be the one on that map located as 42380.

MR. BROOKS: So you've already gotten a permit for that well?

THE WITNESS: Again, I will have to go ahead and defer to the engineer on whether we already have a permit or not.

I know that I have already turned in geologic prognosis and we were working on them and have directional surveys prepared and that work was being put in for permits for those wells.

MR. BROOKS: And, of course, you would need both state and federal permits for these wells and you may well have a state permit and not yet have a federal permit.

THE WITNESS: Yes, sir. To that, I'm not sure I could answer for sure on that either.

MR. BROOKS: Okay. So -- but right now the only well we can pool this for now is the one that's in the notice?

MR. BRUCE: That's correct, Mr. Examiner.

MR. BROOKS: Okay. Thank you.

EXAMINER DAWSON: I have no questions. Thank you.

THE WITNESS: Thank you.

ANTHONY SAM

having been first duly sworn, was examined and testified

as follows:

DIRECT EXAMINATION

BY MR. BRUCE:

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

A. Yes. Anthony Sam.

Q. And where do you reside, Mr. Sam?

A. Midland, Texas.

Q. Who do you work for?

A. Caza Petroleum.

Q. And what's your job with them?

A. V.P. of operations.

Q. Have you previously testified before the Division?

A. Yes, sir, I have.

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

A. Yes, sir, they were.

Q. And are you familiar with the engineering related to this application?

A. Yes, sir, I am.

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

EXAMINER DAWSON: Any objections?

MS. MUNDS-DRY: I have a point of

clarification. I understand you said you were V.P. of operations; is that correct?

THE WITNESS: That's correct.

MS. MUNDS-DRY: What kind of engineer are you, sir?

THE WITNESS: Petroleum.

MS. MUNDS-DRY: Petroleum?

THE WITNESS: Yes.

MS. MUNDS-DRY: Reservoir or -- do you have a particular area?

THE WITNESS: I have done a little bit of both. I have been in Midland since 1982, originally as a production engineer for Chevron. And then on with Chevron as a drilling engineer.

And I did some reservoir work for other companies since 1982.

MS. MUNDS-DRY: Thank you for that clarification. No objection.

MR. LARSON: No objection.

EXAMINER DAWSON: He's so admitted.

Q. (By Mr. Bruce) Can you identify Exhibit 16 for the Examiner and briefly discuss its contents.

A. Yes. Exhibit 16, the first page shows a plat with Second Bone Spring laterals that have been permitted and/or drilled within the roughly

9-square-mile area that we're looking at.

You can see Caza Petroleum's acreage position within 19 highlighted in yellow, very similar to the plats that you've seen previously from the geologic and land presentations.

Just for reference in looking back, we have the API numbers. You'll see the last four digits -- excuse me -- five digits of the API numbers on each location.

The second page addresses the production issue that's been brought up a couple of times here as far as -- here is the Second Bone Spring monthly production plotted out. It looks a little busy, and I apologize for that. But we're looking at monthly production versus producing months.

And you can see the API numbers for the east, west wells on the right-hand side, seven east, west wells; API numbers for the seven north, south wells that are being shown.

The overall type curve or adjusted average of those wells are highlighted. The red solid line represents north, south, averaging; and the dark blue and the dark blue line represents the east, west.

And you can see just plainly from the type-curve analysis and a conglomeration of east, west and north, south wells that the north, south wells have a better

type-curve performance within the Second Bone Spring than the east, west wells.

And this is raw data taken from the OCD side and used back for normalization on a type-curve analysis.

The third page is just another presentation of this showing you the cumulative production over that period of time beyond just with the monthly production.

The red line represents the cumulative production for the north, south wells, which is much better, higher, greater than the cumulative production over the same time period for the east, west wells.

And that next exhibit is just a wider-spaced area showing you that we have additional acreage to the south in Township 21 South, 34 East, that we have drilled a Second and Third Bone Spring well on the east half of section 27 of that. We call that lease our Grammar Ridge Lease. And that's just for representation.

Q. What is Exhibit 18, just briefly?

A. Exhibit 18 is a summary of engineering geological information that we've gathered. It is not all the information that we've used when we move forward in drilling or completing a Bone Spring horizontal well. But it's a process, and I wanted to go through and show you what we've looked at.

In 2012, we started building a database from the

OCD data site, the files, the logs that were available there on a horizontal basis. There were around 600 to that point.

We've built a database now of over 1,800 wells, been drilled. The first three pages of this exhibit just plainly show you that what we're focusing on: We can capture cumulative production, of course, 30-, 60-, 90-, 180-day.

We look at the volumes of fracs, not only the volume of fluid but the number of pounds, how they were fracked, whether they were perf and plug, sliding sleeves, ball drop. If that information is available, we'll put that into this database.

And we have also gone back and looked at the database to determine the number of stages that were pumped, whichever way they were pumped. And that became very important over the life of, if you will, the horizontal play within southeast New Mexico.

We did all this before we ever drilled a well; we started doing this, looking at the science and the known technology. So we began drilling wells in 2013.

Caza has drilled, completed, or is in the process of completing, and operated 16 horizontal wells within southeast New Mexico. We participated with other nonoperated entities with another 16 wells over that

same period of time, from October 2013 forward to this point.

The fourth page is some of the geological information that we use. Once we have the database in place, we pull the logs into a program that our exploration manager maintains. And he takes that -- the information assuming some water saturations, uses Archie's equation.

To calculate the overall oil saturation, we look at resistivity. The page that's shown as page 7, you can see there that we've got a particular Corazon State Unit 4 Well, that we have logs laid out showing porosity, resistivity. The PE curve is on there.

What we do is we go through this using an algorithm and place the rock within the Bone Springs in clusters, cluster 1 through however many. We've got 14 in this particular instance. And those clusters vary on the quality of rock that we're looking at.

What we tried to do is we calculate a total pour volume for that section of the Bone Spring. And, then, using Archie's equation, we get back to what we feel like is a hydrocarbon pour volume that's present within the Second or Third Bone Spring.

So when you do that, you can look at a well, versus an offset well, and calculate if the hydrocarbon

pour volume is greater or equal or less. And you're looking at the overall EUR, anticipated EUR from type-curve analysis then if there's a reason for that. Otherwise, there could be induced reasons from completion. And that's one thing that we've also done. On the next two pages, you can see we're looking at picket plot where the average porosity versus resistivity is shown for various water saturation points.

These are, in particular, Third Bone Spring wells, north, south wells, that we put into this display. And the next page, page 9, you look at this; we've gotten the frac information. We know the volume of water pumped per pound of sand placement within the reservoir from the data that we gathered at the OCD site.

And what this is displaying is that we believe through frac inhibition, the zone has imbibed water from water that's been placed into the reservoir that's -- our cut-off is around .85. Anything .85 or greater, you're going to have a lower initial oil cut in that reservoir in our opinion. And we think we have enough data to back that up in what we're doing with our analysis.

So -- and the next page just displays that on one of the cross sections that's directly behind it. It shows that

the permeability to water can change through inhibition if you have introduced frac water into the situation, overintroduced.

So what we've done is most of our recent fracs, most recent fracs and previous fracs, the four fracs previously, we're trying to target that gallons of water per pound of proppant to .5 to .6. That's our internal numbers that we choose to use.

So on a normal five-million-pound frac over a 40-stage interval that we're looking at, we may have 50,000 barrels.

Some of the similar -- there are some similar fracs in the immediate area that people are using three, four, even five times that volume in the initial frac setup with possibly more proppant. But, actually, the ratio is what's the most important thing to us.

The next page just shows -- it backs up what we are talking about. If you look at the log on the right, they pumped 1.8 million gallons and 2.6 million pounds. That ratio is .71 in comparison to the well to the left, where very similar hydrocarbon pour volumes were pumped, more water. They had a ratio of 1.14.

And overall, the initial cut, you can see those two wells are direct offset wells on the next page that are adjacent, Column Well A, Well B.

And you have in the one case, in the case to the right, you have a 65 percent initial oil cut. The well to the left, you have 52 percent initial oil cut.

I think -- we see this time and time again in what we're looking at, in the Bone Springs -- I'll reiterate, it's only in the Bone Springs interval -- the Wolfcamp shale is a completely different situation. I like to refer to the Bone Spring sand is a conductivity formation that we need to create conductivity through fracturing and the Wolfcamp shale is a contact formation, meaning we have to contact. And so you do use large water volumes, slick water volumes with low concentrations of sands in those situations.

The lateral direction, I think Mr. Carroll has gone over these.

These next three pages are just examples of some of the science that we've used in trying to determine lateral direction with our -- in looking at drilling-induced fractures, the dipole, the bore hole breakout and the imaging tool that we've used, we've used these over several wells that we've gone through.

In fact, we try -- in the first well that we drill in an immediate area, we try to drill a pilot hole, if possible.

And we take that pilot hole and we'll do sidewall core

analysis, which we'll take those cores and do embedment testing with different proppants to try and determine if it's 30/50, 20/40, 40/70; ceramic, nonceramic that we need to be putting in the hole for best performance analysis.

The next two pages are monthly production figures. This first one is a summary of Third Bone Spring wells that are in southeast New Mexico. They are not in the immediate area. But it's a summary of Third Bone Spring wells that are north, south.

We have 47 wells that are north, south. 27 wells that are east, west. And you can see the performance of those wells under a type curve.

It just indicates again that north, south is better for performance than east, west in the Third Bone and the Second Bone. And we looked at that from the previous exhibit, the next page from Exhibit --

MR. BROOKS: Excuse me, sir.

THE WITNESS: Yes, sir.

MR. BROOKS: As you go through these pages could you say on page number such and such because I have a tendency to lose my place --

THE WITNESS: I apologize.

A. Okay. On page --

EXAMINER DAWSON: There's no pages

numbers --

THE WITNESS: What happened was --

MR. BROOKS: You ran out of page numbers.

THE WITNESS: No, sir. This was -- as I said, this isn't everything that we look at when we were trying to establish drilling, but this was part of a larger presentation that we took out for this particular hearing.

A. And I wanted to address this issue, in particular the volume of water per pound of proppant, because we believe that Legacy is pumping potentially too much water in their fracs.

The frac analysis or the frac design potential that they're talking about on the one-and-a-half-mile well from the north to the south is at or near one in the ratio that we just discussed.

And from an engineering standpoint, we feel like that's incorrect.

MR. BRUCE: Mr. Examiner, Mr. Brooks, it does go up to page 16 and then there are three unnumbered pages which we could mark as 17, 18 and 19. And then the remaining pages, they'd pick up page 22.

MR. BROOKS: So 16 --

MR. BRUCE: 17 and 18 and 19. Like you said, there were a couple of pages taken out.

THE WITNESS: And, once again, I apologize for that.

A. So we're looking at what's page number 22. And this data here is just another presentation on what we've done in the past beyond -- we've done through-bit analysis, meaning run the bit in the lateral, after the lateral's drilled, to use to pick our perfs in a plug-and-perf setup situation.

We've done just a normal geometric cluster design for perf and plug over the lateral section. And then we've moved on to what we feel like is the better technology, at least from what we're looking at right now for completion of laterals within the Bone Spring interval.

And page 23, it just displays post-frac modeling analysis for different stages when you're seeing through-bit logging versus just cluster mechanical geometric logging, geometric cluster analysis.

And this is displaying frac length in color. You can see the different colors which indicate conductivity, frac length, frac width within the display.

And what we're wanting to show here is that we've moved -- it is shown as NCS here, but there's different companies offering the same opportunity; a sliding

sleeve, coiled-tubing, assisted frac is what we believe is currently the best completion technique for 1 mile, 1.5 mile wells, can actually do the sliding sleeve, coiled-tubing, assisted-type fracs.

And down on the left-hand side of page 24, you can see roughly a graph of Third Bone Spring results from wells that were engineered with geometric spacing using -- and one that was done with the through-bit logging spacing and then one that was done with the NCS sliding sleeve system.

And what's important about this is that we're doing a cluster every 100 feet within the lateral when you do the coiled-tubing, assisted. You're concentrating on one cluster or one sleeve that's opened -- every 100 feet, we place proppant into that opening.

So we'll have anywhere from 40 to 42 stages in most of our one-mile laterals that we're looking at.

And you can see the post-frac model analysis comparison to the engineered and the geometric frac on the left versus the NCS-type coiled-tubing, assisted frac on the right. We're getting much better pipe, much better conductivity and frac width across the lateral itself.

And these last two pages, page 26 and page 27 --

26 shows what we were displaying here -- excuse me -- on the frac modeling, it talks about the different frac length, the propped length, the frac height and width for an engineered or geologic -- an engineered frac with the through bit -- or NCS sliding sleeve, coiled-tubing assisted is on the right, where the numbers are just that much better presented.

The last page is the data that we have for the areas that we're discussing. The Igloo 19 2 Well is our well that's located on the east half, east half of 19. It's a Third Bone Springs well.

This data is directly out of the OCD site. You can see the production. It's a one-mile lateral, one-mile Third Bone well that in the first 39 days, this well was fracture treated with the coiled-tube and assisted frac, 39 stages in place, using ceramics, which is another important thing within the completion of the Third Bone in this area. With the ratio of liquid that we talked about being very small, it's close to 50,000 barrels total volume.

And we produced near 33,000 barrels in the first 39 days of this well within the Third Bone. The Third Bone record that I have from Legacy's operated 32H well that's available on site to the public for API 3002542342 indicates just right at 30,000 barrels

produced in sixty-one days.

So there's a noted difference in the early life period of each producing well. And it is in our opinion from internal discussions that Legacy potentially is placing too much water in place during their initial completion on the frac.

Q. And, again, Caza's well is a one-mile lateral as opposed to Legacy's mile-and-a-half lateral?

A. That's correct.

Q. Going back to page 16 and the prior couple of pages, you believe this shows that insofar as maximizing the fractures that you're going to hit with the well, it's better to drill north, south than east, west?

A. Absolutely. I think the API numbers that are displayed, which we've discussed in Exhibit 16, within the 10-square-mile approximate area clearly show that north, south is more productive, higher cumulative rates over the first 36 months in east, west.

Q. Let's -- going back to the Exhibit 16, the second page of the exhibit, the prior witnesses have gotten questions regarding 80-acre laterals.

And in the southwest quarter of 19, there were a couple of 80-acre laterals permitted, correct?

A. Yes, sir. We have permitted four wells in the southwest quarter, primarily two Second Bone wells and

two Third Bone wells with the state. Those permits have been submitted and approved for 80-acre laterals.

Q. And why was that done?

A. We did that primarily -- we initially farmed out the acreage from Yates. Yates had an 80-acre permit in place on the west half, west half, which they called the Igloo Ice Chest BRR 1H.

And we were proceeding with our permitting. We wanted to permit our wells across the entire section 19, assuming that Legacy would participate with us and drill a well from north, south, a one-mile lateral.

Q. Was Yates ever able to reach an agreement with Legacy on a one-mile lateral --

A. Not to our knowledge. From the internal discussions we had, they were not able to come to an agreement with Legacy on a one-mile lateral.

Q. And the yellow on the map, the state lease, that was initially issued to Yates, correct?

A. The first well -- yes. The lease, yes. Yes, sir, it was.

Q. And so Caza acquired its interest from Yates or the Yates entities?

A. Correct.

Q. But Caza's intent was always to drill one-mile laterals in this section?

A. That is true, yes.
Q. Now, if you look at -- if Caza cannot drill one-mile laterals in the west half of section 19, ignoring the economics at this point, your well would have to stop 330 feet from the center line, the east, west center line of section 19?
A. That's correct.
Q. And, likewise, the Legacy well would have to stop 330 feet north of the east, west line?
A. That's correct.
Q. So 660 feet of reservoir would not be tested --
A. Would not be properly stimulated in our opinion. 660 feet represents six stages using the coiled-tubing, assisted sliding sleeve analysis that we just discussed. Six stages out of forty is a significant portion of the lateral that the state and the federal lands would not have properly stimulated in our opinion without drilling a one-mile lateral.
Q. And, actually, you are looking at more than that because you're multiplying that by at least four wells?
A. Oh, yes. Most likely eight to twelve. Because the First Bone is potentially productive in this area, and the Second and Third most definitively are and the Wolfcamp in itself.

So, ultimately, there could be several wells within those intervals drilled north, south across this acreage.

Q. Would that cause waste?

A. Oh, absolutely.

Q. And would it impair Caza's correlative rights?

A. Yes, sir, it would.

Q. One final question. In looking at that same page, Legacy is suggesting you drill east, west laterals in the south half of section 19. Again, the data, especially on Exhibits 16 and 18, show that drilling stand-ups is much better economically and for preventing waste and recovery of reserves?

A. Absolutely. In our opinion, there's no doubt that north, south geologically and from an EUR recovery standpoint, initial rates, monthly cumulative rates that we've displayed is much better than an east, west well.

The wells in section 30 are no doubt good Second Bone Spring wells. The surface location of those wells is on the east half, east half.

I don't know for certain, but if you look at the geological maps that Mr. Carroll submitted to you previously, you can see that there's a low, which would make it very difficult to drill through that low, which we had some difficulty drilling through that low on our

Igloo well.

But I think, from an engineering standpoint, the reason that they're drilling east, west is because of that low that runs across that section on the east half.

Q. And, certainly, if you wanted to drill at this point east, west Third Bone Spring wells in the south half of section 19, you could only have 120-acre laterals because of the existing well?

A. That's correct. And regardless if we went east, west or -- with the Second or Third Bone, the Legacy acreage would still be involved in the calculation. We would have to drill 80 acres one way or the other.

Q. And you certainly could not drill -- I mean if you had to drill east, west in the south half, you're stranding acreage up in the northeast quarter of section 19?

A. Correct.

Q. So either way you look at it, there could be 160 acres that's stranded with no hope of drilling a well -- an economic well?

A. That's correct. With an east, west well setup, that's correct.

Q. And, certainly, if Legacy drilled mile-and-a-half laterals heading into the northwest quarter of section 19, again you'd be foreclosed from drilling proper

wells?
A. That's correct.
Q. Were Exhibits 16 and 18 either prepared by you or compiled under your direction and supervision?
A. Yes, they were.
Q. And, in your opinion, is the granting of Caza's application in the interests of conservation and the prevention of waste?
A. Yes.
MR. BRUCE: Mr. Examiner, I move the admission of Exhibits 16 and 18.
EXAMINER DAWSON: Any objections?
MR. LARSON: No objections.
MS. MUNDS-DRY: No objection.
MR. BROOKS: Point of information, my copy of what I assume to be Exhibit 16 has no exhibit sticker --
MR. BRUCE: It's marked on the back.
MR. BROOKS: Okay. Thank you.
EXAMINER DAWSON: Exhibits 16 and 18 will be admitted into the record.
(Caza Petroleum, Inc.'s, Exhibit 16 and Exhibit 18 were offered and admitted.)
MR. BRUCE: I pass the witness.
EXAMINER DAWSON: Okay. Any questions?

MS. MUNDS-DRY: No questions.
MR. LARSON: I have some.
EXAMINER DAWSON: Okay.

CROSS EXAMINATION

BY MR. LARSON:

Q. Mr. Sam, I have some questions on some permitting issues. Are you the person to --

A. I am.

Q. A follow-up on Mr. Brooks's question, have you filed an API application for the well that's the subject of your pooling application?

A. Yes, we have. It was delivered to the BLM prior to 2:00 on Tuesday of this week.

Q. And have you had any communications with the BLM about who would be the operator?

A. Not directly, we have not. We have filed -- since we had the surface location on the southwest, southwest within our acreage position, we have filed as operator.

Q. And in Mr. Bruce's scenario about doing mile laterals in the west half, west half of 18 and the west half, west half of 19 -- do you recall that question? --

A. Uh-huh.

Q. -- you have a Legacy in 18 and a Caza in 19. Do you know if the BLM would require separate matters for

each of those wells?

A. We have a state fed com that we operate that we call West Copperline in Lea County. And to answer your question, I'm not certain. But we do have a federal quarter section and a state quarter section that both the fed and the state have allowed us to do well testing through allocation to a single tank battery and report that as production.

Q. And if the BLM did require separate batteries, wouldn't that increase the cost of your Igloo well in 19?

A. Well, we've decided and determined since we've been discussing this particular hearing that we're going to do separate tank batteries anyway, because it needs to be done, it could be done.

But it will increase the cost, but that's not -- you know, right now the economics would make sense at 5.01 million that we're talking about in the AFE.

Q. And I apologize, I don't remember which exhibit has production curves for east, west and north, south wells.

A. It's actually in both exhibits -- it's on page 3 of Exhibit 16 -- that's the Second Bone monthly production, volumes versus monthly -- for those API numbers that were shown on the first page of that

exhibit, for those wells within the immediate area of the Igloo lease.

Q. You directed me where I needed to be. If you look at the fourth page of Exhibit 16, the curve for east, west wells, would you call those economically viable wells?

A. Yes.

Q. And this is a question I asked Mr. Carroll. Have you looked at the production data for the Cimarex wells in section 24?

A. Absolutely.

Q. And what's your conclusions regarding that data?

A. Our conclusion is that those wells are viable economic wells. But, in our opinion, as displayed within the type-curve analysis, the previous page, we can obtain a higher rate of return on our capital because of production, greater production, over a north, south-oriented well than an east, west well.

Q. I don't know if you have -- I think this was Exhibit 7 -- Exhibit 7 in front of you.

If we look at the well in the east half, east half of 19, that's a Caza north, south well; is that correct?

A. Those are -- yes, the east half, east half, that's the Caza Igloo 19 2H Well.

Q. Okay. And that's a producing well currently?
A. That is a producing well. That's the well I referred to in Exhibit 18.
Q. Okay. And is that the Second Bone Spring or Third?
A. No, sir. That's a Third Bone Spring well.
Q. Now a follow-up with a question I had for Mr. Carroll; I asked him about possibly doing an east, west First Bone Spring in the south half of 19. Do you think that's a viable proposition?
A. No. I don't think economically for full development within the section itself that any east, west wells are viable within section 19 -- in my opinion from an engineering standpoint and talking about overall cumulative recovery of petroleum products.
Q. And I don't remember Mr. Bruce's exact question, but he was talking about stranded acreage in the east half, east half of 19.
MR. LARSON: Did I understand that correctly?
MR. BRUCE: Northeast quarter.
Q. Northeast quarter. In what scenario would that be stranded acreage?
A. The same scenario that we're discussing here. If we went east, west, then those would be 80-acre

locations in the northeast quarter of section 19.

We would be sitting here discussing whether we could pool with the northwest quarter to get one-mile laterals that are, in our opinion, the most proficient in recovery of hydrocarbons.

Q. But you are still producing from the northwest quarter; is that correct?

A. We are producing a Third Bone --

Q. Sorry. Mr. Bruce gave me a look and he's correct. I meant the northeast quarter.

A. Yes, we are.

Q. You said the Igloo well is currently producing its third; did I hear that correctly?

A. Yes.

Q. And if you were to drill, for instance, a First Bone Spring east to west, could you not still do more north, south Third Bone Springs in the east half of 19.

A. We have no intention of drilling east, west wells whether it's in the First, Second, or Third Bone primarily because we've determined that it's not as economical due to the performance of the wells that we're seeing in the immediate area.

Q. And is there any geological, mechanical reason you couldn't drill east, west wells?

A. There are no geological or mechanical reasons to drill -- to not drill east, west wells. Strictly economic and well performance.

Q. I'm going to give you another potential alternative scenario here. I believe you testified these Cimarex wells in 30 are Second Bone Spring?

A. Yes, sir.

Q. Would it be possible to drill a mile-and-a-half First Bone Spring north, south from the southwest quarter of 19 through section 30, assuming that Cimarex would agree or you could pool that acreage?

A. Repeat the question please.

Q. Sure. It's kind of a compound question. We've got -- do you know if Cimarex controls all this acreage in 30?

A. I do not know that.

Q. Let's just assume for a moment that they do. Would it be possible to drill a mile-and-a-half lateral from the southwest quarter of 19 through the west half, west half of 30 in the First Bone Spring?

A. Would it be possible?

Q. Yes.

A. It would require having a pooling agreement.

Q. Absolutely.

A. Yes.

Q. Let's assume that Cimarex has either agreed or you have a pooling order.

A. Right. Yes, it would be possible.

Q. And how about the Third Bone Spring, the same scenario?

A. The same scenario.

Q. That it would be possible?

A. Possible.

MR. LARSON: I'll pass the witness, Mr. Examiner. Thank you.

EXAMINER DAWSON: Any questions?

MS. MUNDS-DRY: No questions, Mr. Examiner.

EXAMINER DAWSON: Mr. Brooks?

MR. BROOKS: No questions.

EXAMINATION BY EXAMINER DAWSON

EXAMINER DAWSON: Mr. Sam, I notice that well over in the east half, east half of section 19, API No. 40604. It looks like there's two laterals. And, apparently, I guess, I would suppose that first one, you know, it looks like it cut like 80 acres. Did you run into trouble with that --

THE WITNESS: We had some difficulty with the curve; got to the curve point on that particular well, had to pick up approximately 500 feet in vertical depth to build a new curve.

EXAMINER DAWSON: Oh, okay. So you just went ahead and flooded that well and spudded it?

THE WITNESS: Yes. It never reached target depth. It was -- while we were building the curve to get to our horizontal depth -- which is a Third Bone target within the Bone Springs -- we had some mechanical issues with the curve itself. Cement plug came back. Built a new curve. And that's the existing long lateral.

EXAMINER DAWSON: Have you drilled any mile-and-a-half laterals?

THE WITNESS: No, sir, we have not.

EXAMINER DAWSON: Okay.

No further questions.

EXAMINATION BY EXAMINER McMILLAN

EXAMINER McMILLAN: And my question is is Exhibit 16, page A-4, Cumulative Oil Production vs. Month.

THE WITNESS: Yes.

EXAMINER McMILLAN: Comparing north, south, east, west, are these normalized curves --

THE WITNESS: Yes. They're normalized curves for the 7 API numbers that are displayed for east half, west, north, south.

EXAMINER McMILLAN: Describe how they were

normalized.

THE WITNESS: Because wells are normalized, the production is normalized picking a common start date or time date of zero essentially and normalizing the production for every well back to a common start date and averaging that production over that period for the -- by the number of wells that are within the production gathered.

EXAMINER DAWSON: Did you assume lateral length? Was that a factor in normalization?

THE WITNESS: The normalization of all wells shown within this area are 1 mile. They are all 1 mile. So lateral length was common.

EXAMINER McMILLAN: Okay. And the wells in section 31, they are --

EXAMINER DAWSON: They're COG wells.

EXAMINER McMILLAN: Those are Second Bone Springs?

THE WITNESS: Sir, I believe that may be a combination of Second Bone Spring and Third. I'm not certain. I know there are some Second. I haven't focused on that particular section myself.

EXAMINER McMILLAN: What are the reserves for the Second Bone Springs in section 31 versus the reserves of the Second Bone Springs in section 30?

THE WITNESS: Well, the reserve base, the EURs for the wells in section 30 are probably in excess of 550,000 BOEs. The ones in 31 without having my hand on it -- I mean we have the information. I just don't have those in front of me. I apologize.

I mean the EURs are going to be very similar. It's not they're going to be dissimilar. They should be better. They may be actually within the database that we're looking at, those particular curves.

I don't have the EURs. I have the monthly production here showing performance-wise, the cumulative production versus the month for the returns.

And I don't have the exact EUR per well here on these maps.

EXAMINER McMILLAN: I'm trying to understand why you did -- you looked at the Third Bone Springs for your log calculations when the Second Bone Springs was your primary objective.

THE WITNESS: Well, the Third Bone Springs, we drilled the east half, east half well. It was absolutely one of the first Third Bone Springs wells drilled within this 9, 10-square-mile area. So we did a lot of work on that.

And we think the development obviously is going to continue across 19. In fact, I think

geologically, the rock gets better as you move from the east to the west.

So we took the risk upon ourselves in the company to prove up the Third Bone on our acreage block and have gathered a lot of information because of that. But we also felt that when we permitted the well on the west half, west half -- and in the discussion we're talking about pooling -- that in order -- that Legacy would be in agreement to pool and share expenses to prove up the Second Bone within their block with the well that we're proposing on a one-mile lateral.

EXAMINER McMILLAN: So your log characterizes more perfs in the Third Bone Springs and not the Second, it's in the primary objective, is that the same thickness?

THE WITNESS: Yes. We have -- I'd have to refer back to the geologist. But we have maps and estimated thickness within the Second Bone. These calculations, as I told you when I began my testimony, these are just some of the calculations that we've used moving forward.

EXAMINER McMILLAN: But these are the exhibits that are part of the record?

THE WITNESS: Yes, sir. Yes, sir, they are part of the record. The Second Bone, in my opinion,

should be very similar to the Third Bone in the completion technique that we've described.

And the well should perform better in the north, south than in the east, west, overall, on an average basis, with the display that we've submitted.

EXAMINER McMILLAN: Okay.

MR. BROOKS: I don't have any other questions.

EXAMINER DAWSON: I have one other question.

EXAMINATION BY EXAMINER DAWSON

EXAMINER DAWSON: In your assessment on your laterals east, west versus north, south, they were all one-mile laterals, did you do any calculations on mile-and-a-half laterals east, west or north, south, how they performed compared to the one-mile laterals?

THE WITNESS: We gathered some information under Exhibit 18 on page -- we kind of went through it. I guess it's page 21. It's the page in front of 22. You can see our calculated EURs per 1,000 foot of affected vertical section. We've got a Third Bone and Second Bone display.

So what we're looking at is roughly on a -- at a normal one-mile lateral, you can see the cluster within the Third Bone display, that we're going to get somewhere in the range of 100,000 BOEs per 1,000 foot of

section.

And when you're looking at a one-and-a-half-mile lateral, which would be out towards the 7,000 section, below there you can see we're going to get somewhere in the range of 150,000 to maybe 125,000 per 1,000 foot of lateral length in the Third Bone.

And then we've got the same display for the Second Bone -- where we have data for mile and a half, which is limited compared to what we have on one-mile basis.

EXAMINER DAWSON: Okay.

MR. BRUCE: Could I ask a follow-up question just to clarify?

EXAMINER DAWSON: Yes.

REDIRECT EXAMINATION

BY MR. BRUCE:

Q. Looking at the third page of Exhibit 16 --

A. Yes.

Q. -- the north, south versus east, west comparison, when you're doing comparisons, all the comparisons are for the Second Bone Spring, what we're here for today, right?

A. That's correct. The comparisons are for the Second. We displayed within 18 some Third Bone

performance within southeastern New Mexico.

But within the immediate area, it's a Second Bone performance, which is month to month -- it's not showing EUR on those calculations, though.

Q. And if you look at this third page on the north, south wells and then look at section 31, the north, south wells --

A. Uh-huh.

Q. -- the one that has -- I guess it's the API No. 40103 is in section 31, and that's a stand-up Second Bone Spring well.

A. Yes, sir.

Q. And that's apparently the best well on this plat, is it not?

A. It is. The APIs are displayed, and you can see that, yes. The north, south well, 40103 is definitely the best performing well on this particular display.

Q. And, again, these are all the comparison of strictly Second Bone Spring?

A. That's correct on this display.

MR. BRUCE: That's all I have, Mr. Examiner.

EXAMINER DAWSON: Any questions?

MR. LARSON: Mr. Examiner, I have one follow-up question.

EXAMINER DAWSON: Go ahead.

RECROSS EXAMINATION

BY MR. LARSON:

Q. The question Mr. Carroll deferred to you, I asked Mr. Carroll if he had an opinion regarding the contribution of each 40-acre spacing unit within your proposed project area, and he said that you would be the person to answer that question.

A. An opinion as to?

Q. Mr. Carroll testified that he thought the pay was -- the well would be productive throughout the 160-acre project area. And then I followed up and asked him, would there be a differential in the pay in each 40 acres within the 160-acres, and he deferred that to you. So I'll ask you the question.

A. In my opinion, I don't think the full 160 acres would be properly drained with an 80-acre lateral due to the reason that we discussed, being 330 off the center line to the north, the well that's being proposed by Legacy from north, south being 330 off, there's going to be stranded reservoir in First, Second, Third, Wolfcamp that would not be properly stimulated and produced within this particular area.

Q. I appreciate your answer. Maybe I should ask it a different way.

We're going to have four standard 40-acre spacing

units within your 160-acre project area for your Igloo well; is that correct?

A. We filed and have those wells approved by the state, but our intention is to have four one-mile laterals on the west half, west half.

Q. And for purposes of your application today, which is a mile lateral Second Bone Spring well, do you have an opinion as to the level of pay that each 40-acre standard spacing unit within that project area will contribute to the well?

A. To the level of pay?

Q. Yes.

A. Can you define that for me, please?

Q. I'll phrase it another way. How do you see the production playing out from each of the 40-acre spacing units within the 160-acre project area?

A. You're asking in my opinion the performance for each 40-acre location within a one-mile lateral?

Q. Basically, yes.

A. I --

Q. And just in a rough comparison. In other words, are you going to get better production from the northwest quarter, northwest quarter than you are from the southwest quarter, southwest quarter?

A. I can't answer that for you in particular. I

mean it's -- in my opinion, it's not just a mathematical decision that you're looking at. It depends on rock quality, completion technique, proppant placement, water pumped within the reservoir.

And my display within Exhibit 18, in my opinion, clearly shows that wells need to be completed with .5 to .6 or .7 gallons per pound of proppant; and the completion technique which someone might use, that Legacy has used offsetting this in the past would create a well that may not perform quite as well on an EUR basis or a month-over-month basis to a well that's completed as we discussed.

Q. Thank you, sir. That's all I have.

A. Thank you.

MR. BRUCE: Can I follow up with that?

EXAMINER DAWSON: Sure you may.

FURTHER CROSS-EXAMINATION

BY MR. BRUCE:

Q. I'm showing you the isopach map Mr. Carroll prepared. And Mr. Carroll testified that each quarter, quarter section would be productive of hydrocarbons.

Would you agree with that statement?

A. My guess.

Q. But when you're looking -- I'm not sure but I think that what Mr. Larson was getting to was whether

each quarter, quarter section would produce the exact same amount. But looking at the isopach, the thicker pay is on Caza's acreage, is it not?

A. That's correct.

Q. So there's thinner pay on Legacy's acreage?

A. Uh-huh.

Q. But they won't suffer because if Caza's acreage is better, they would still get their proportion at a 50 percent share then?

A. That's correct.

Q. Thank you.

EXAMINER DAWSON: Any more questions?

MS. MUNDS-DRY: Nothing for me.

EXAMINER DAWSON: Thank you, very much.

MR. BRUCE: May I have a few minutes to fold up the maps?

EXAMINER DAWSON: We'll take a ten-minute break till 11:00 a.m.

(Brief recess.)

EXAMINER DAWSON: Okay. At this point we'll continue case 15437, Caza. Mr. Bruce.

MR. BRUCE: I'm finished with my presentation.

EXAMINER DAWSON: Okay. Mr. Larson.

MR. LARSON: I call Mr. Roberts.

LEGACY RESERVES, L.P.

CASE-IN-CHIEF

CLAY ROBERTS

having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. LARSON:

Q. Good morning, Mr. Roberts.

A. Good morning.

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

A. My name is Clay Roberts.

Q. And where do you reside?

A. Midland, Texas.

Q. And by whom are you employed and in what capacity?

A. Legacy Reserves, L.P., as a landman.

Q. And what is the focus of your responsibilities as a landman for Legacy Reserves?

A. My job is to work through all land issues dealing with Legacy's assets in the Permian Basin, but, more specifically, my focus is on southeastern New Mexico.

Q. And does that include the Lea Unit that Legacy operates?

A. Yes, sir.

Q. And are you familiar with the land matters that pertain to Caza's application in this case?
A. Yes, sir.
Q. Have you previously testified at a Division hearing?
A. I have not.
Q. And given that, would you please summarize your educational background and your professional experience in the oil and gas business.
A. Yes, sir. I received a bachelor's degree in secondary education from Lubbock Christian University in 2010. I received a master's degree in organizational leadership from Lubbock Christian in 2012.
In June of 2012, I began my career at Legacy Reserves as a landman.
Q. Did you play point guard for Lubbock Christian?
A. I did, yes, sir.
MR. LARSON: Mr. Examiner, I move that Mr. Roberts be qualified as an expert in oil and gas land matters.
EXAMINER DAWSON: Any objections?
MR. BRUCE: No objection.
Q. Mr. Roberts, would you identify a document marked as Legacy Exhibit No. 1.
EXAMINER DAWSON: Time out for a minute.

MR. LARSON: Certainly.
EXAMINER DAWSON: What affiliation do you have?
THE WITNESS: With Legacy Reserves.
EXAMINER DAWSON: Are you a member of any societies or --
THE WITNESS: Oh, yes, sir. I'm a member of the AAPL and the Permian Basin Landman Association.
EXAMINER DAWSON: All right. He is so accepted. Mr. Larson, go ahead.
Q. Mr. Roberts, would you identify a document marked as Legacy Exhibit No. 1.
A. Yes, sir. That is a map of the Lea Unit, titled the Lea Unit Acreage Contribution Map.
Q. And is the Lea Unit Acreage noted by the red-dashed line?
A. Yes, sir. The red-dotted line is the outline of the Lea Unit.
Q. And is the Lea Unit a federal unit?
A. Yes, sir.
Q. And who is the operator of the Lea Unit?
A. Legacy Reserves operates the unit.
Q. What is the blue-shaded area designated in section 19?
A. The blue-shaded area is going to be state

acreage. I'd like to clear up that it has been perpetuated throughout the previous testimony that the northwest quarter of section 19 was federal lease. But it is, in fact, a state lease, namely, state of New Mexico lease OG5588.

Q. And does Legacy own 100 percent of the interest in the northwest quarter?

A. Yes. We have 100 percent leasehold in the northwest quarter.

Q. Would you next identify the document marked as Exhibit No. 2.

A. Yes, sir. Exhibit No. 2 is just a Word document showing lien and acreage contribution and ownership within the Lea Unit.

Q. And what are those ownerships?

A. Legacy Reserves has a 91 percent working interest. Finley Resources has roughly a 5 percent working interest. HOG Limited Partnership has a 1.95 percent working interest. And COG has a 1.68 percent working interest in the unit.

Q. And how much of the Lea Unit is BLM surface?

A. It's going to be roughly 94 percent of the unit, which is going to come out 2,399.68 acres.

Q. And is the remainder state of New Mexico acreage?

A. Yes, sir. The remaining 160 acres of the unit is

state acreage.

Q. Would you next identify the document marked as Exhibit 3?

A. Yes, sir. That is an aerial photo of the Lea Unit.

Q. And would this be properly described as a GIS map?

A. Yes, sir, it would be.

Q. What is a GIS map intended to depict?

A. It's intended to depict an aerial topo map of the area, of what our plans are for developing the UA Unit in the Bone Springs Formation.

Q. Could you next identify a document marked as Exhibit 4?

A. Yes, sir. This is a Lea Unit complete development plan. What Legacy is recently undertaking is a plan to develop the entire Bone Spring Formation unit-wide. That means that we would put a lateral in the First sand, Second sand, and Third sand.

In this map, the First sand wells would be denoted by the orange lines. The Second sand wells would be the green lines, and the Third would be the red lines.

Q. And within this development plan, is Legacy focusing on drilling and completion of north, south

mile-and-a-half laterals?

A. Yes, sir.

Q. And would those laterals be in each bench of the Bone Spring?

A. Yes, sir.

Q. And will Mr. McKamey and Mr. Sparkman explain the reasons for drilling the mile-and-a-half laterals?

A. Yes, sir.

Q. How many north, south mile-and-a-half Bone Spring horizontal wells in section 18 and the northwest quarter of section 19 are included in your -- Legacy's development plan for the Lea Unit?

A. As the map depicts, we have three -- excuse me -- six Bone Spring wells targeted in the west half of 18 and including the northwest quarter of 19.

Q. And is the map you're referring to Exhibit 4?

A. Yes, sir.

Q. And does Legacy have approved APDs for any of those wells?

A. Yes, sir, we do. We have an approved Third Bone Spring well in the west half, west half of 18 and it also includes the west half of the northwest quarter of 19. That would be the Lea Unit 59H.

Q. And when did Legacy receive the BLM's approval of the APD for the Lea Unit of the 9H?

A. Legacy received that permit on January 19th, 2016.

Q. And have all the interest owners in the Lea Unit approved Lea Unit 59H?

A. Yes, sir.

Q. And where exactly will the 59H be located?

A. As previously stated, it will address the west half, west half of 18 and the west half of the northwest quarter of section 19.

Q. And which bench of the Bone Spring?

A. The Third Bone or Third sands.

Q. And so would I be correct to say that the lateral of the 59H would extend into the north half of Caza's proposed project area?

A. Yes, sir, it will.

Q. Would you next identify the document marked as Exhibit 5?

A. Yes, sir. Exhibit 5 is again a Bone Spring horizontal development map. This map shows -- it's color-coded by stick. The black sticks within the Lea Unit are wells that Legacy plans to drill. The red sticks indicate which wells Legacy has already developed in the Bone Spring Formation within the Lea Unit. Green would be the approved APDs that we've received -- wells that we have an approved APD on. And, lastly, with the

blue arrow, is wells that we are currently pending approval of APDs at the BLM.

Q. Would you next identify the document marked as Exhibit 6?

A. Yes, sir. This just breaks down further the previous map by breaking it out into which wells Legacy currently has permitted within the unit.

Q. So what we're seeing on 6 is included in the stick graph on Exhibit 5?

A. Yes, sir.

Q. And does Legacy have approved BLM APDs for all the wells shown on Exhibit 6?

A. Yes, sir, we do.

Q. Would you next identify the document marked as Exhibit No. 7.

A. Yes, sir. Again, we have another map of the Lea Unit, but this time with sticks indicating which wells we have submitted APD applications to the BLM.

Q. And since you prepared this map, has the BLM approved any additional APDs that Legacy has submitted?

A. Yes, sir. I prepared this map on February 16th as dated below the legend. And since then, Legacy has received approved permits for the two wells that cover the east half of section 13 and then down into the east half of the northeast quarter of section 24. And those

would be the Lea Unit 37H and Lea Unit 40H.

Q. And does Legacy have any pending APDs -- when I used the word "pending," I mean you submitted those to BLM -- that would also include acreage within Caza's proposed project area?

A. No more additional wells in the proposed area, but in the offset directly to the east would be the Lea Unit 62H which is an application to drill a Third Bone well in the east half of the west half of 18 and also the east half of the northwest of 19, so they would be parallel wells -- it would run parallel to Caza's project area.

Q. And are Legacy's development plans for the west half, west half of section 18 and the northwest quarter of section 19 consistent with Legacy's overall plans for the Lea Unit?

A. Yes, sir, they are.

Q. And do you believe that Caza's proposed well would unreasonably interfere with Legacy's development plan?

A. Yes, sir.

Q. And how would Legacy's completion of its 59-inch well affect the interests of the state of New Mexico?

A. Once Legacy drills and completes the Lea Unit 59H, the state acreage would be included in the Bone

Springs participating area of the Lea Unit.

Once it is approved by the BLM and the State Land Office, they would begin to receive their proportionate share of royalties on Bone Spring production unit-wide.

Q. Have you communicated with the BLM regarding the circumstances presented by Caza's application?

A. Yes, sir. When we received the application, we did reach out to Ed Fernandez in the BLM Carlsbad field office.

Q. And what did Mr. Fernandez tell you about Caza's application in terms of operation of the well?

A. Ed told us that --

MR. BRUCE: I would object. This is hearsay.

MR. BROOKS: That would appear to be correct unless there's some purpose for offering it other than the truth of the matter stated. And I am going to assume that he's going to say something for this purpose -- that he's going to say something other than -- let me collect my thoughts before I continue speaking.

I am assuming that he's going to relate something that this gentleman said that would indicate whether or not the BLM will grant the application for

the Caza well.

Now for purposes of ruling on the objection, is that the nature of the communication you're going to relate?

THE WITNESS: I believe so, yes, sir.

MR. BROOKS: Then it would seem to me that that would not be relevant unless what the BLM representative said was true; and, therefore, it's being offered for the truth of the matter stated. Do you disagree with that?

MR. LARSON: I disagree with the focus of the question. The focus of the question is does the BLM have a view of who will be the operator of Caza's well?

MR. BROOKS: Again, that is still being offered for the truth of the matter stated, I believe.

So I will recommend the Examiner sustain the objection.

EXAMINER DAWSON: The objection is sustained at this point --

MR. BROOKS: Well, I think so, yes, unless you have reason to -- you know the rules of evidence are not binding on the OCD. As such, they're merely admonitory and the Examiner has the discretion, if he believes it's in the best interest of resolution of the case and in accordance with the Oil and Gas Act, to

overrule -- to refuse the recommendation of the legal officer. But that's not what's usually done. And that's all I can say.

EXAMINER DAWSON: Okay. The objection is sustained.

Q. (By Mr. Larson:) Mr. Roberts, what is your understanding of BLM policy regarding the operation of wells that include both off-unit acreage and unit acreage?

A. We have been informed several times that any acreage combined -- excuse me -- any unit acreage combined with non-unit acreage, the BLM would require that the unit operator operate the well.

Q. In your opinion, will the granting of Caza's application impair the correlative rights of Legacy and the other interest owners in the Lea Unit?

A. Yes, sir.

Q. Were the documents marked as Legacy Exhibit Nos. 1 through 7 prepared by you or under your direction and supervision?

A. Yes, sir.

MR. BROOKS: Mr. Examiner, I move the admission of Exhibit Nos. 1 through 7.

MR. BRUCE: I have no objection.

MS. MUNDS-DRY: No objection.

EXAMINER DAWSON: Legacy Reserves' Exhibits 1 through 7 will be so admitted.

(Legacy Reserves, L.P. Exhibits 1 through 7 were offered and admitted.)

EXAMINER DAWSON: Mr. Bruce.

CROSS EXAMINATION

BY MR. BRUCE:

Q. Mr. Roberts, do you know when the Lea Unit was approved?

A. As a unit?

Q. Yes.

A. Yes, in 1959.

Q. So that was when vertical wells were drilled?

A. Yes, sir.

Q. And you said -- you more or less implied that at this point there is no participating area in the Bone Spring Formation covering the northwest quarter of section 19?

A. Correct. Because there's not been any wells drilled.

Q. And because there's a high majority of federal land in the unit, the BLM is the primary governor of unit operations?

A. Yes, sir.

Q. Not the State Land Office?

A. Yes, sir.
Q. Now you talked about the state acreage, that if a PA is formed, the state will join in -- the state lands will join in receiving at least some royalties from the Bone Spring production unit-wide?
A. Correct.
Q. Now if Caza's application were approved, it would get its proportionate share of royalties from that well from the Lea Unit plus it would get the 50 percent of the royalties under Caza's lease, correct?
A. Yes, sir.
Q. So it's kind of hard to compare who'd get -- who'd be better off under that scenario, wouldn't you agree?
A. Under the granting of Caza's application?
Q. Correct.
A. Well, I believe that the state acreage in the southwest quarter could still be fully developed.
Q. But that's not what I'm asking. What I'm saying is the west half -- all of section 19 actually is state acreage, correct?
A. Yes, sir.
Q. And if Caza gets to drill its wells, however many Bone Spring wells there are, because the southwest quarter isn't unitized, ought to be those

wells, the state of New Mexico would get 50 percent of the royalties off the top from each of Caza's wells?

A. Yes, sir.

Q. And then the other 50 percent of the royalty would be allocated to the unit?

A. Yes, sir.

Q. So the state is receiving production either way?

A. Yes, sir.

Q. And then --

A. May I add something to that?

Q. Go right ahead.

A. That I just -- that I don't believe that that would be in the best interests of our partners and that's not what a prudent operator of the Lea Unit would do.

Q. Why not? They're still getting production.

A. Well, you're adding the additional cost of drilling a mile-long lateral in the west half of 18 and then an additional mile-long lateral in 19.

Q. And were you here listening to Caza's engineering witness?

A. Yes, I heard him.

Q. And you heard him say that Caza's one-mile results were better than Legacy's one-and-a-half-mile

results?

A. I cannot -- that's beyond my expertise.

Q. Just a couple of follow-up questions. How will granting Caza's application compare to Legacy's correlative rights? They'll still be allocated their proportionate share of production, won't they?

A. Right. Yes, sir.

Q. Thank you.

MR. BRUCE: That's all I have.

EXAMINER DAWSON: Go ahead.

EXAMINATION BY MR. BROOKS

MR. BROOKS: So you've already got a permit to drill a mile-and-a-half lateral in the west half, west half of 18 and the west half, west half of -- of the north half of 19?

THE WITNESS: Yes, sir.

MR. BROOKS: And that would be a unit well, of course?

THE WITNESS: It would be, yes, sir.

MR. BROOKS: That was my understanding. I guess that's all I can really clarify now at this point.

EXAMINATION BY EXAMINER McMILLAN

EXAMINER McMILLAN: What is the significance about having to PA the Bone Springs?

THE WITNESS: What is the significance of it?

EXAMINER McMILLAN: Yes.

THE WITNESS: So the Lea Unit is an exploratory unit. You have to prove production in the unit for the participating area to expand. So as new wells come on outside of the participating area, the participating area is then expanded to incorporate acreage.

EXAMINATION BY EXAMINER DAWSON

EXAMINER DAWSON: So there is already an existing participating area within the Lea Unit for Bone Spring production?

THE WITNESS: So the participating area covers the entire Bone Spring Formation, all three intervals.

EXAMINER DAWSON: Okay. You said your APD was approved on 1/19/2016?

THE WITNESS: Yes, sir.

EXAMINER DAWSON: When did you submit that APD?

THE WITNESS: I believe the permit was submitted in September of 2015.

EXAMINER DAWSON: Okay.

THE WITNESS: Along with the rest of the

pending APDs. Our engineer does all of the APD submission, so he could speak to that better than I did -- better than I can.

EXAMINER DAWSON: And your C-102 well dedication plat and also the C-101, they are for the mile-and-a-half-long lateral?

THE WITNESS: Yes, sir.

EXAMINER DAWSON: Okay. That's all the questions I have. Thank you.

MR. BROOKS: Nothing further.

EXAMINER DAWSON: No further questions.

MR. LARSON: I have one follow-up.

EXAMINER DAWSON: Sorry. Go ahead, Mr. Larson.

REDIRECT EXAMINATION

BY MR. LARSON:

Q. Mr. Bruce asked you a question about the correlative rights issue.

A. Yes, sir.

Q. Do you feel that the -- or do you believe that the granting of Caza's application would impair the rights of the Lea Unit interest owners to maximize their interests in the unit?

A. Yes, sir.

Q. Thank you.

MR. LARSON: Nothing further.
EXAMINER DAWSON: I have one further question.
THE WITNESS: Yes, sir.
EXAMINATION BY EXAMINER DAWSON
EXAMINER DAWSON: You said there is a Bone Spring participating area already existing within the unit?
THE WITNESS: Yes, sir.
EXAMINER DAWSON: Do you have an idea of how many wells are within that --
THE WITNESS: Yes, sir.
EXAMINER DAWSON: -- of the acreage involved in that participating unit?
THE WITNESS: May I go pick up another folder at my chair?
EXAMINER DAWSON: Sure.
THE WITNESS: Okay. We recently had our fifth revision of the Bone Springs participation area approved. In the current Bone Spring participating area, there are 1,760 acres.
EXAMINER McMILLAN: This includes -- does it include a portion -- does the PA include a portion of the northwest quarter of 19?
THE WITNESS: No, sir. Because there's no

Bone Springs production in it.

EXAMINER DAWSON: So that's roughly 1,760 acres of the -- of about 2,499.68 acres; is that a pretty fair --

THE WITNESS: The exact acreage within the unit boundaries is 2,559.68 acres.

EXAMINER DAWSON: So that's more than half of the unit?

THE WITNESS: Yes, sir.

EXAMINER DAWSON: Does it include the fifth revision of the Bone Spring participating area?

THE WITNESS: Excuse me?

EXAMINER DAWSON: Over half of the unit -- or half of the Lea Unit has Bone Spring participating area involved --

THE WITNESS: Yes, sir.

EXAMINER DAWSON: -- approved --

THE WITNESS: Yes, sir.

EXAMINER DAWSON: -- with the fifth revision?

THE WITNESS: Yes, sir.

EXAMINER DAWSON: Okay. Those are the only questions I have.

Mr. Larson, how long do you think the next witness will take?

MR. LARSON: If we're talking about a lunch break, I don't know that we'd finish him before noon.

MR. BROOKS: Let's take our lunch break from now until 1:15, and that way I won't -- since I'm leaving a little early, I'll get back a little sooner, and I won't be running the risk of keeping you waiting.

EXAMINER DAWSON: At this point, we're going to be on lunch break from now and we will reconvene at 1:15 p.m.

(Lunch recess from 11:30 a.m. to 1:15 p.m.)

EXAMINER DAWSON: We are back on the record and we will continue with case No. 15437.

And, Mr. Bruce, you can continue. Oh, I'm sorry. It is Mr. Larson's, that's your witness. Go ahead, Mr. Larson.

MR. LARSON: I am presenting my next witness, Mr. McKamey.

EXAMINER DAWSON: Okay.

KEITH E. McKAMEY

having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. LARSON:

Q. Good afternoon, sir. Could you state your full name for the record.

A. Keith McKamey.
Q. And where do you reside?
A. I live in Midland. And I work for Legacy Reserves, LP.
Q. And what is your role at Legacy Reserves, LP?
A. I am a geology manager. My responsibility is to generate economic locations for oil and gas.
Q. What personal experience do you have in the Permian Basin in southeastern New Mexico?
A. About 35 years.
Q. Have you previously testified at a Division hearing?
A. I have.
Q. And at those hearings were you qualified as an expert in petroleum geology?
A. I was.
Q. And are you familiar with the matters addressed in Caza's application?
A. I am.
Q. And are you also familiar with Legacy's development plan for the Lea Unit?
A. I am familiar with the development plan.
MR. LARSON: Mr. Examiner, I tender Mr. McKamey as an expert in petroleum geology.
MR. BRUCE: No objection.

MS. MUNDS-DRY: No objection.

EXAMINER DAWSON: He is so admitted. You may continue, Mr. Larson.

Q. Mr. McKamey, I direct your attention to Legacy Reserves Exhibit 8 and ask you to identify it.

A. Exhibit No. 8 is a type log of a well right in the middle of our unit. It is the number 31H. And the purpose of a type log is to show you the intervals that were mapped and the maps to follow.

So the bracketed intervals are the isopach intervals that I've mapped. I mapped the First Bone Springs landing interval, because that's where everyone lands in the First Bone Springs; from bracket to bracket, that would be the Bone Springs to the First Bone Springs porosity middle.

And the Second Bone Springs, it would be the Second Bone Springs Pay No. 3 that I have there to the base of the Second Bone Springs Pay No. 3, that bracketed interval there.

And the Third Bone Springs interval, in which everyone lands their horizontals, is from the Third Bone Springs shale top to the Third Bone Springs shale base. And, again, the bracketed intervals are the intervals that everybody lands in.

Q. And did you prepare this type log?

A. I did, yes.
Q. And how is it germane to your testimony today?
A. It just shows that the isopach intervals, the isopach in the top, and the base of those intervals.
Q. And I next ask you to identify Legacy Exhibit No. 9.
A. Exhibit No. 9 is an activity base. The purpose of this map is to show you every lateral within a mile or two of the acreage in question, what zone that they've landed in, and the TVD of that landing, as well as the 30-day IP.

It's to kind of give you a comprehensive feel of every well located next to us. Just as an example, all the wells that we drilled in the Lea Unit are all Third Bone Springs wells. As an example, down in 30, all the wells drilled east, west there are Second Bone Spring wells. And you'll notice the 30-day IP rate. And that's the max 30-day IP.

The only other Second Bone Springs laterals on the map other than 30 are the two verticals in the east half, east half of 23 and the east half, east half of 26. Those are the only two north, south Second Bone Springs wells on the map.

Q. And did you also prepare this exhibit?
A. I did.

Q. And did you intend it to be collective of data from all three benches of the Bone Spring?

A. Exactly. As well as vertical information. So all of these symbols, you'll see in a legend up in the upper left-hand corner, indicates the vertical production within the unit.

Q. I next direct your attention to the exhibit marked as Exhibit 10. And if you would identify it for the record.

A. Exhibit No. 10 is a Third Bone Springs net isopach map. The Third Bone Springs is the primary zone that everyone's drilling in the area. That's over 80 percent of the wells in this mapped area are Third Bone Springs north, south wells.

And the text beside each lateral only pertains to the Third Bone Springs. So if you see the text with the TDV interval of the landing as well as the 30-day IP, you will notice that it is also identified as a Third Bone Springs well.

I want to call your attention to a couple of points. A net fee isopach well is normally used to identify a conventional zone. Gross isopach zones are usually used to identify unconventional zones or zones that have uniform porosity throughout the entire section. And this is more of a conventional zone that

has varied porosity within the section.

The other thing I want to call your attention to is the way that I have interpreted the data. First of all, the values, the data points for each well is in blue where I don't have a blue density log, a blue value for a density log. You will see a pink value, and that is a sonic log.

The other thing I want to call your attention to is the control points nearest Caza acreage. The well in the northeast of 25 is a zero well in the Third Bone Springs. The well in the southeast of 24 is an 11-foot-porosity well in the Third Bone Springs.

So those are the two closest control points in the Third Bone Springs. And it shows that the pay in the southwest of 19 is greatly diminished compared to the pay in the unit as well as the number 59H which we have an approved APD permit for.

Q. And staying with your net isopach of the Third Bone Spring, what is your interpretation of the pay interval in the Third Bone Spring in the west half, west half of section 19 -- I am sorry -- sections 18 and 19?

A. There's significantly more pay in the Third Bone Springs lateral interval in the west half, west half of 18 and the west half, northwest of 19 compared to the

southwest of 19. I think that is very near zero net fee pay isopach.

Q. I next direct your attention to the exhibit marked as Legacy 11. And would you identify it for the record.

A. Exhibit No. 11 is the same style map for the Second Bone Spring sand. Again, it is a net fee pay isopach. Just like the first one, it's cut off. It was based on ten percent porosity.

The control points in blue are density curves, which is the preferred curve because it's got secondary porosity. The control points in red or pink are the sonic curves. And those are primary porosity. They are generally a little more pessimistic.

But I posted both of them, so where we don't have density data, we have sonic data to go by.

Again the thing I want to point out about the Second Bone Springs map, net fee pay isopach map, is the two nearest wells to Caza's acreage is very near zero. The well in the southeast of 24 only has 9 feet of pay. The well in the northeast of 25 has 16 feet of pay.

So our interpretation is that the southwest of 19 is very near zero.

Q. And Mr. McKamey, just so the record is clear, when you say "Caza's well," are you proposing to their

proposed well in the west half, west half of 19?

A. Excuse me. That's correct.

Q. And have you also prepared a net isopach map for the First Bone Spring?

A. Yes, sir, I have.

Q. And is that Exhibit 12?

A. Exhibit No. 12, yes. Sorry. It is going to sound like a broken record, but it's a net fee pay isopach of the First Bone Springs. Again, the porosity cut-off is 10 percent. As you can see, the porosity in the southwest of 19 is mapped to be very near zero or much thinner than the porosity in 18 -- the west half of 18 and the northwest of 19.

I show up to 50 feet of pay with offset logs in section 13 there and much less than that potentially in the southwest of 19.

And I also call your attention to a couple of points that I haven't talked about before. And that's Caza's well in the northeast of 19. That's a 16-foot-of-pay well, compared to the wells offsetting our 18 location are in the 50 range.

COG just drilled a well in the west half, east half of 18. That well has been logged. It only has 21 feet of pay. It is being completed. But it has not been completed up to this point.

Q. In your opinion, do the pay intervals in each of the Bone Spring benches increase as you move north from the southwest quarter of 18 up into section 19?

A. In every sand, First, Second, and Third Bone Springs lateral interval -- which is what we are all drilling out here -- the pay increases to the north and the west.

As a matter of fact, I heard testimony earlier that Caza believes the same thing. And it's just better rock quality up there. And it's reflected in the net fee pay isopach map.

Q. And given that Caza proposes to drill a Second Bone Spring horizontal well in the west half, west half of section 19, do you believe that the pay would be similar to the Caza producing lateral of the proposed well?

A. Definitely not. I think that there is potential for up to 50 feet of pay in any well in 18, and greater than 25 feet of pay in any well in the northwest of 19, but near-zero pay in the southwest of 19.

Q. And in your opinion, would there be an equitable allocation of revenues from Caza's proposed mile lateral in the west half, west half of 19?

A. No. It would be an unequitable allocation because you are combining very little pay, if no pay,

with as much as 50 feet or greater pay in Legacy's acreage.

Q. And during the break, did you have an opportunity to review Mr. Carroll's Second Bone Spring gross isopach map that is marked as Caza Exhibit 14?

A. I did.

Q. And do you think that his gross isopach map contradicts your opinions about the reservoir boundaries in the location of the better rock?

A. It does. Gross isopach maps do not reflect reservoir potential or reservoir boundaries. It just shows you that the zone is present.

And a net fee pay isopach is the only mapping mechanism other than seismic that will give you a reservoir-defining boundary.

Q. And, in your opinion, would the granting of Caza's application impair the correlative rights of Legacy and the other Lea Unit interest owners?

A. Yes, it would.

Q. And did you prepare the documents marked as Exhibits 10, 11, and 12?

A. I did.

MR. LARSON: Mr. Examiner, I move the admission of Legacy Exhibits 8 through 12.

MR. BRUCE: No objection, Mr. Examiner.

MS. MUNDS-DRY: No objection.
EXAMINER DAWSON: Caza's Exhibits 8 through 12 are so admitted.
(Legacy Reserves, L.P., Exhibits 8 through 12 were offered and admitted.)
MR. LARSON: And I pass the witness.
EXAMINER DAWSON: Mr. Bruce.
MR. BRUCE: Just a second, Mr. Examiner.
THE WITNESS: It's not "Caza's" exhibits; it's Legacy's.

CROSS-EXAMINATION

BY MR. BRUCE:

Q. Mr. McKamey, looking at your Exhibit 10, the Third Bone Spring net isopach, you really -- ignoring the section 30 Cimarex wells -- you really have no well control out there other than Caza's well in the east half, east half of section 19, correct?

A. I also have the COG well.

Q. Okay.

A. The Caza well didn't log the Third Bone Springs interval, so you don't have a data point for Caza's well.

Q. But how do you account for the result that you gave it basically zero net porosity and it is a great well?

A. Because -- in the Third Bone Springs --
Q. In the Third --
A. -- because I don't have data points for the Third Bone Springs. I think that there definitely is porosity in the north half of that lateral. Because I show it to have over -- over -- certainly something over the zero. So there is certainly porosity in the north half of that lateral. I think the south half of that lateral may be very near zero.
Q. You said you looked at Caza's porosity isopach.
A. Excuse me. It's a gross isopach.
Q. Yes, I understand.
Other than the COG well and the Caza well, there is no well control from section 18 and 19 westward for about five or six miles?
A. No, sir. It's directly offsetting in section 13.
Q. So you are speculating that there is a zero-porosity line there?
A. Excuse me. You said westward.
Q. Eastward, eastward.
A. Okay, eastward.
There is no control east of Caza's well, you are correct. There is no control except down in 30, and the northeast corner of 30 is 12. So it is bounded --

Caza's acreage is bounded on three sides by control, an 11-foot well in the southeast of 24, a zero-foot well in the northeast of 25, and a 12-foot well in the northeast of 30.

So three sides of that show that it is very near zero.

Q. But, again, I ask you how did Caza get such a good well with no porosity --

A. They did have porosity. And it's not as good a well as our wells. And I think that is where we address the unequal allocations, because we think there's more pay.

Q. So, basically, by your math, the Caza well is really only producing from the northeast quarter to the northeast quarter of section 19.

A. That's my interpretation, correct.

Q. And, yet, it's a great well?

A. It's a well. It's certainly not as good a well as Legacy's well.

Q. And the same could be said for your First and Second Bone Spring maps: It's pure speculation because you don't have any control for six miles -- say five miles at least from the western boundary of section 18 or 19 eastward. So anything you draw on here, you won't know until you drill the wells?

A. Well, I disagree with that, because I have three data points on all sides of Caza's acreage that shows very near zero.

I do show in the Second Bone Springs that there is some porosity in section 18 and laps over into the northeast of 19 in the Second Bone Springs. So I think that they do have some porosity in the northern part of their acreage in the northeast corner.

Q. Until you drill you won't know?

A. You will never know until you drill a well, that's correct.

Q. Because you're 11,000 feet down and it's kind of hard to put a periscope down there?

A. Yes. And like I said, it's my interpretation that it will be very near zero.

Q. Thank you.

MR. BRUCE: That's all I have.

THE WITNESS: One thing I would like to interject is that the exhibits that were admitted, they were Legacy Exhibits 8 through 12, and not Caza's exhibits. I just want to make sure.

MR. LARSON: I meant to say Legacy Exhibits 8 through 12.

EXAMINER DAWSON: Do you have any questions?

MS. MUNDS-DRY: No, Mr. Examiner.

EXAMINER DAWSON: Mr. Larson, are you done?
MR. LARSON: I defer to the Examiners.
MR. McMILLAN: Go ahead.
EXAMINATION BY EXAMINER DAWSON
EXAMINER DAWSON: Mr. McKamey, can you verify where is the Concho well that you are talking about?
THE WITNESS: It's the west half, east half of 18.
EXAMINER DAWSON: Okay.
THE WITNESS: And that well is shown to be a location, but it, in fact, has been drilled and represents -- I do have data points because I obtained the log several weeks ago from Concho.
EXAMINER DAWSON: But you don't have any data points for any of your isopach maps for that well?
THE WITNESS: Yes, sir, I do. In the Third Bone Springs, I have 1, 1 feet of pay. In the Second Bone Springs, 31; and the Third Bone Springs, 21.
EXAMINER DAWSON: Okay.
THE WITNESS: I'm sorry. The First Bone Springs, 21.
EXAMINER DAWSON: Okay. And then the well north of there in the west half of the east half of section 18, you only had a sonic log on that one,

right?

THE WITNESS: No, sir. I had a density log. The density is in blue. And I'll refer you to the Exhibit 10 that has 1 feet of density pay and it also had 1 foot of sonic pay.

In the Second Bone Springs map on Exhibit 11, it had 31 feet of density pay, 20 feet of sonic pay.

And then in the First Bone Springs, 21 feet of density pay, 7 feet of sonic pay.

EXAMINER DAWSON: Okay. I was unsure on those values because they are kind of near another well to the south.

THE WITNESS: Yes, I understand.

EXAMINER DAWSON: That's all the questions I have. Thank you.

Do you have any questions, David?

EXAMINATION BY MR. BROOKS

MR. BROOKS: I am just curious, if you know, you show pretty good porosity -- I mean pretty good pay in the -- well, good pay in the First Bone Springs, highly variable in the others in the south half of 24. I wondered if you knew why there's been no horizontals drilled in the south half of 24.

THE WITNESS: That's a very good question.

There should be in my opinion. I think there is First Bone Spring pay there. It hasn't historically been very heavily developed, because the Third Bone Spring is the primary target. It is the one with the most EURs.

The Second Bone Springs has been developed next to the Third. The First Bone Springs, there's only a few wells nearby that have been drilled to the First.

And the ones that I'll call your attention to are in 23. And they are not as good IP, 30-day IPs as the Third or the Second sand wells are.

MR. BROOKS: Okay.

THE WITNESS: We intend to fully develop our unit in all three sands.

MR. BROOKS: Do you own an interest in the acreage in the south half of 24?

THE WITNESS: No, sir.

MR. BROOKS: I mean your company, not you personally?

THE WITNESS: No, sir, I'm pretty sure we don't.

MR. BROOKS: Not that that's relevant. Thank you.

THE WITNESS: You bet.

MR. BROOKS: Scott, I'm through.

EXAMINATION BY EXAMINER McMILLAN

EXAMINER McMILLAN: So just for clarification purposes, how are you getting the zero values in the west half of the southwest quarter of 19?

THE WITNESS: For the Third sands?

EXAMINER McMILLAN: For the Second.

THE WITNESS: Okay. It's a contour interval. The Second sand isopach shows a very-near-zero data point in the southeast of 24, only 9 feet of pay. So that's the most near-zero well.

The northeast of 25 has 16 feet of pay. The well in the northeast of 30 in the Second Bone Spring sand has 29 feet of pay. So by contour interval, I expect it to be 9 feet or less in the southwest quarter of 19.

While we are on that subject, Mr. McMillan, I would like to reiterate that the Second Bone Springs 30-day IPs that were all drilled in section 30 are better east, west than the only two Second Bone Springs north, south wells within the mapped area.

And the east half, east half of 23, that 30-day IP was 297. And if you look in 30, every one of those are 800 or better. The other well in the east half, east half of 26 was 214 barrels, 30-day IP,

compared to the wells closest to Caza's acreage of over 800 barrels in an east, west direction. And I think Mr. Sparkman's testimony for EUR later will verify that as well.

EXAMINATION BY EXAMINER DAWSON

EXAMINER DAWSON: Mr. McKamey, you show a fault on the east side of the unit there.

THE WITNESS: Yes, sir.

EXAMINER DAWSON: That's through the Bone Spring.

THE WITNESS: Yes. If you'll notice, none of the isopach intervals are offset. That is a public data fault, a deep-seated fault through the Devonian. It probably offsets Wolfcamp and probably steep drape over the Third sand.

When you map the Third Bone Spring structure, you see evidence of that, because Caza's acreage in 19 is much lower than the Lea Unit. But I'm not sure it's offset. It probably is steep dip.

I've just illustrated it because it is in the public data, and we see it in seismic.

EXAMINER DAWSON: And then on your Exhibit No. 11.

THE WITNESS: Yes, sir.

EXAMINER DAWSON: In the southwest quarter

of 19, do you have an expired permit?

THE WITNESS: That was a permit, I believe, that Yates filed. That has expired.

EXAMINER DAWSON: Okay. Is that for that 7H well?

THE WITNESS: I'm sorry. I don't know the name of the well. I just remember something about an expired permit by Yates.

EXAMINER DAWSON: Okay. I have no further questions.

MR. LARSON: I have nothing further.

EXAMINER DAWSON: You may be excused. Thank you, Mr. McKamey.

THE WITNESS: Thank you.

EXAMINER DAWSON: Mr. Larson, you may proceed.

MR. LARSON: I call my next witness, Mr. Sparkman.

CRAIG SPARKMAN

having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. LARSON:

Q. Good afternoon, Mr. Sparkman. Would you state your full name for the record.

A. Yes, sir. Craig Sparkman.
Q. And where do you reside?
A. Midland, Texas.
Q. And by whom are you employed and in what capacity?
A. I am employed by Legacy Reserves, LP, as an operations engineer.
Q. And what is the focus of your responsibilities as an engineer at Legacy?
A. I work our southeast New Mexico assets in Lea, Eddy, and Chavez counties.
Q. And that includes Legacy's Lea Unit?
A. Yes, sir.
Q. Have you previously testified at a Division hearing?
A. No, sir, I have not.
Q. Given that, would you summarize for the Examiners your educational background and professional experience?
A. Sure. I received a bachelor of science degree in petroleum engineering from the University of Texas Tech. And I have six and a half years of experience as a petroleum engineer, two and a half with a small operator, Breck Operating out of Breckenridge, Texas. And then the previous four years with Legacy Reserves.

Q. Are you familiar with the matters addressed in Caza's application?
A. Yes, I am.
Q. And are you also familiar with Legacy's development plan for the Lea Unit?
A. Yes, sir.
MR. LARSON: Mr. Examiner, I tender Mr. Sparkman as an expert petroleum engineer.
EXAMINER DAWSON: Any objections?
MR. BRUCE: No objection.
MS. MUNDS-DRY: No objection.
EXAMINER DAWSON: He is so admitted.
Q. Mr. Sparkman, do you have Legacy Exhibit 4 in front of you there?
A. Yes, sir.
Q. And maybe I should ask the Examiners the same question.
EXAMINER DAWSON: I have it.
MR. LARSON: It is titled Lea Unit Complete Development Map, Legacy No. 4.
EXAMINER DAWSON: They both have it. We all have it.
MR. LARSON: Good.
Q. Has Legacy drilled both mile and mile-and-a-half laterals in the Lea Unit?

A. Yes, sir, we have.
Q. And the mile laterals are primarily in section 12?
A. Yes, sir.
Q. And why were those drilled as mile laterals?
A. Basically, just because of the unit boundary. Legacy was told by the BLM, when we initially started development out here, that our development had to be contained inside the unit boundary.
Q. And I believe you heard Mr. Roberts' testimony that Legacy has focused its current development plan on mile-and-a-half laterals in the Bone Spring.

Is there a cost factor in play with regard to the current development plan focusing on mile-and-a-half laterals?
A. Yes, sir, there is. We believe that the economics on mile-and-a-half laterals are better than the mile laterals. Our rate of return and PV-10 values are substantially higher on a mile-and-a-half lateral versus a mile lateral.

And it also greatly reduces our gross capital investment to develop the unit via mile-and-a-half laterals where we can because it reduces the overall well count.
Q. And do you see improved ROI with a

mile-and-a-half well?

A. Yes, sir, I do.

Q. And if Caza's application were granted and we have a mile lateral in the west half, west half of 19, would there be increased cost for that well because of a battery?

A. Yes, sir. That is my understanding. There would be -- the BLM would require, due to allocation purposes, for a separate battery to be placed anywhere you combine unit acreage with non-unit acreage.

Additionally, it's going to increase our gross capital development cost forcing us to drill another mile lateral in 18. So if you are just looking at the west half of the west half of 19 and 18, we currently have three wells for the First, Second, and Third sand proposed.

We estimate that our mile-and-a-half lateral cost at around 5.5 million. And if we were to have to drill mile laterals in 18 and 19, that would double the well count from three to six. And we estimate a mile lateral to cost about 4.5 million.

So three mile-and-a-halves at 5.5 million is 16.5 million gross. Six mile laterals at 4.5 million is 27 million gross. That's an increase of 10.5 million gross just for that project area.

Q. Just so we are clear, would you be drilling mile laterals in 19 or are we talking about 18?

A. If Caza's application were granted and their mile lateral in 19 was granted, then we would drill a mile in 18. Otherwise we would drill the mile-and-a-half across 18 and the northwest of 19.

Q. And if I understand you correctly, drilling one-mile laterals in 18 would significantly increase your cost?

A. Yes, sir.

Q. And is your comparison of the capital cost in ROI based on Legacy's experience in drilling Bone Spring mile-and-a-half laterals in the Lea Unit?

A. Yes, sir. To date, we've drilled two mile-and-a-half laterals and five mile laterals at Lea Unit.

Q. And referring again to Legacy Exhibit No. 4, what is Legacy's development plan for the northwest quarter of section 19?

A. We plan to drill six mile-and-a-half laterals in the northwest quarter of 19; two Third sand mile-and-a-half laterals; two Second sand mile-and-a-half laterals; and two First sand mile-and-a-half laterals.

Q. Now I direct your attention to Legacy Exhibit 3,

which is titled Lea Unit Aerial Photo.

Are there any well pads identified on Exhibit No. 3?

A. Yes, sir. The white pads or the white rectangles are existing well pads for vertical wells and a couple of horizontal wells inside the unit.

The green rectangles to the north and the south of the unit boundary are proposed multi-well pads. And you can see they are numbered 1 through 12. Most of the even numbers are to the north and the odd numbers are on the south.

Q. I draw your attention specifically to the green dots with the numbers 11 and 12. And what are those pads intended for?

A. Those pads are intended for our mile-and-a-half laterals that I just spoke about, the two Third sand wells, the two Second, and the two First.

Q. That is in the west half of 18 and the northwest quarter of 19?

A. Yes, sir.

Q. Has the BLM approved either of those multi-well pads in section 19?

A. Yes, sir. We performed on sites with the BLM, an organization called CEHMM, the U.S. Fish and Wildlife service, as well as the landowners.

Q. And do the BLM approvals allow you to drill additional wells to the three Bone Spring wells of each pad?

A. Yes, sir. These multi-well pads were proposed to the BLM to eventually be five low pads. We've identified at least two landing intervals in the Wolfcamp that we feel are very prospective.

And so these pads were designed to hold as many as five surface locations and possibly more.

Q. And how would Legacy be impacted if it's unable to use these two-well pads in section 19?

A. If Caza's application was granted, these well pads would basically become obsolete, and we would not be able to utilize them.

Q. And where would your alternative well pads be?

A. Most likely, they would have to be placed inside the unit which would force us -- we would end up stranding about 700 feet of pay inside our unit, because it takes us about 700 feet to build our curve section.

So being off lease allows us to maximize the reserves that we are recovering for Legacy in the unit.

Q. Could you estimate the time frame of the process to renegotiate multi-well pads which I assume would go to section 18?

A. In the past, it has taken us as long as six

months.

Q. And in your opinion, would the granting of Caza's application negatively impact Legacy's development plan for the northwest quarter of section 19?

A. Yes, sir. I feel it would greatly increase our capital investment cost to develop our acreage and that it would significantly increase the time it took us to get to that point.

Q. And in your opinion, would the granting of Caza's application adversely impact Legacy's correlative rights?

A. Yes, sir.

MR. LARSON: I'll pass the witness.

EXAMINER DAWSON: Mr. Bruce.

CROSS-EXAMINATION

BY MR. BRUCE:

Q. I have just a few questions.

Your wells that you propose in sections 18 and 19, are they going from the north to the south or the south to the north?

A. From the south to the north.

Q. So it looks like those well pads are non-unit acreage?

A. Yes, sir, that is correct.

Q. They're on Caza's lease?

A. Yes, sir.
Q. I just wanted to clarify. You made a statement that you would get more reserves by having a mile-and-a-half well unit. But wouldn't you produce even more reserves by having all of sections 18 and 19 developed, all of the west half of section 19 and section 18?
A. I don't know that I stated that it would get more reserves. I think our economics are better.
Q. Well, if you get more reserves, doesn't that help make the economics better?
A. Not necessarily if you have to increase your capital investment.
Q. And, also, with respect to -- you talked about acreage or footage that wouldn't be fracked. I mean couldn't Legacy and Caza agree to unorthodox locations for the terminus of their wellbores so that there would be very little stranded acreage?
A. That's not the part -- I'm not worried about the terminus of the wellbore. I'm worried about where the -- about the surface location.
Q. Right now you are going to have to stop your -- oh, I see what you are saying. Okay.
But, still, you could arrange the wells in sections 18 and 19 to have unorthodox locations and

there would be very little untapped acreage, footages, in those wells, correct?

A. That may be true. We have not pursued anything in section 7 to the north of us. I just know that that is a very tedious and long process. The quickest option would be to stay on the unit as far as...

Q. But your well pads in section 19 aren't on the unit?

A. Correct. But they're already approved.

MR. BRUCE: I think that's all I have, Mr. Examiner.

EXAMINER McMILLAN: Go ahead.

EXAMINATION BY EXAMINER DAWSON

EXAMINER DAWSON: The well pads in the section in the south, the west quarter of section 19, those have been approved by the land office?

THE WITNESS: No, sir. They have been approved by the BLM, the surface owner, CEHMM, the U.S. Fish and Wildlife Services.

EXAMINER DAWSON: I thought the lease in 19 was a state lease?

THE WITNESS: It is.

EXAMINER DAWSON: So the BLM is approving pads on a state lease?

THE WITNESS: Yes, sir, because the well

accesses --

EXAMINER DAWSON: Accesses the unit --

THE WITNESS: -- the unit and federal minerals.

EXAMINER DAWSON: Okay. Did you have any communication with Caza on the placement of those well pads?

THE WITNESS: No, sir. We were not required to notify the offset operator.

EXAMINER DAWSON: Okay. Did you state that you have -- within the unit, you have two mile-and-a-half laterals drilled already?

THE WITNESS: Yes, sir.

EXAMINER DAWSON: And when you started first drilling that unit, you drilled mile laterals; is that how you started?

THE WITNESS: Yes, sir.

EXAMINER DAWSON: So the most recent wells that you drilled were the mile-and-a-half laterals, the last ones or --

THE WITNESS: We drilled five wells at the end of last year; three of those were mile laterals and two were mile-and-a-half. The last well that we did drill was a mile-and-a-half.

EXAMINER DAWSON: And how did those produce

compared to the mile laterals?

THE WITNESS: It's still very early. We've only got about four months of production on our most recent well or the well that we started drilling last fall.

The mile-and-a-halves did not initially show higher rates than the mile wells. But that may be somewhat due to our completion process.

We did a perf and plug, but the plug that we used was a ball drop plug. And we used a dissolving ball in hopes that we would not have to clean out the lateral with coil tubing.

And on the latest mile-and-a-half well, we recently went in about a month ago and cleaned it out with coil and the rates have come back exceptionally well. So it appears that it is not one-and-a-half-times better than the mile lateral but it is better.

EXAMINER DAWSON: What about the costs to drill? Do you have an idea of the costs for a mile lateral versus a mile-and-a-half lateral?

THE WITNESS: Yes, sir. We are estimating the mile at 4.5 and the 'mile' at 5.5. So the cost is not 1.5 times either.

EXAMINER DAWSON: Do you know who owns the lease to the northeast of the unit section 7?

THE WITNESS: I want to say that's Concho, but I do not know.

EXAMINER DAWSON: Okay.

MR. LARSON: Could we ask Mr. Roberts, the landman?

MR. ROBERTS: Cimarex.

EXAMINER DAWSON: Cimarex on 7?

MR. ROBERTS: Yes.

EXAMINER DAWSON: Can you identify where your two mile-and-a-half laterals are on Exhibit 3?

THE WITNESS: Sure. But I might suggest we look at -- let's look at Exhibit 5.

EXAMINER DAWSON: Okay.

THE WITNESS: Yes.

EXAMINER DAWSON: Yes, that's a little bit easier to see.

THE WITNESS: So our drilled wells are outlined in red. If you look at the middle of 24 in section 13, there is the Lea Unit in 32H in red.

EXAMINER DAWSON: Okay.

THE WITNESS: That was the first mile-and-a-half lateral we drilled last year. And then the last lateral we drilled is over here in section 11 and 14 on the very west side of the unit, the Lea Unit No. 54H.

EXAMINER DAWSON: Okay. Those are all the questions I have. Thank you.

MR. BROOKS: No questions.

EXAMINER DAWSON: Any questions?

EXAMINATION BY EXAMINER McMILLAN

EXAMINER McMILLAN: So how much more reserves are you getting out of mile-and-a-half versus the mile?

THE WITNESS: Internally, we have the mile lateral at 676,000 BOE. And we have the mile-and-a-half lateral at 1.036 million BOE.

MR. BROOKS: What was the answer on a mile lateral just a moment ago?

THE WITNESS: The reserves?

MR. BROOKS: Yes.

THE WITNESS: 676,000 BOE.

MR. BROOKS: And 1.0-something on a mile-and-a-half?

THE WITNESS: Yes, sir.

MR. BROOKS: What was that figure?

THE WITNESS: 1.036.

MR. BROOKS: Thank you.

EXAMINER DAWSON: So that's almost twice as much -- is that right? -- not quite --

THE WITNESS: Not quite.

MR. BROOKS: It's a good way short of twice as much but it is substantially more than one and a half times.

THE WITNESS: I think it's right at one and a half times.

MR. BROOKS: Let's see. Do you have a calculator?

(Pause.)

MR. BROOKS: It's really close to one and a half. My statement that it was substantially more is clearly wrong looking only at the first figure.

EXAMINER DAWSON: 1.53.

MR. BROOKS: It is very close to one and a half.

EXAMINER DAWSON: Do you have any more questions?

EXAMINER McMILLAN: No.

EXAMINER DAWSON: Any more questions?

MR. BROOKS: No more questions.

EXAMINER DAWSON: That's all the questions. Thank you very much.

MR. BRUCE: May I ask a follow-up question regarding one-and-half-mile laterals?

EXAMINER DAWSON: Yes.

RECROSS EXAMINATION

BY MR. BRUCE:

Q. Mr. Sparkman, you said you used a plug-and-perf fracking technique, correct --

A. Yes, sir.

Q. -- on those Lea Unit wells?

A. Yes, sir.

Q. Did you use that on the Lea Unit 32H?

A. Yes, sir.

Q. That's a mile-and-a-half lateral?

A. Yes, sir.

Q. What volume and type of frac fluid did you use?

A. I couldn't quote you the volume offhand. But it was a slick-water frac.

Q. Did you have -- if you don't have the data, fine, but do you have an idea of what concentration in pounds per gallon of proppant was pumped?

A. Our highest concentration?

Q. What concentration? Like five gallons, five pounds per gallon or seven pounds per gallon?

A. I think it was two pounds per gallon, was our highest. Maybe two-and-a-half.

Q. And if what type of proppant? Sand or ceramic?

A. No ceramic. We did pump a resin-coated sand.

Q. Thank you.

MR. BRUCE: Thank you, Mr. Examiner.
EXAMINER DAWSON: Thank you.
MR. LARSON: I just have one follow-up question.
EXAMINER DAWSON: Okay.

REDIRECT EXAMINATION

BY MR. LARSON:

Q. The Examiner asked you a question about the mile laterals in section 12. I am looking at Exhibit No. 4. And I believe your testimony was that you did those as mile laterals because you were under the assumption that you couldn't leave the unit boundary to the north there?

A. Yes, sir.

MR. LARSON: Thank you. That's all I got.
EXAMINER DAWSON: No more questions. Thank you very much. Do you have any closing statements?
MR. BRUCE: Give me 60 seconds, and I will tell you in a nutshell.
MR. LARSON: Okay. If he's going to do one, I'm not waiving mine.
EXAMINER DAWSON: Go ahead, Mr. Bruce.

CLOSING STATEMENT BY MR. BRUCE

MR. BRUCE: Two main issues, No. 1, Legacy is looking at full development of the unit. I

understand that. But what Caza is looking at is full development of the reservoir.

And no matter -- if Legacy gets its way, no matter what happens, they're going to have 160 acres of stranded acreage that isn't going to get developed, pure and simple. And that's what's bad. Caza's correlative rights will definitely be affected.

Insofar as whether it's gross or net porosity isopachs, if you look at Mr. Carroll's isopach, it covers a much broader area than Mr. McKamey's; it goes to the east; it shows how there's definite, very thick gross sands to the east of the well.

And, again, how did Caza get such a good well with virtually zero net porosity. The only other thing and fact of the matter is there is good porosity there. And you are not going to know until you drill.

My final point would be, simply based on the data that Mr. Sparkman just said, if you get a 50 percent more production from a mile-and-a-half lateral than a mile lateral, why not have two and get 100 percent more production -- if you have two one-mile laterals, the Caza wells in 19 and the Legacy wells in section 18.

The numbers he gave, if you took 676,000, you are looking at -- what is it? -- 1.35 million as

opposed to the 1.035 they are going to get allegedly under a mile-and-a-half lateral. And when you multiply that with the number of wells, you are producing a lot more reserves. And that takes away the fear of having increased well costs.

Thank you.

CLOSING STATEMENT BY MR. LARSON

MR. LARSON: Mr. Examiner, I believe we've established that Caza's application should be denied. I strongly disagree with Mr. Bruce's statement about stranded acreage.

I think we established through Caza's witnesses that there are alternatives to the mile lateral they would like to do in the west half, west half of 19. If the application is granted, it will prevent Caza's timely development of its unit acreage. It already has an approved APD.

EXAMINER McMILLAN: You mean Legacy's?

MR. LARSON: I'm sorry. Yes, Legacy. I keep getting the two confused.

Legacy already has an approved APD. It has multi-well pads approved. And, lastly, it is likely, even if the application is granted, the BLM will require Legacy -- and I do mean Legacy -- to operate the well. And therefore we ask that the application be denied.

MR. BRUCE: Mr. Examiner, I would say that Caza has even proposed to Legacy that they operate. So that's not an issue.

MR. BROOKS: Can either of you tell me, is BLM approval of an APD required for a well that penetrates the federal unit but does not penetrate federal acreage?

MR. BRUCE: It is my understanding that it does, because it's a federally --

MR. BROOKS: It seemed like probably it would to me but --

MR. BRUCE: I have seen other situations where they didn't over by the Big Eddy Unit. But the personnel at the BLM keep changing.

MR. LARSON: I agree with Mr. Bruce, I think so, but I can't say definitively. But I think they would have to get a federal APD.

MR. BROOKS: Well, I made the statement earlier today that the BLM is not shy about regulatory outreach.

MR. BRUCE: Did you say "outreach" or "outrage"?

MR. BROOKS: Nothing further.

EXAMINER DAWSON: No more statements?

(No response.)

EXAMINER DAWSON: That concludes this hearing. Case 15437 will be taken under advisement. Thank you.

(Time noted 2:15 p.m.)

STATE OF NEW MEXICO)
) ss.
COUNTY OF BERNALILLO)

REPORTER'S CERTIFICATE

I, ELLEN H. ALLANIC, New Mexico Reporter CCR No. 100, DO HEREBY CERTIFY that on Thursday, March 3, 2016, the proceedings in the above-captioned matter were taken before me, that I did report in stenographic shorthand the proceedings set forth herein, and the foregoing pages are a true and correct transcription to the best of my ability and control.

I FURTHER CERTIFY that I am neither employed by nor related to nor contracted with (unless excepted by the rules) any of the parties or attorneys in this case, and that I have no interest whatsoever in the final disposition of this case in any court.

ELLEN H. ALLANIC, CSR
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