BEFORE THE IDAHO DEPARTMENT OF LANDS

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| In the Matter of the Application of Snake River Oil and Gas, LLC for an Order Establishing a Spacing Unit Consisting of the NE 1/4 of Section 9 and the NW1/4 of Section 10, Township 8 North, Range 5 West, Payette County, Idaho, | AGCY. CASE NO: CC-2024-OGR-01-001 OAH Case No. 24-320-OG-01 |
| Snake River Oil and Gas, LLC, Applicant. | |

BEFORE

HEARING OFFICER: LESLIE M. HAYES

Date: June 13, 2024

Location: Fruitland City Hall
200 S. Whitley
Fruitland, Idaho 83619

REPORTED BY:
MONICA M. FUHS, CSR NO. 471
NOTARY PUBLIC

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SNAKE RIVER OIL & GAS, LLC





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SNAKE RIVER OIL & GAS, LLC





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THE HEARING OFFICER: This is the matter before the Idaho Department of Lands in the Matter of the Application of Snake River Oil and Gas, LLC, for an Order Establishing a Spacing Unit Consisting of the NE1/4 of Section 9 and the NW1/4 of Section 10, Township 8 North, Range 5 West, Payette County, Idaho. Snake River Oil and Gas, LLC is the applicant. This is Docket No. CC-2024-0GR-01-001. Office of Administrative Hearings Case No. 24-320-0G-01.

I'm the assigned Hearing Officer, Leslie Hayes. We are here for the evidentiary hearing starting at 1:00 p.m. in the Fruitland City Hall. The public comment portion of these proceedings will occur today at the same place at 5:00 p.m.

The parties previously stipulated to admission of each other's exhibits. And we deemed openings unnecessary. And the order of presentation of evidence will be Mr. Christian first presenting on behalf of the Applicant. Followed by Objectors. Followed by the Oil and Gas Commission's attorney, Mr. Marotz. Also present at these proceedings, in addition to Mr. Christian, is externs for the Office of Attorney General.

Mr. Marotz, would you like to introduce your

extern.
MR. MAROTZ: Yes. We have Jennifer Shalforen, an extern from the Attorney General's Office. James Thum, the oil and gas program manager for the Idaho Department of Lands. And I'm representing the Idaho Department of Lands, as well.
THE HEARING OFFICER: For the Office of Administrative Hearings we also have present Scott Zanzig, one of our administrative law judges. And Xavier Suarez, our legal extern for the summer. Neither which are impeding within decisional independence. I'm the hearing officer and sole decider in this matter.
Mr. Piotrowski, would like to introduce yourself at this time.
MR. PIOTROWSKI: Sure. James Piotrowski with Piotrowski Durand, PLLC, on behalf of Karen Oltman and CAIA.
THE HEARING OFFICER: And then, Mr. Christian, would you like to introduce your witnesses that are present here today.
MR. CHRISTIAN: Thank you, Ms. Hearing Officer. I have via zoom today Wade Moore, who is a land man working for Snake River. And Dave Smith, who is a geologist working for Snake River.
THE HEARING OFFICER: And also present is



eleven years. The last four years directly with Snake River.
Q. And you worked for a predecessor operator before that?
A. That's correct.
Q. Are you -- first of all, did you provide a declaration as part of Snake River's application in this case? I'm sorry. Let me back up.
Are you familiar with Snake River's Exhibit SR-01, which is the application materials?
A. Yes, sir.
Q. And SR-02, which is the certified mailing receipts?
A. Yes, sir.
Q. Okay. Do the certified mailing receipts in SR-02 reflect the mailing of application materials to the uncommitted owners in the unit and uncommitted adjacent owners?
A. Yes, they do.
Q. And were you the person that accomplished those mailings?
A. Yes, I did. On May the 6th.
Q. And did you also mail the application materials and a notice to Payette County?
A. I did.



Richard Brown.
MR. CHRISTIAN: Oh, yes. And Richard Brown is the manager of Snake River Oil and Gas, the Applicant. I don't believe he will be testifying, but he is on zoom watching the proceedings.
THE HEARING OFFICER: Okay. With that the floor is yours, Mr. Christian.
MR. CHRISTIAN: The applicant would call Wade Moore.
THE HEARING OFFICER: I will ask the court reporter to swear the witness.

WADE MOORE,
first duly sworn to tell the truth relating to said cause, testified REMOTELY as follows:

DIRECT EXAMINATION
QUESTIONS BY MR. CHRISTIAN:
Q. Mr. Moore, are you land man working for Snake River?
A. Yes, sir.
Q. And how long have you worked for Snake River in Idaho?
A. Next month -- well, for Snake River in Idaho -- I have been in Idaho working this area for



Q. Can you tell me whether there were -- are there any working interest owners in the unit or adjacent to the unit other than Snake River?
A. No, there are no other working interest owners.
Q. Were there any mineral owners you cannot locate?
A. Nope. Everyone was locatable.
Q. And the uncommitted owners in the area are identified on Exhibit SR-01 by number; are they?
A. Yes.
Q. And they are indexed to a list, which is on -- that are on pages six and seven to Exhibit SR-O1?
A. That's correct; yes.
Q. And so the uncommitted owners are identified on the list?
A. Yes, sir.
MR. CHRISTIAN: I don't have any further questions.
THE HEARING OFFICER: Mr. Piotrowski, do you have any questions for this witness?
MR. PIOTROWSKI: Yes, I do.
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CROSS-EXAMINATION

QUESTIONS BY MR. PIOTROWSKI:

Q. Mr. Moore, how did you develop that list? The list of people you mailed to?

A. Title research.

Q. And you said your list includes all of the uncommitted owners in the unit. Which unit are you referring to?

A. The North Harmon unit.

Q. And explain to us why you call it the North Harmon unit?

A. That is the name the company has added -- put those two places together. I'm not the one who names the units.

Q. So when you refer to the Harmon unit -- North Harmon that is what Snake River Oil and Gas is calling this area?

A. That's correct.

Q. And how did you go about determining what would be the outline, the size, of the North Harmon unit?

A. Again, that is not my area of expertise.

Q. Okay. So you said you looked up the mineral interest owners in that unit. Did you look those up yourself?



A. Not myself in entirety; no. We had a team working on it.

Q. But you were involved in that process?

A. Yes.

Q. Okay. And why did you choose to look up mineral owners adjacent to the North Harmon unit?

A. Those we had of record. What we did with that is we had two adjacent. And we had -- we had sent previous leases to these people as well. So this was nothing new. We had record of these people already.

Q. And did you make the decision that you were going to send the notice to those who owned property adjacent to the unit? Or was that somebody else's decision?

A. It wasn't my decision directly; no.

Q. And, Mr. Moore, do you have any specific training in interpreting the statutes of the State of Idaho?

A. I can read as far as --

Q. Okay. Are you familiar with the rules of statutory instruction that lawyers and hearing officers typically use?

A. I'm not tracking where you are going.

Q. I'm trying to establish the level of your familiarity with the relevant law on this is all. I'm



just trying to figure out how much you know about the statute before I ask additional questions.

A. Regarding what?

Q. Mr. Moore, what is the difference between an uncommitted mineral interest owner and an uncommitted owner in the unit? If I put those two phrases in front of you would you understand how they were different?

A. I would title the uncommitted interest owners to the unit. And the other title speaks for itself. They are outside of the unit.

Q. And so if somebody were to say to you uncommitted mineral interest owner, just those words, that could mean an owner either inside the unit or outside of the unit or anywhere at all; right?

A. It could.

MR. CHRISTIAN: I'm going to object at this point. Mr. Piotrowski is asking a land man to offer I think legal opinion about the meaning of the statute. Which is certainly a subject for Mr. Piotrowski to argue to you, madam hearing officer.

THE HEARING OFFICER: Mr. Piotrowski, do you have a response to that objection?

MR. PIOTROWSKI: Mr. Moore just told us he was familiar with the relevant law. So I was just following up with that assuming that he was accurate with that



answer. And so, yes, I'm asking him to start telling me what he understands in the statute.

THE HEARING OFFICER: I can have Mr. Moore clarify. But I think what he testified to was that he wasn't entirely sure what you were asking and to ask your next question. Mr. Moore.

THE WITNESS: Yeah. I have no idea what we are trying to accomplish here.

THE HEARING OFFICER: So I'm going to sustain the objection to the extent that you are asking him to interpret any legal arguments that may govern these proceedings, Mr. Piotrowski.

MR. PIOTROWSKI: Okay.

THE HEARING OFFICER: But to the extent you want to question him about how he determined who was an uncommitted mineral interest and an uncommitted mineral interest owner for purposes of the mailings you are welcome to ask those questions.

Q. (BY MR. PIOTROWSKI) Mr. Moore, were you instructed to send the notices to the adjacent owners? Or was that a decision that you made in your job as land man?

A. It was not a decision I made.

Q. Okay. Were you involved at all in the decision to mail to adjacent landowners? Or did you

simply execute that decision?
MR. CHRISTIAN: Objection. Asked and answered.
MR. PIOTROWSKI: I'm trying to make sure we are clear.
THE HEARING OFFICER: I'll let him answer that question. Go ahead, Mr. Moore.
THE WITNESS: I did not make the decision. I mean, it is the same question. Were they mailed? Yes. Did I make a decision to mail them? No.
Q. (BY MR. PIOTROWSKI) And in the case where you sought to identify the holder of a mineral interest you were able to do so; right?
A. Yes.
Q. And that includes the adjacent owners that you had to locate? You had no difficulty identifying them so you could provide them notice; is that fair?
A. That's fair.
Q. And presumably -- you've worked now in Payette County for a number of years it sounds like. Is that correct?
A. That's correct.
Q. And It sounds like -- would you say that from the quality of the Payette County land records you can identify the mineral interest owners in the surrounding



land sections if you wished to?
A. If we wish to; sure.
Q. Have you worked in states other than Idaho as a land man?
A. Yes.
Q. And would you say that in Payette County, Idaho the accessible land records are good, bad, average? Do you have an opinion about that?
A. Well, I mean, there is no standard. It varies. So are they user friendly. Some. I don't know. It is hard a question to answer. My experience is there is from zero information online. To Payette County has information online. It is all over the board. Each county is different. I mean, I don't know how to answer that.
Q. Fair enough. Other than the categories you have already testified that you said you researched and sent the notice to uncommitted mineral interest owners in the unit, uncommitted mineral interest owners adjacent to the unit, and you looked for but determined there were no working interest owners.
Did you send the notice to any other categories of people or entities?
A. That was it. Well, Payette County.
Q. Yeah. Besides Payette County. Now, Payette



County is also a mineral interest owner in this unit; aren't they?
A. Payette County is not --
Q. Is the City of Fruitland?
A. The City of Fruitland is.
Q. Okay. So you sent it to the City of Fruitland as an owner. And to Payette County because the statute requires that. Is that right?
A. That's correct.
MR. PIOTROWSKI: Thank you. That is all the questions I have.
THE HEARING OFFICER: Thank you, Mr. Piotrowski. Mr. Marotz, any questions for this witness?
MR. MAROTZ: Not at this time.
THE HEARING OFFICER: Any redirect?
MR. CHRISTIAN: No. Thank you.
THE HEARING OFFICER: May this witness be excused?
MR. CHRISTIAN: Yes, ma'am.
THE HEARING OFFICER: Mr. Moore, you are welcome to stay on and listen to these proceedings if you desire. Otherwise, you are free to leave if you have other things you would like to do today.
THE WITNESS: All right. Thank you.
THE HEARING OFFICER: Mr. Christian, your next



witness.
MR. CHRISTIAN: We call David Smith.

DAVID SMITH,
first duly sworn to tell the truth relating to said cause, testified REMOTELY as follows:

EXAMINATION
QUESTIONS BY MR. CHRISTIAN:
Q. Dave, can you tell us where you're testifying from?
A. I'm testifying from Houston, Texas.
Q. And what is your occupation?
A. I'm a geologist/geophysicist.
Q. And can you briefly describe your educational background as it relates to your profession?
A. Sure. I have a bachelor of science in geology from Virginia Tech in 1983. And I have taken a lot of additional classes in Houston in geophysics. And industry courses offered in various geologic and geophysical topics through the years. Continuing education and such.
Q. Have you worked in the oil and gas industry as a geologist and a geophysicist for some time?
A. Yes. Over 40 years. Since the summer of

1983.
Q. And can you briefly describe your professional experience?
A. I started actually working in college in summers --
THE COURT REPORTER: He is going to have to speak up. I am having a hard time hearing.
THE WITNESS: I will try to turn it up on my end.
THE HEARING OFFICER: Let's try that, Mr. Smith. If we need to turn the speakers off here in the room and do it from the laptop we can do that as well.
MR. CHRISTIAN: I'll give you the same instruction I have received many times over the years. Which is slow down and speak slowly. It is much easier for the court reporter. I have been yelled at many times in my career for going too fast.
THE WITNESS: Okay. I will.
Q. (BY MR. CHRISTIAN) All right. I think where we left off I was asking you to summarize your professional experience and you started by saying you did some work while you were still in college.
A. Yes. In the summers I worked on drilling rigs. And I just mentioned that because it gave me



real, in my view, valuable insight as to how operations are conducted in the field. And how well logs are acquired. And the quality of the data. And so forth. My first professional job as a geologist was starting in the summer of '83. And I have been employed in the oil and gas industry since then. And positions of increasing responsibility. I have worked at probably most of the productive oil and gas basins in the United States. And a lot of basins internationally. My experience is exploration and development. And also acquisition and evaluation of producing oil and gas properties. Specific to the Rockies. I have worked in Colorado and Utah. Idaho of course. And Oregon. Starting in the mid to late '90s in this field of area in Oregon. And in Idaho in 2012.
Q. And do you currently provide geology and geophysical consulting services to Snake River in Idaho?
A. I do. I'm also a working interest partner in the project.
Q. And as part of that work are you familiar with the proposed unit area involved in this proceeding, which is the NE 1/4 of Section 9 and the NW 1/4 of Section 10?
A. Yes, I am.
Q. And it sits just to the north of the unit for



the existing Fallon 1-10 well; is that right?
A. Yes, it does.
Q. And are you familiar with the application materials in this matter?
A. Yes, I am.
Q. And, in fact, you provided a declaration in support of the application that is part of the application materials?
A. Yes. I wrote a declaration based on my opinions in this area. And also constructed the exhibits.
Q. And can you -- and we'll get into more depth. But can you briefly state the conclusions that are set forth in your declaration?
A. I think the most salient conclusion is that we feel that we have very strong evidence based on our experience in the basin -- my experience in the basin -- our 3D seismic data. And the evidence from the local wells that we have drilled. And the geophysical logs that we have collected in those wells. And the production of oil, gas, and condensate in the area and very locally. That there is a very high likelihood of a gas pool comprised of Sand A and B. With a general outline as indicated on the exhibits. And we can get into specifics I guess.



Q. Is it your opinion that the unit area that is proposed reasonably describes an area that is economically and efficiently drainable by one well into those sands?
A. Yes.
Q. I want to back up and talk more generally about the information that you developed to reach your opinions and how. Can you briefly describe generally how you acquire information and knowledge about the geography in the area? I'm sorry, geology in the area?
A. Okay. Well, I was the vice president and geoscientist with the predecessor company that started up in here in 2012. And we were partners with that group. And we became aware of activity in Idaho. And we became interested in participating with a prior company, Bridge. And pursued a joint venture with them. They ultimately became insolvent and we acquired their properties from them, their leases, and some wells they had drilled. We, as a team, a pretty large geoscience team at the time, with a couple of very learned local gentlemen that helped us to get educated in the basin. And also with a substantial geoscience team here in Houston. We tried to become as educated as we could on the basin. Including lots of field trips. Review of all of the existing wells that had previously been

drilled. And tried to understand the complexities of the basin and how we might ultimately drill a successful oil and gas well here in this area.

It was my opinion based on the work I have done in Oregon that we needed to shoot what is called 3D seismic data. Which is an expensive proposition. But it allows you to get a very good image of the subsurface of the earth. And with our partners elected to do so. And in 2013 we acquired our first 3D seismic survey. And in subsequent years, 2014 and 2015, we acquired more of this 3D seismic in the area. And if I might use analogy. If you could imagine an extremely large chess board placed above the surface of the earth. At each one of the corners of the squares is a data point, common depth point, and we -- with a 3D seismic method you lay out a very carefully, precisely surveyed in series of areas that you input energy into the earth called a source point. And areas where you collect the reflected energy called a receiver point. And we will have what is called a spread. The recording equipment. Which literally has 10,000 to 12,000 microphones. It is a low frequency microphone call a geophone that will record those reflections from the subsurface of the earth. And we will very methodically go through and put energy using a large sort of a -- it looks like a



road grader with a vibrator on the back of it. And it sets the pad down and it puts energy at a certain frequency called a sweep into the earth. And it is recorded by all of those different receivers or geophones around. And this takes months to do this. And it is expensive. But what it does is it gives you a very good image where you have sufficient coverage of what is going on in the subsurface. The other thing it does is it eliminates a lot of the drilling of unnecessary wells or dry holes. Or unsuccessful wells. And the 3D seismic process itself is very low impact to the ground. And of course we maintain spacings around minimal distances away from houses and utilities and water wells and things like that.

Q. Were you responsible for designing the seismic project that covers the area that includes the proposed unit in this proceeding?

A. I was. I designed it, bid it out, supervised it, and oversaw the processing. And did the interpretation. And was the primary interpreter of it.

Q. Okay. Do you also derive information from other wells that either Snake River has drilled or someone else has drilled in the area?

A. Absolutely. We look at all of the available information. When we began this project of course we



had not drilled any wells. And what wells had been drilled were fairly widely scattered. But those were the wells that we used to help inform our thinking and drive our interpretations. Since we --

Q. Just briefly can you summarize how you get information from the drilling of other wells and how that information is presented?

A. Surely. The old wells might just have a lithology log where as they were drilling the drillers would record on a per foot basis the types of rocks that they were drilling through, i.e., sand at 900 feet to 920 feet. Something like that. Or it shows oil and gas that they got. Starting in the -- really more in this basin the '50s is when we started to get more modern logs. And then there was another scattered population of wells in the '70s. And then immediately preceding us was an operator called Bridge that drilled eleven wells. None of which were successful. But one of which had a good show of oil and gas. And we ultimately hooked it up. It was noncommercial. But it gave us confidence that there was a chance to find commercial oil and gas in the basin. And the more modern wells have -- after the well is drilled we will lower geophysical tools into the well and measure various physical properties of the rock. There is an induction log which measures the



ability of electrical current to go through the rock. There is gamma ray monitor that measures the amount of gamma ray radiation that comes out which allows you to make lithological or rock type descriptions. There is a sonic log which is -- it looks like a little torpedo and it puts sound into the formation on one end and records it on the other end and measures the speed as the sound goes through the rock. There is a density log and a neutron log that allows you to estimate the porosity of rock. We put all of these logs together and you can come up with an interpretation of what is in the subsurface. Is it a clay stone. Is it a sand. Is it a basalt. What is it. And so we will use the information gained from prior operators going back a hundred years. Some of the wells in this basin are 1902, 1903. And we'll incorporate all of that information into our thinking as to what is going on in the geologic history. And where we might find a sand or a potential reservoir that has oil and gas in it.

Q. In this case you are primarily targeting what we called Sands A and B; right?

A. Correct.

Q. And we'll get into this in some more detail. But the nearby Fallon 1-10 well, for example, did it encounter those same sands?

A. Yes, it did. And that was the second well we drilled in this area. I think we drilled eight or nine wells to the east of here when we drilled the Fallon 1-10. Immediately prior to that we drilled the Barlow 1-14 and -- on what we call our calibrated 3D seismic survey. And that Fallon 1-10 well was a dual objective targeting Sand A and Sand B. And when we drilled the well we found at Sand A approximately 12 feet -- which is what's called behind pipe right now. It is not being produced. It will be produced later when we complete the deeper zone. And it is producing oil and gas right now from Sand B. And it has produced about 1.2 billion cubic feet of natural gas. And I think around 20,000 barrels of condensate and natural gas liquids. I don't recall that number off the top of my head.

But to answer that question, using the techniques that we do, and the 3D seismic, prior to drilling we bought leases, formed a unit, drilled a well, all in anticipation of making a discovery in Sands A and B, which we subsequently drilled a well and did do based on the same techniques that we are using to presume to have a pool that is worth developing in this proposed new unit.

Q. And are there other sands below Sands A and B that you wish to explore in a well in the proposed unit?



A. Yes. We carried, as I said in this area, which we call the Harmon area, we carried the Fallon 1-10 well about 2,000 feet or so deeper than the objective A and B specifically. Because this is a -- what we would call a frontier, a lightly explored basin, to see other sands below it. And we got some gas shadows in Sand B in the Fallon 1-10 well. And we were able to use that information and drill a successful well later to the east of this area called the Fallon 1-11. Which is productive in those sands. And another reason to drill the Fallon 1-10 well deeper was to encounter what we predicted would be a basalt sill around 5,000 feet. I don't recall the exact depth. Which generated a very strong seismic response. We wanted to get a physical subsurface time/depth pair at that point, which helps us with forecasting and predicting our depth of the various formations in the area. So in this case with the proposed well, and the proposed new unit, we would intend to carry the well deeper below Sands A and B and sample a deeper section. Primarily Sands D and the ones below. We haven't -- assuming that we -- or presuming that we can get the unit successfully formed, and the drilling permit approved, we would intend to drill deeper.

Q. Okay. So as a basic matter, with a combination of seismic data, and well log information from a nearby well, can you correlate from formations found in the nearby well to what you would expect to find in the proposed unit area?



A. Yes.

Q. Okay. Can you share your screen with -- I want to go through your exhibits, the exhibits to your declaration, briefly at first so you can describe for us what they are. And then we'll go back through them in some detail.

A. All right.

Q. Rather than go A, B, C, can we start with Exhibit C to your declaration, which is, for the record, I think it is Exhibit SR-01 at page 17.

A. Can you all see that?

Q. Yes. Can you just briefly summarize what Exhibit C to your declaration illustrates?

A. Okay. There is a lot of information on here. But I will just start with a few basic things and then maybe we can come back to it. Is that right?

Q. Yes.

A. Okay. So I think the first thing to point out. This maroon rectangle that I am outlining with my curser is our proposed 320 acre unit. The proposed new unit. And you can see on the exhibit -- and this is



page 17. Exhibit C. It is annotated in maroon "Proposed New Unit Boundary." And there is a lot of information here which I'll get to as we develop this. But a couple of salient points that I want to cover real quickly. There are a couple of extracted what we call arbitrary lines. One thing I will point out just for -- before we get into what all of these colors mean, just to give you an idea of the scale, every one of these little boxes right here is a bin. And they are 82-1/2 feet on the square. So if you see that little bin there are all of these little stair steps. So that gives you some idea of scale. And so we have information from all of these thousands of points. And it is literally hundreds and thousands of points in the entire survey. Just for physical scale this unit is a mile -- roughly a mile east/west and half a mile north/south. So that is the proposed new unit. The existing Fallon 1-10 is denoted with the blue box and this blue dash. This is the existing Fallon 1-10 unit boundary. This little black square right here is the surface location where the Fallon 1-10 well was drilled. This black dash line going right here is the path -- the directional path of the wellbore in the subsurface. So typically what we do when we are drilling a directional well is we'll drill down about 1,000 feet or so and start the kick.

Meaning, you are starting the direction to drill a well in whatever direction we happen to be going. And then at around 1,100 or 1,200 feet we'll set what is called surface casing. The original casing would be the conductor set to about 200 feet. And then we'll drill the direction of the well. Where you see this little value, the 1296, minus 1296, that is the actual interceptive point where the Fallon 1-10 well encounters Sand B. It is called a dam. And then this additional part right here is the extended part of the well down to a total depth of -- it is covered up. But I think it is 5,300 feet or around there. So that is where the Fallon 1-10 well is.

Our proposed bottom of the hole location for the new well in the new unit, presuming that it is approved, the proposed bottom of the hole location would be in this area and the area where we encounter Sands A and B. The surface location would actually be just to the north of the Fallon 1-10 surface location in the same pasture on the west side of 95. And there would also be a slight directional deviation to the west.

So we'll get back to these colors in a minute. The red lines are some of the seismic data that I have selected to demonstrate the area of the presumed gas pool. There is a north/south line which is delineated



by this line. And there is a west/northwest line, east/northeast, that runs between these two faults. Which would be another line.

Q. And so those arbitrary lines those correlate with your other two exhibits?

A. Yes. Exhibit A and B are of this same arbitrary line, the north/south line, running through the proposed bottom hole location of the new proposed well. And also the Fallon 1-10. And A is the entire line that you see on this map. And B is just a zoomed in version where you can see a little more detail. And then one of the following exhibits, I guess D here, D is this west/east northeast one.

Q. So each of those -- and we can, for example, look at one of the other exhibits. Take Exhibit A for example. So what that shows is essentially a vertical slice of the seismic data along that line?

A. That is correct.

Q. Okay.

A. Again, going back just to refresh ourselves. We are going to be looking at this line here. And the area that you see on the map I selected this outline or cropped this map such that you see exactly the extent along this red line, the north to the south, running through the presumed well and the existing well. And



you'll see it also will show this little green fault to the south.

THE HEARING OFFICER: Mr. Christian, for the record, can you have him clarify that he was following the north/south line on Exhibit C when he was referring to "this line."

MR. CHRISTIAN: Yes.

Q. (BY MR. CHRISTIAN) Dave, when you were discussing the line that extends -- the red line that extends through both the proposed new well location and the existing Fallon 1-10 well, that is the north/south line?

A. That is the north/south line that is denoted as Exhibit A.

Q. And on Exhibit C that line has been labeled north at the top end of it and south at the bottom end of it; is that right?

A. It does. And also at Mr. Thum's suggestion from improving the original exhibits after he asked for some additional information, and for additional labeling, I don't think I had made them sufficiently clear, he asked hat I label them on the exhibit itself. So you'll see up here on Exhibit C I show that 1 is the known Sand B gas pool down to the south. 2 is the presumed gas pool that is untested. And then 3 is the



location of the 3D seismic lines and the two previous lines. And following that number 3 I have a 3 for following the line. And a 3 for the north/south line. So that is -- Exhibit A is along that line.

Q. Okay. And then Exhibit D is going to be along the -- is going to follow the path of the east/west line; right?

A. Exactly. The west/northwest. The east/southeast. Exhibit D follows along this path.

Q. And that second line is denoted WNW at the left end of it and ENE at the lower right end of it. Is that right?

A. Yes. That's correct. That stands for west/northwest. That is the west/northwest end of the line. And it goes traversing to the east/northeast. It should east/southeast. That is a typo in there.

Q. I'm just now realizing that.

A. I got it correct on Exhibit D here. I was probably not paying attention there.

Q. Okay. Before we move onto what I'll call the seismic slice exhibits for now. Can you just briefly explain what the different colors show on Exhibit C to your declaration?

A. I can. I think it might follow better and be more understandable if you go to the seismic at this

point.
Q. Okay. That's fine. Let's start with Exhibit A.
THE HEARING OFFICER: Mr. Christian, can I ask a question to make sure I understand.
MR. CHRISTIAN: Certainly.
THE HEARING OFFICER: So the 1, 2, 3 on Exhibit A, B, C, and D, they all correlate to the same thing? The 1's are all 1's. The 2 are all 2's. And the 3's are all 3's.
MR. CHRISTIAN: Correct.
THE HEARING OFFICER: Okay. So regardless which map you are going to look at 3 is going to denote 3 on all three, just from different angles, whether looking down or looking from the side?
MR. CHRISTIAN: I say that. But --
THE WITNESS: No, not exactly.
THE HEARING OFFICER: Okay.
Q. (BY MR. CHRISTIAN) Each one of the exhibits has a legend at the top which --
A. Exactly.
Q. -- tells you what 1, 2 or 3 means. On Exhibit A for example, you know, 1 denotes the Fallon 1-10 well. And, Dave, you can describe it for me.
A. Which one are you on?



Q. I'm looking at Exhibit A. So I'm trying to differentiate between what we were doing with Exhibit C.
THE HEARING OFFICER: I think that you clarified. Follow the legend on each individual exhibit. Not assume that 1, 2, 3, means the same thing on each exhibit.
MR. CHRISTIAN: Yes. I apologize for creating that confusion.
THE WITNESS: With that being said, if I may, if I can continue the labeling conventions here. So we are on Exhibit A now. And it is a north/south 3D seismic line. And it shows number 1, the existing Fallon 1-10 well on the right. And this is a known Sand B gas pool. And Sand A gas saturated sand. On number 2 right here on the left it is the presumed Sand B gas pool in the proposed new unit. I should have said A and B. That is A. It should have been denoted Sand A and Sand B. And then 3 proposed new unit boundaries (maroon dashed lines). So these are -- that is on the south side. This would be the common boundary with the proposed new unit area here on the left. And then this known reservoir area of Sand A and Sand B here on the right. And 3, as designated by the legend up here, proposed new unit boundaries (maroon dashed lines), this is where this arbitrary line crosses the unit boundary



on the north. And this is where it crosses the unit boundary on the south.
And just for clarity I'm going to scroll down to Exhibit C. So this is that same north/south Exhibit A line that we were looking at. And that point indicated on Exhibit A is where it would cross the presumed -- or proposed north boundary and the proposed south boundary. And, again, this is about half mile -- it is half mile north/south. The traversal line would be a little longer since it cuts it obliquely. And then east/west this is about a mile. And, again, it goes through the proposed new well and the Fallon 1-10 well.
Q. Okay.
A. So do you want me to talk about what this shows us? Or do you just want to go by question and answer?
Q. No. First, you have given some information about what Exhibit A shows. So I want you to describe how you interpret what the -- for lack of a better term, the squiggly lines, which is the seismic -- the illustration of the seismic data, your interpretation of what those show?
A. Okay. All right. So the first thing -- this is the north. This is the south end. And, again, this part of the seismic line runs through the proposed unit.



And then this is the existing unit in production. So what we are looking at. Let's go over to the right-hand side. And you see this legend. This dimension is timed. And that is how we record the information as it comes back. After we put a pulsive energy into the earth it travels down. And it goes down. And it is basically unmolested until it senses a boundary of some type. Something that causes it to reflect some energy back to the surface where we can then record it. So some energy is reflected back to the surface. Some energy is refracted and continues down below. And then is available to be reflected off of deeper layers. And so we record that as the time that it takes for these -- this is called a reflection here. Each one of these events is a reflection. And the first information that you get from them is structural based on the longer that it takes the reflection to get back to the surface you know that it is deeper just in a general sense. The longer it takes a reflection to come back is -- and you can imagine it being analogous to a submarine. It is a common analogy that we use for (inaudible). If you send out a ping you know what the sound, with the velocity of water, the velocity of sound is in water, it goes out until it hits another ship or something. You hear a ping. And then you hear ping when it comes back. You

can measure that time. And knowing the velocity of water you can solve from a distance. If the velocity of sound and water is -- it's right around 5,000 feet per second. It depends on temperature and solidity and things like that. But you know if you make a pulse in the water, and you hear something come back two seconds later, you know you have pinged something basically 5,000 feet away because it took a second to get there and a second to come back.

Q. Okay. So just to clarify then. When you are sending seismic energy down through the rock you have got some knowledge of how fast the signal will travel in a given kind of rock. Am I correct that there is also a difference in the speed at which the signal will travel depending on whether you are going through an area that is saturated with water or not?

A. Yes.

Q. Or with a liquid, let's say?

A. Yes. That is one of the factors that we deal with in trying to get an accurate depth prediction using seismic. Because near surface it is generally a little bit faster than the velocity of water. It might be around 6,000 feet per second near the surface. And it gradually increases to 6,100, 6,200 feet per second, as an average. Getting down to 7,000, 8,000 feet per



second. But every time you cross a little -- a different layer of rock it can vary. If you get what is called a marly layer. It has calcium carbonate in it. It's like adding lime in it. Calcium carbonate. That can be faster. But in any case that's -- those are some of the things that we use to get our depth information.

Q. Okay. Now a couple of features that are illustrated in the seismic data I'm going to ask you to explain. Essentially the lines that go from the top to the bottom. They have a couple of different features. One is at different times they will bend one way or another. And there are also areas that are colored black. More or less black.

A. Yes.

Q. So can you explain what those two things mean?

A. Okay. Let me back up just a little bit and explain what a trace is before we answer that.

Q. Sure.

A. So each one of these little squiggly lines you see is called a trace. And that represents reflections from a particular point in space. And each one of these represents one of these bins that you see on the map. So, for example, when you come across here -- I counted them up the other day. It is actually about 100 traces on this piece of line that I showed as Exhibit A. You



can sit here and count them. I think it was 98 or 99. But each one of these are 82-1/2 feet apart. And so this is half a mile from here to here. And I measured this distance many times from where we want to drill this proposed well to where the Sand B was intercepted it is about 3,000 feet. So there is probably about 34 or 35 traces in between there. But this is an actual record of the reflections from that particular point. That little point on the chessboard. And then as you go deeper in time those are the reflections from, as you get deeper in that spot, if you drilled an imaginary well here, or here, or here. Or where the existing well is there. And so the first information that we can get from this, as I said, is structural. You can tell that this particular event right here is shallower because it came in -- a reflection of it came in quicker. It is about 930, 940 milliseconds. And then here in this area it came in at about 980 milliseconds. So you can tell that this is deeper. And just as a rule of thumb it is not exactly accurate. But it gives you some analogous -- every millisecond is about four feet. Three-and-a-half to four feet. So from 900 milliseconds to a 1,000, that is roughly 350 to 400 feet. Something like that. So this is showing about a 2,000 interval north to south. Or top to bottom. And it is about -- I



think it's a mile-and-a-half or so. 8,000, 8,300 feet, something like that, east/west.

All right. So what -- your question was what do the little wiggles mean?

Q. Yes.

A. That trace -- what it is saying is that -- and what you can see there is a lot of -- this little black thing. That is called a peak. So each trace is where the geophone -- basically you can think of it as going up or down. If there is a compressional pulse -- if you're -- this is -- we are recording the compressional pulse. The reflection from that. If it is going -- if the sound is going through something that is harder or denser it generates a little peak. That is one of these things. So you can see that this particular bed that the reflection is coming from is slightly harder than this right here. This is a trough. So each -- if I just zoomed in on that. This area on that trace that's a trough.

Q. So just for clarity. A peak is more or less a bend to the right in the trace and the trough is a bend to the left?

A. Exactly. That's the SEG convention.

Q. And now there some areas that are black or darker. Can you explain why that is?

A. Okay. So we have talked about what a peak is. And then what a trough is. And in general -- or in absolute if something -- if the sound is reflecting off of something that's -- this is soft above and hard below. It is going to generate a peak. And the magnitude of that departure from the zero line is called amplitude. So this would be a moderate aptitude where you see a peak like that. When you see a really strong peak like that that is called high amplitude. That is a much stronger departure. Or a peak. It is a high amplitude peak. This is high amplitude trough. And so something in here is saying that I am very slow and very not dense. And that is presumed to be the Sand A gas reservoir. Likewise, below here, something in the Sand B interval, known to be Sand B interval over here, the sand is very soft here and harder down here. So Exhibit -- let me zoom out a little bit. I did the same line in Exhibit A. Exhibit B is just essentially the central portion of Exhibit A. It is the same line. And I just zoomed in on it so that we could look at that in a little more detail.

Q. Okay. So now that we are on B let's describe the notation that is on it so it is clear for the record?

A. Do you want to go back to A?



Q. I had one other question about A.

A. Let's do it.

Q. Which is getting to the bottom line. Which is am I correct that part of how you identify a presumptive sand that you want to explore is looking for strong peak and trough amplitudes?

A. Yes. Except it's trough/peak. Not a peak/trough.

Q. Sorry.

A. And, again, this assumes zero phase data. I am not going to get into the phase of the data. But that is something also that you need to have to make any kind of fluid interpretations like we are talking about. And that is another reason why we purposefully drill deeper wells sometimes to come into contact the basalt layer. Because basalt is extremely hard and dense. And you know that that is going to generate a peak event. And then you got to make sure your seismic agrees that it is at the phase that you think it is at.

Q. Okay. So as a general proposition this seismic slice, like we have in Exhibit A, is a way of illustrating where you can identify a presumptive gas sand?

A. Yes. And this is just -- it is called an arbitrary line because I picked it out on purpose. Not



arbitrarily. But that is what it is styled as. So that we can demonstrate various salient features that we will get to. The location of the proposed new well. And then run through the existing well where we have some known subsurface control. But in reality I have the ability to pull up a line. I can do what is called pull up a cross line. And just look at all of the cross -- every line. Just dit, dit, dit, dit, dit. And go through -- roll through thousands of cross lines or end lines that run this way. Or arbitrary lines that run a particular direction. So there is actual countless hours of interpretation that go into figuring out what the subsurface is presumed to be.

Q. One more question on Exhibit A before we move to Exhibit B. There are some other lines of different colors. There is a green line off to the right. And a purple or maroon line further off to the right. And then a reddish looking line off to the left that angles. What do those illustrate that?

A. That's what is called a fault. And what that is is -- that is where you have -- for example, up here you can see this particular reflection that I have got the gold on here. The colors on top of that. These are interpretations from me. The base data, the actual recorded process -- recorded, collected, and processed



data is the black traces. Anything you see on that -- like this is a rise. And this is my interpretation of that. And actually the software will snap to the highest amplitude. Or you can pick it manually. Whatever.

Q. So --

A. And these are just called horizons.

Q. -- just for clarity. Where you have drawn a line through -- where the software has drawn a line through one of those amplitude events?

A. Yes. This is what we called a horizon. This is my interpretation.

Q. Okay.

A. But the software that I use, the interpretation software, will essentially automatically pick that in the highest amplitude spot where there is a trough or a peak.

Q. Okay. Back to the faults. What is the purpose for identifying and illustrating the faults in the exhibit?

A. Okay. So as I said earlier, the time information that you can see, if you are interested in a particular horizon, this gold one that I'm pointing at, for example, you can see that it came in -- this reflection came in later. It is about .98 seconds

versus over here .934. So this whole horizon would be shallower over here and deeper over here, etc. Over here you can see the Sand B horizon as I have interpreted it. It is higher here. It came in quicker in time. It goes deeper. And then it comes across the saddle there. So this is continuous across here. But you will also see various places where there is sort of an abrupt termination. And you can see that it is not just that one reflection. All of these horizons have essentially terminated there. Likewise over here -- this is an exhibit. I can't move the box. But if I move this box out of the way you can see that this horizon here at about 940 milliseconds is offset to about -- let's see, it is probably about 930. It is offset to about 950 or 960. So this is the same event. It crosses this green fault. Now, it is lower over here. So this is what is called a fault. And this happens in the subsurface as the basin adjusts. In this case we have a lot of intrusion of basalt sills and dikes. Which I think drives some of this local faulting. Imagine the sedimentary section inflating from volcanic sills being in place at that depth. It also -- just as a basin -- there might be some basin faulting that gradually adjusts. And the sediment will fail along a particular surface called a fault. And you



can determine those by watching the terminations of these reflections. And then mapping it. And seeing if it holds together. And these faults are generally at 45 degree angle. If you find something a lot different than that you probably have a bad data problem or it is not a fault. But that is part of the interpretation process is mapping shallow reflectors, middle reflectors, deep reflectors, all of they way down to see if your theory -- if that was a fault. If it holds together or not. In this case I have done that. And mapped it. And this is a fault right here. This maroon line on Exhibit A. That is down to the northeast fault. And this green line right here is a down to the southwest fault.

And going back to Exhibit C. You can see where the Exhibit A line was going. And we looked on the north -- or the left-hand side of it you can see this maroon fault right here. The little sort of tent symbol means that's the downthrown side. So the sediment is higher on this side. On the south side. And lower on the downthrown side on the north. Likewise here, this green fault, it's a down to the south fault. You see a little tent symbol on there. The northern part of the fault is high. And the southern part is low. And we are just going to look at those. Again,



line A. Exhibit A. And that was where we are mapping Sand B. This is the green fault on the south. And you can see this reflection here -- starting up here this reflection has been faulted to there. This reflection has been faulted to there. And this reflection has been faulted to there. And this reflection been faulted to there. And it continuous. And the fault takes a bend right there. Likewise, on the north end, you don't have a whole lot of lines to see here. But this maroon fault is down to the north. And this is the lowest side. And this is the highest side. So as much as I would have liked to going back to Exhibit C, as much as I would have liked to have disconnected these faults, the green and the maroon down, and I spent a lot of time trying to resolve this fault situation in here, they don't. As an explorationist you like to have one very easy explanation. And one continuous fault would be that explanation. But we don't have that. In this case you can see you're losing structure to the northwest/ northwest. And you also lose sand. You lose the amplitude. And that is what the state --Mr. Thum asked me to provide additional information showing this west/northwest to east/southeast traverse.

Q. Can we move onto Exhibit B.

THE COURT REPORTER: Before we do that can we



take a break?

THE HEARING OFFICER: Sure.

(Recess.)

Q. (BY MR. CHRISTIAN) Dave, I think we left off discussing Exhibit A to your declaration. Which for the record is Exhibit SR-01 at page 15. Before we go on. For clarity of the record when you are using the curser on your screen to identify something can you identify where on the page you are in terms of direction and location so that what you are doing will track in the transcript?

A. Yes, I can.

Q. Just as a summary of questions before we move onto Exhibit B. Within the dashed red lines on Exhibit A to your declaration, which is the proposed unit area north and south boundaries, the two what you called horizons that are described within in it, are those what you have called presumed Sands A and B inside the unit?

A. Yes.

Q. Okay. And is it -- well, I will get the the ultimate question in a bit. Let's move onto Exhibit B to your declaration. Which is page 16 of Exhibit SR-01. I think you described earlier that this is a zoomed in view of the same information on Exhibit A. But within the boundary unit. Is that correct?

A. It is.
Q. Actually, it shows the south unit boundary. That dashed red line down the middle. And then to the right of that is the Fallon 1-10 well. And the sand that it intercepts. Right?
A. Yes.
Q. Then to the left of the dashed red line, that would be from the south boundary of the proposed unit configuration toward the north. Just summarize for me what that illustrates?
A. Okay. So the -- one of the sort of principles of science that we use in exploration is work from the known to the unknown. And the simple to the complex. So from the known, what is known on this, we know that this is shallower. And this is deeper. And by shallower I'm pointing to the top of the exhibit. And deeper I'm pointing to the bottom of the exhibit. We know that we have good quality 3D -- very excellent quality 3D data in this particular area. And we also drilled a Fallon 1-10 well here.
Q. Which is on the right side of the exhibit?
A. Exactly. And it is a directional well. And you can see where it was coming through. I notice that had Mr. Thum filed some log sections which I'm looking forward to hearing the testimony there. It is basically



expanded versions. And I'm kind of kicking myself. I probably should have put that in. And I didn't. But I'm glad he did. But in any case these are what is called log curves.
Q. Well, let me clarify. What you are referring to is sort of a jagged orange line that follows along the course of the Fallon 1-10 wellbore; is that right?
A. Yes. I'm referring to that. This jagged looking gold/orange line is what is called the gamma ray. And it is showing the values in the wellbore recorded on a per foot basis all of the way down. And the utility of this is where you have the lower gamma ray readings. And the scale on this would be low on the left. Higher on the right. Higher gamma ray readings indicate clay stone or shale typically. Because of the potassium in the clay minerals. Lower gamma ray readings indicate a lack of radioactive elements. And more things that are nonradioactive like quartz. So you can see this departure on the gamma ray here where I have called it Sand A. And Mr. Thum's exhibits will show that in more detail. And then this large departure down here is Sand B. This is the large thick Sand B unit.
Q. And you are referring to part of the orange line that intersects the area shaded in pink on the



right side of Exhibit B?
A. Exactly.
Q. So just for clarity that orange or gold well log line, you have taken information from a well log and overlaid it on a picture of seismic information; is that right?
A. I didn't overlay it. I just asked my work station to display that. You can ask the software to the display a particular log curve you want and what the physical readings are. And this is just a good example of one that is relatively determined to --
Q. Okay.
A. So there is some manipulation on my part. It's exactly scaled and raised in units. And you can see it on the logs that will be I assume shown later.
Q. So the area where it intersects the pink, which is Sand B, on the right side of Exhibit B, the gold line jumps quite a bit further to the left. Why is that?
A. It jumps further to the left because it has less gamma ray radiation. That means there is less clay minerals. Less potassium basically. And so it is showing that this is -- where my curser is -- I'm pointing to where it says the top of Sand B.
Q. Yes.



A. And then down you can see that it is still departing from the zero line, which is where the wellbore is. And then it comes back in below where the arrow is. As Mr. Thum's exhibits will show there is a portion of the sand below the gas/water contact that is water saturated. And you still have sand down there. But the event that is most obvious and apparent on the seismic data here is the boundary between the gas saturated sand above -- and I'm basically moving my curser where I have a pink area described, or a light red, and the peak, the underlying peak, which is an indication -- the seismic is saying I'm getting a strong positive reflection here from something that is relatively flat and is higher density and higher velocity below than above. And above that where I have the Sand B annotation you can see a large trough developed. And that says -- the seismic is saying I have a lower velocity, a lower density event in here. So that is what I map that horizon on. You can see where I am starting at the right-hand edge of the seismic data and I'm mapping that trough down and through the wellbore and then continuing down. And in that trough where I am -- the red trough actually intersects the top of the blue horizon. That is now actually the top of Sand B. And so what happens is you

actually get a polarity reversal with these sands. When you put gas in when they are full of water they are a weak/positive reflection. Where I'm showing my curser right now where the blue line is. And then continuing to the north. All of a sudden you develop a trough on top of it. And the presumption here is -- the interpretation is that at this point it becomes gas saturated. Not just because of the amplitude and presence of a low velocity interval, or presumed low velocity interval, presumed gas sand, which would be represented by this low velocity interval, but also coming out of it the strong peak underneath. You always try to take as much of this information and incorporating them together as possible. So this trough here, with a trough on top, and a peak on the bottom, is very indicative oftentimes, not exclusively, but oftentimes, by the gas sand. And that is what we tested over here, this trough on top of this peak, successfully. In the pre-drilling we predicted that we would have gas in Sand B and it will be thick. And also that we would have gas in Sand A and would not be as thick. And so we --

Q. And you are discussing right now what you encountered in the Fallon 1-10 well?

A. Yes. And then by analogy -- I apologize if I



have gone too much into the weeds with people. But I do want to explain the basis. We didn't just randomly select this unit. It is very deliberately determined. And the interpretation and the amount of expense that we have put into acquiring good 3D data, and the amount of time I have spent interpreting it and incorporating it with other known information in the basin, allows us I think to be as precise as we can. Which is still not that precise when you get down to it. It is still -- we are listening to the the ground vibrate. So I try to push the interpretation as far as I can. But we still have to deal with the limits of resolution of the seismic method. And so I will try to point those out as we go along.

Q. Okay. As --

A. Go head.

Q. I was going to say to summarize what you have just been talking about am I correct that you interpret, based on how you have notated on Exhibit B, you interpret the horizon line at the top to be the top of the sand. And the black peak event below to be the -- where the gas/water contact occurs. Is that right?

A. Yes. It can be -- in various places it would go back to Sand A -- or, excuse me, Exhibit A. In the region that I am pointing at now.



Q. Right.

A. Where the Fallon 1-10 well is. This is most likely a gas/water contact that we are imaging. Because it is a very strong trough/peak combination. A very strong peak. And it is relatively flat. Going to the right, where you can see that the event has some structural character, it is climbing, that is -- my interpretation that is the base of the sand. And it is also a lesser amplitude reflection. Going from a gas sand to clay stone is not as strong of a contrast as going from a gas sand to a water sand. That is a very dramatic reflection. So the interpretation here -- it's basically -- it is a combination horizon. Here is the gas/water contact presumed and confirmed by the geophysical logs running the well. And I'm outlining with my curser this high amplitude peak in the area of the Fallon 1-10 to the south of that where the event reflection climbs. It is a lower amplitude peak event. And that would be a base sand reflection.

Q. Okay. Just for clarity. Can you just real briefly describe what we mean when we say gas/water contact?

A. Certainly. So if you had a jar, a big jar, and you put marbles in it, all the same size, more or less, and you filled it up about halfway with water, and



put a big stopper in it, the air would be on top and the water would be at a flat level. And that would be the air/water interface. Well, the principles of physics remain the same in the subsurface as they do on the surface. And so that is what happens in a gas reservoir at depth. If there is a thick sand that is water bearing. The gas will form a -- essentially will keep accumulating into the track and pushing the water out and it will form a flat surface called a gas/water contact. And if you have a sand that is thick enough sometimes you can image that with seismic. And we think that that is what we are imaging here. And now I have moved to Exhibit B. And I say that because we have drilled this well. We have logged it. We have found -- I don't remember exactly. About 90 feet or so or 100 feet of gas on water. The lower part of the sand is water bearing. And Mr. Thum's exhibits will show a geophysical log requiring the wellbore. But what was predictive using the seismic actually occurring is the prevailing truth in the ground. That there is a gas accumulation on top of a water bearing lower portion of the sand. And it does generate a strong reflection.

Q. So based on the seismic data that you have developed, and your experience in the Fallon 1-10 well, you expected to encounter the same condition in presumed

Sand B within the unit area?
A. I do with some qualifications. Again, the timed information is useful to determine structure and whatnot. And depth. Presumed depth. And here you can see that the gas/water contact is proved -- proven in the well is in 1388 subsea. I don't remember the measured depth. And recall that we are -- the surface elevation here is about 2,150 feet roughly. Plus the 1,388. You are looking at whatever that math is. 3,400, 3,500 feet, 3,600 feet vertical. But the measured depth is going to be quite a bit more.
Q. I'm going to stop you for just a second so we can have clarity in the record for the hearing officer's benefit. So when we have a number that is subsea. That is a number that is measured -- the number below sea level; right?
A. Below sea level; right.
Q. When we have a measured depth we are talking about the distance from the top of the well through the wellbore to whatever the point is you are measuring; right?
A. Exactly.
Q. Which in the case of the Fallon 1-10 well, for example, is not vertical because it is a directional drilled well; right?



A. Correct.
Q. And then if you are referring to a true vertical depth that is the distance from the ground vertically to the point you are measuring?
A. Exactly.
Q. All right. Please go on.
A. Okay. So the point I wanted to make. You asked is this area -- and I'm pointing to the area that I have covered light red -- is this area similar to the unknown area where we presume a gas pool to exist. And my answer is yes, with qualifications. And the similarities are it has the same type of amplitude in the trough event above. And peak event below. Which are consistent with a gas bearing sand. As the known gas pool on the adjacent unit -- existing unit. The differences are -- I think that this gas/water contact, which is known to be at 1388 subsea, it is coming in -- if you look at the time annotations on the side it is coming in at about 1.209 milliseconds. And as you go to the north you can see that there is sort of a little kick up. And then you're climbing in structure to the north. You cross the unit boundary. You just have a weak, low amplitude peak. And then all of a sudden you develop this trough amplitude above it. And a strong peak amplitude below it. But this peak at the area of



the well is at a higher time -- or a lower time, i.e., shallower depth.
Q. When you refer to the well you mean the proposed well in the new unit?
A. Yes. Proposed new unit well. And I have put a little box here. So the time of that peak event, which could be a gas/water contact, or a basin sand event, based on the strength of it I think it may be a gas/water contact at 1.186 seconds. So you can see that is 23 milliseconds higher. And using the time/depth information we have gathered through multiple wells in the area the predicted gas water contact would be 1294 subsea. Approximately 100 feet higher than here. And I make that point just to demonstrate another point to suggest this is not a common accumulation. It is probably a -- I presume it to be a gas/sand accumulation in Sand B. But at a higher elevation. And with a different gas/water contact. And this pool, presumed pool, unknown, than the known pool in the Fallon 1-10 existing unit to the south. That is what the seismic information is telling us.
Q. And have you engaged in the same interpretation with respect to Sand A above Sand B?
A. Correct. I didn't want to make -- I have already made these exhibits somewhat complicated and I



didn't want to make it any more. My thesis would be that this area, by amplitude, with a strong peak underneath, high amplitude trough, and I'm pointing to Exhibit B, under the proposed unit well where it says Sand A on the left and minus 1139. That would be the predicted subsurface of top of Sand A. There is a big trough there. And underneath of that is a strong peak. I would interpret this to be Sand A gas charge. And where you lose that trough-peak amplitude coming down the structure it becomes unproductive at some point. It is known to be productive over here at the Fallon 1-10. It is about 12 feet. And, likewise, going to -- so that is the north/south line looking at the west/northwest to east/northeast line.
Q. And you are looking at Exhibit C when you say that?
A. Yes. I'm sorry. I'm looking at Exhibit C. And I am moving my curser along the west/northwest to east/southeast line with a 3 on either end of it. It runs from the northwest corner of the proposed unit to the southeast corner of the proposed unit. And my annotation is incorrect. It should say east/southeast. ESE. Not ENE. But that is the line I'm going to be looking at as Exhibit D. That is this one here.
Q. Okay. So Exhibit D is a different slice of

the seismic information through the proposed unit area. Essentially not exactly at a right angle to the other Exhibit A. But it is at a different angle from it going through the unit at a different direction; right?

A. Yes.

Q. Okay. Does it contain the same illustrations about, for example, the proposed unit boundary? In this case it would be the east and west boundaries; right?

A. Yes. And so looking at Exhibit D. There is a legend at the top that says where it is. It is a west/northwest to east/southeast 3D seismic line showing number 1 -- these are the reflections that represent the presumed Sand A gas pool on top of Sand B. And that trough-peak pair. And the Sand B trough-peak pair representing that Sand B presumed accumulation. And then number 2, the annotation number 2, proposed new unit boundaries displayed on the seismic line (maroon dash). And I'm using my curser up and down showing the one on the east/southeast on the right side annotated by number 2 within the unit boundary. And then on the left the unit boundary and the maroon dash also annotated by a 2. And at the same point here is the amplitude of the trough and the peak for A. You can see it is clearly contained within the unit boundaries. And likewise for the presumed -- or the reflection representing the



presumed Sand B gas pool is contained -- and I'm pointing to the middle of Exhibit D. And underneath the number 1. The proposed new unit well is a vertical black line that the 1 is on top of. And on the top, just to the left of the line, you see Sand A annotated. And to the right is a data value minus 1139 subsea. And there is a trough-peak pair there that I'm interpreting to represent gas in Sand A. And following the Sand A event to the left or west/northwest it dies out. Following it past the proposed new unit well and to the east the amplitude of the trough event dies out before you get to the unit boundary. And I have haven't interpreted it -- or I have interpret it, but it is not turned on. The peak event underneath -- if you turn on all horizons you can't see anything. I don't have the horizon turned on. But you can see the peak event as strong amplitude dying out to a weak amplitude in either direction. And likewise below that, still under the proposed new unit well, you can see where the Sand B reflection is indicated. And the GW, representing the presumed gas/water, relatively flat. And you can see that dying out to the west and to the east. All consistent and staying within the unit boundaries. And my interpretation is -- when you look at just one line you might convince yourself of several of many things.



When you look at countless lines, and look at every one of these traces, you develop a common interpretation. And what I see consistently is this termination of amplitude of the trough-peak event representing the presumed Sand B gas pool along a particular pattern. And that is what I have indicated -- going back to Exhibit C. This black dash line. Sand B Termination (Black Dash). It is a very linear feature when you look at the rest of the 3D line. You recall that we have 300 square miles of 3D seismic out here. We are looking at about maybe one mile square of data right now. But this consistent termination of amplitude is mappable. And it does add complexity to my proposed trapping mechanism. And that to trap this presumed gas pool I'm relying on this maroon fault here. And I can't even map an event on the northeast side. There is no amplitude out here. And then there is another fault here. So I feel good about the trap along that maroon fault. And as I said I would have loved if the interpretation showed that this was one fault. But it doesn't. It clearly doesn't. And you can look at countless lines through here and you can see that this maroon fault is separate from this green fault. So the amplitude does terminate in here.

Q. I just want to make sure for clarity. We are talking about Exhibit C to your declaration which is



page 17 on SR-01.

A. Yes.

Q. When you say the maroon fault you are referring to the dark faulted area that sort of trends from the northwest to the southeast kind of mostly in the east half of the proposed unit area; right?

A. Yes.

Q. Okay. And then you have described this green fault. Which is to the northwest that has sort of a fork shape. Those are two different faults.

A. Yes. There is a little splay on the south end.

Q. You spoke about a trapping mechanism. First just generally explain what you mean when you say a trap?

A. Okay. So let's go back to Exhibit B. A trap is anything that impedes the gas from escaping from a reservoir. And a reservoir or a pool is, in this basin, typically in the sandstone. Going back to the marble analogy. In the pore space between the marbles, which would represent our sand, gas can accumulate as it is generated from deeper organic material. And it will generally escape unless it is trapped somehow. And if it is trapped in a porous medium, like a sandstone, and that could be structural like here, this is basically a

little what we call a saddle or a little low spot. It gets higher more on the side of the structure here. So there is impermeable clay stones above that prevent the gas from escaping. In this case I think, if we are proposing a new unit well, part of the trap is this maroon fault here. It doesn't show you all of the evidence. But there is a large amount of evidence for the existence of this maroon fault.

Q. And you are pointing to the left side of Exhibit B?

A. Yes. I'm on Exhibit B.

Q. On the left side that is where you are identifying the fault? It kind of dies into the label proposed new unit well; right?

A. Yes.

Q. All right. So your view is that that fault acts as a trap on the north -- to the north?

A. Yes. Again going back to the exhibit. So here you can see a clear displacement of this reflector. And this reflector down to here. And this reflector comes down here. Going back to Exhibit C. We were looking at this fault. Which is down to the north. And I'm pointing to the maroon colored fault that runs along the northern portion of the proposed unit. And it is very clear, but it does what is called dying out. Which



means it stops being a fault and there is no offset on reflections above or below beyond this point. But the salient point -- and that could be a leak for this trap. But the salient point is the amplitude also terminates there. And it is very close to my Sand B determination that I can map on the eastern part of this feature and well to the southeast. That was also demonstrated with Exhibit D where you can see the -- this map has the amplitude of -- and you asked me to explain this earlier, and this is probably an appropriate time, what these colors mean. So over here on the right is the color bar scale. And zero on the low end is dark blue going to the lighter blues. And then the hot colors is the red. And these are 3,000 amplitude units on the high end. So this would be a strong amplitude. Or a weak amplitude. The higher the number and the hotter the color the stronger the amplitude. So what you see is a large area of high amplitude. And I am mapping the amplitude of the peak. And I have denoted that just generally with this large outline as being the approximate boundaries of the presumed Sand B gas pool (orange dash) based on amplitude strength of the peak. And specifically looking at an example of that. Let's look at the Exhibit D. The west/northeast to east/southeast line. And both of the lines by the way



intersect and cross at the presumed -- or the proposed bottom of the hole location. But lets look at that amplitude character along that line of the Sand B event. We'll just go down to that.

Q. So now we are looking at Exhibit D, which is page 18 of Exhibit SR-01.

A. Yes. I'm starting in the middle of the exhibit where the proposed new unit well is. It is denoted by a black line going down through Sand A and to the Sand B reflection. And we are looking at the peak of it where you see a GW. Presumed gas/water. You can see that -- if you blew up on that you can see that these are high amplitude trough. High amplitude peak. And the peak event gradually just fades out. And then it -- it is still there but very weak.

Q. And you have indicated going toward the west; correct?

A. Going towards the west/northwest; correct.

Q. So is it -- am I correct that the green line below it, and the maroon line above it, are correlated with the two faults that you have shown on Exhibit C?

A. They are.

Q. Okay. So is it your interpretation that the combination of the two faults, and the decreasing amplitude in between them, that combination of things is



what acts as a trap to the north and the northwest?

A. Yes. And I'm going go back to Exhibit C. So the lack of amplitude in this region to me suggests that there is no strong -- there is no strong reflectivity in there. Either a trough or a peak. If you looked at the amplitude of the trough event and the peak event they are strong in this area where I have drawn the orange outline. And it just fades out. And so my interpretation is that the sand essentially pinches out. And that is somewhat confirmed by going back to Exhibit D. If you look at the character of this reflection. Where this trough just sort of loses amplitude and then goes into a weak peak. The sand terminates. This is the exact same type of response that we get a trough-peak pair terminating into a weak peak at the edge of the sand when we go -- when we map the edge of the sand to the south. And that is supported by the fact that -- at pre-drill we said we are going to have a thick Sand B. There was -- Bridge had drilled a well called May in Section 13 a couple of miles to the east of here. It had no sand in the B section. And we propose this is the trap for the Fallon 1-10. This stratographic termination. And we were successful in finding A and B. And both A and B have a stratographic termination to the east. And I think that is because there are

probably fluvial sands that run similar to the --
THE COURT REPORTER: Slow down again. You tend to get going.
THE WITNESS: Sorry. The remark I was making is that the -- on Exhibit D, the termination of this trough-peak pair, where I am pointing, to me indicates the stratographic termination, or we call it a pinch out, of Sand B. So this would be a stratographic trap. And I see this same seismic character elsewhere in the basin in the local area. And it is documented and proven by the lack of Sand B in wells to the east. And the lack of Sand A in the wells to the east. Small samples size. But nonetheless six or seven wells.
Q. (BY MR. CHRISTIAN) Okay. If you can go back to your Exhibit C for me. So we have discussed your views on the trapping mechanisms to the north and northeast and to the northwest. And I think you had started referring to your interpretation of how it worked to the south. Can you expand on that?
A. Yes. So I think if we go Exhibit A. This north/south line. What you'll see is that there is a high area to the south in the existing Fallon 1-10 unit and well. And then there is a saddle or a low area in this area. I am basically running my curser near the common boundary between the proposed new unit and the



north edge of the existing Fallon 1-10 unit. And then you come back up as you go north onto a separate structure. So let's look at that on Exhibit A.
Q. So when you are referring to a saddle you mean an area -- a lower area?
A. A lower area; right. If you could imagine this as two peaks. Here is a peak. And I'm pointing to the structure that the Fallon 1-10 is on. And here is a neighboring peak where the proposed unit well is. And there is a low area in between. We call that a saddle. And so what you see is that the amplitude -- I'm now pointing to the area of the proposed new unit well. And you can see that the amplitude of the trough is present, the trough-peak pair, at the proposed unit well. And then going to the south the amplitude of the peak diminishes dramatically, as does the amplitude of the trough, until you get to the unit boundary. And likewise the amplitude of the trough and the peak associated with Sand A also diminishes to the south. So the trapping mechanism to the south, and going back to Exhibit C, it is low to the south in this area. And it is also low to the southwest. The structure dips away from this -- from the green fault and maroon fault to the southwest. And you can see that there is -- there is lot of noise to the data. You can't literally



interpret every little bubble and wiggle. But when you look at the mapping, the trough, and the peak, and various other attributes, we use what is called AVO. Which stands for amplitude versus offset. It is another way of looking at the seismic data. It helps in determining whether you think gas may be present or not without getting into the details of how we do it.
Q. Okay. I think we have -- you'll correct me if I'm wrong. I think we have discussed it a fair amount of length your interpretation of the data to reach conclusions about the presence of hydrocarbons. And the trapping mechanisms with respect to Sands A and B in the proposed unit area. The last thing I want to talk about is you indicated that there is -- there are some presumed sands at greater depth that you would wish to explore. Can you, let's say, on Exhibit A, identify what you are talking about?
A. All right. On Exhibit A, under the number 1 where it says Fallon 1-10 existing well, starting just under that label, and going down, you cross where I have identified the reflection associated with Sand A and Sand B. We discussed those at great length. Underneath that, continuing deeper, you see the curve. That sort of jagged looking gold curve again is the gamma ray. And the regions that I'm pointing to there is a lot of



character to the gamma ray curve. There is a lot of sands down here. And when we drilled the Fallon 1-10 we specifically wanted to sample this and be able to test it and run our higher resolution geophysical logs across it and see what's the quality of these sands. Is there good porosity. Are they thick sands. Are they thin. Those sorts of thing. Is there any gas there. Is there any oil there. And we also wanted to drill deeper to sample the slope, which is deeper than this arbitrary line shows, to get a time/depth pair. Which we did. But we found some gas shows. And a gas show is a small amount of gas not commercial. But when you are drilling a well you get some gas coming out of the rock as you are drilling it. We were able to correlate those gas --
(Screen froze.)
(Recess.)
THE HEARING OFFICER: We are back on the record.
Q. (BY MR. CHRISTIAN) Dave, do I have you?
A. Yes.
Q. I think where we left off I had asked you about your interpretation of the -- what I'll call the secondary sands at greater depth below Sands A and B.
A. Yes.
Q. And you had begun discussing those. I think

you were looking at Exhibit A. You had discussed encountering them in the Fallon 1-10 well, and gas shows, and the gamma log indication that is shown on Exhibit A. And I think that is where we left off. And I think you had said that you were seeing the same trough-peak indications within the unit boundary. Do I have that right?

A. Are you talking about below A and B?

Q. Yes.

A. Okay. Yeah, to my recollection, I'm not sure where I lost you all. And where I froze up on the internet on this end. But I recollect your question was why do you want to drill below them. And I was making the point that that is what we did with the Fallon 1-10 as part of our exploration strategy in this basin to learn more. And we think we are good at finding gas in the sands. But, you know, practically oil in a sand is, to the seismic method, not really apparent in terms of an amplitude anomaly. You might be able to map a structural trap. But you may get some sort of amplitude anomaly. So to be thorough and to try to minimize waste and maximize economic efficiency a lot of times we like to drill wells deeper because the incremental cost is not that high. And see what is happening below us. And sample those sands and learn more about the whole



geology of the basin. We did that with the Fallon 1-10. And we got some gas shows. I'm pointing at Exhibit A in an area around 1.3 seconds. And you can see the gamma ray curve has got a lot of character to it. That is the Sand B interval. We had some gas shows here to the east of this area extending and correlating with this area of mapping to the east. The area gets structurally higher. We have some amplitude anomalies there where we proposed a new unit, the unit was granted, and we drilled a new well, Fallon 1-11, which was successful, and is currently producing gas. And similarly we would propose if this new unit is granted, and the drilling permit is approved, we would propose to drill some distance below Sands A and B to test the deeper stratographic section.

Q. The trapping mechanisms that you described with respect to Sands A and B, do you generally interpret them to apply to the deeper sands that you might encounter?

A. Yes. They do the -- the maroon fault and the green fault do continue deeper with depth and could be proposed trapping elements.

Q. And likewise do you have the same saddle elements to the south?

A. Yes. And looking at Exhibit A you can see the same structural saddle as evident in the deeper section.



And it is south of the proposed unit boundary of the new unit.

Q. So based on all of the discussion that we have just engaged in over the last hour-and-a-half or so, do you have an opinion about whether the proposed unit area appropriately describes, at least for Sands A and B, an area that would be economically and efficiently drained by one well?

A. I do. I think that it is the most logical unit to cover the presumed gas pool comprised of Sand A and B, and cover it, and be economical and efficient to develop that.

Q. And based on your experience with exploring and producing those sands in other wells, and the information you have described here, do you believe that the proposed unit area will aid in the orderly development of the pool as a whole?

MR. PIOTROWSKI: Objection. Calls for a legal conclusion.

THE HEARING OFFICER: Do you have a response to that objection?

MR. CHRISTIAN: It's a factual opinion.

MR. PIOTROWSKI: I'm not aware of factual opinions.

THE HEARING OFFICER: Can you read the



question back to me.

(Record read back.)

THE HEARING OFFICER: I'm going to allow it. If you can go ahead and answer the question, Mr. Smith.

THE WITNESS: I believe it will. If I may refer to Exhibit C. Our proposed unit again is denoted with the maroon dash as a 320 acre unit roughly. I'm not exact sure of the exact section size here. But it is about 320. You can see that the amplitude is very clearly centered on both of those quarter sessions. And in terms of, as a non-legal person, how it would be consistent with orderly development of the pool it is immediately adjacent to the existing Fallon 1-10 unit. And the people involved in the Fallon 1-10 unit, the mineral owners, are receiving revenues from Sand B production currently. In the future they will receive revenues from Sand A when we have depleted the deeper Sand B and cover up the hole and complete at Sand A. Likewise, the mineral owners encompassed within the proposed new unit would be receiving revenue from their share of the production from the -- if they are there -- Sand B and Sand A pool. And there is no gaps. There is nobody left out. It is all -- it is seamless in terms of adjacent -- the units are adjacent to each other.

Q. (BY MR. CHRISTIAN) One of the --

A. So the answer would be yes.
Q. Okay. The last question. One of the objectors, Ms. Oltman, are you familiar with where her property lies adjacent to the unit?
A. From talking with you on the phone -- I'm using Exhibit C. My understanding is that her land, just to be clear, is not within the outlines of the proposed unit, but would be adjacent. And somewhere adjacent on the east boundary towards the north side about where that purple fault is moving through. Am I correct in saying it? Or is it further north?
Q. Well, let's assume it is right where you indicated. If that's the case, based on your interpretation of the data that you have developed, would her minerals be impacted by the proposed unit area?
A. Her minerals would not be impacted. I believe that commercial Sand A and B reserves, if present, would be trapped on the south side of this maroon fault that I'm -- maroon/brown fault I'm running my curser on. It runs near the northern boundary of the presumed unit, or proposed unit, and curves around to the south. And her -- if her acreage is where I am moving my curser, outside of the proposed unit, and adjacent to it, her minerals would be across at least one fault and possibly



north and east generally of the brown marked fault on Exhibit C there are no hydrocarbons at the depth of Sands A and B?
A. I am not mapping any amplitudes there that would be consistent with Sand A or B.
Q. Okay. And if you would please go up to Exhibit A. So looking at Exhibit A. You explained this is -- in this graph here, this image here, the numbers in the right-hand column running from .900 to about 1.420 roughly. That is milliseconds; right?
A. It's actually expressed in seconds. 1.4 seconds. But, yes, if you look at the (inaudible) .000 that would be milliseconds; correct.
Q. Okay. This -- I'm not sure whether to call this a chart or graph or what I call this thing.
A. It is called an arbitrary seismic line. So it is excised from the seismic volume.
Q. And it looks like this goes down to 1.425 seconds; is that right?
A. Yes.
Q. And could you tell me what depth that is roughly?
A. Well, from the Fallon 1-10 wellbore you can see where I have actually entered what is called a top for Sand A and Sand B. And then those are the subsea



two and not impacted by any development for a presumed well. Or assumed well.
MR. CHRISTIAN: That is all the questions I have.
THE HEARING OFFICER: Thank you. Mr. Piotrowski, do you have questions for this witness?
MR. PIOTROWSKI: I do.

EXAMINATION

QUESTIONS BY MR. PIOTROWSKI:
Q. Mr. Smith, you have Exhibit C of your declaration on the screen. That is a perfect place to start. So you said with respect to that maroon fault. This designation on Exhibit C. Your curser is on it there. It is your opinion that that fault acts as a trap for both Sands A and B? This area?
A. Yes.
Q. And the areas -- so to the northeast of that fault -- to your knowledge -- to the best estimate you can make on the data we have for your interpretation there was no hydrocarbons associated --
MR. COURT REPORTER: I'm sorry. I lost you. There was no what?
Q. (BY MR. PIOTROWSKI) Let me try it again. Mr. Smith, is it correct that you believe that to the



values. You would add about 2,150 feet as the approximate surface location. And then going down further I have got another top at 1,932 at about 1.33 seconds. Plus 2,150. That is 4,000 feet. And you have about another 100 milliseconds of data. So it would be about 4,400 feet roughly to the bottom of what you can see.
Q. Okay. And did I understand your testimony correctly that at the Fallon 1-10 well you were able to make contact with some salt layer?
A. It may have sounded like salt. But what I said is basalt. B-a-s-a-l-t. Basalt.
Q. Right. And Fallon 1-10 drilled down to that basalt layer?
A. Down to it and through it. Or at least into it. Yes.
Q. And how far down ultimately did that well reach? Do you know?
A. About, I believe, 5,300, 5,400, 5,500.
Q. Okay.
A. If that line wasn't on it -- I could look at my work station and tell you exactly. It was to 5,442.
Q. Okay. Now back to --
A. And basalt is at 5,306 measure depth. So it looks like we just drilled into it.

Q. Okay. Now, if we go back to Exhibit A, please. This only shows down to that 1.425 roughly second mark, which you said is approximately 4,400 feet; right?
A. Yeah, roughly.
Q. Okay. And let's go to Exhibit B, if we could. This is a larger view of that same north/south 3-D seismic line; correct?
A. Yes.
Q. In this case we are looking not quite as deep on this one; right?
A. Not quite as deep and not quite as shallow. You can see it runs from about --
Q. Oh, I see. Yeah.
A. -- 1.02 down to 1.32. And looking at Exhibit A it covers, where my curser is, from maybe about here and to here. Well, you can --
Q. Okay.
A. So basically I changed -- on the display I changed the -- what is called the inches per second of data displayed and the trace density. How many traces per inch. I basically zoomed in on this area in the center part of -- so Exhibit B is zoomed in, if you will, or enlarged, and interpreted part of Exhibit A.
Q. Okay. Thank you. Now let's -- all right. I



think I understand. If we go down to Exhibit C. And this is the amplitude map which shows the strength of the -- or the amplitude of the reflective inlets; right?
A. It is the amplitude of the peak event.
Q. Okay.
A. This specific event here.
Q. Excellent. All right. Now, looking at Exhibit C. So to the best of your knowledge, at least in the area and the depths where you did find Sands A and B, and likely hydrocarbon deposits, you are not getting similar amplitudes in that northeast corner beyond the brown fault. And it looks like -- I mean, kind of all four corners have much lower amplitude figures. Is that correct?
A. Generally speaking, yes.
Q. Okay. Now I'm not nearly as mathematically inclined as I wish as.
THE COURT REPORTER: Mr. Piotrwoski, I am losing you again.
MR. PIOTROWSKI: That's okay. Because I was scrambling.
Q. (MR. PIOTROWSKI) Mr. Smith, do you -- when you are making your interpretations do you apply a sort of standard of proof or a confidence interval or anything like that that would explain or qualify the



strength of your confidence in your conclusions?
A. Yeah, I would say, to the extent that I can, we try to -- for example, referring back to an exhibit here. I will map the amplitude of this trough event. Which represents the top of the sand. And map this peak event. Which represents, in my opinion, the presumed gas/water boundary. And I wouldn't just map it on this volume. This is a merged volume with this --
THE COURT REPORTER: Hold on, Mr. Smith. Speak up just a little bit. A merged volume with this --
THE WITNESS: This particular volume that is displayed here is called the Killebrew-Willow merge. That's the Killebrew seismic -- reading seismic survey, which this area is. And the Willow reading survey, which is our original survey. 3-D survey. It is centered about eight or so miles to the east of here. And I have processed each of them, the surveys, individually and collectively. And when they were collectively processed together and merged it allows you to sort of do an apples to apples comparison. And we have kept the same parameters in terms of source spacing and receiver spacing --
Q. (BY MR. PIOTRWOSKI) Sir, I'm going to interrupt you. Because I think you are far off from my question. Which is really pretty simple in this case.



A. Okay. Go ahead.
Q. In Exhibit C. Please scroll down to Exhibit C. You have input lines here. One is the presumed Sand B gas pool line. Do you see that?
A. Yes.
Q. And is it your opinion, to the best of your scientific ability, that that represents the most likely extent of the Sand B gas pool based on the data known to you?
A. Looking at this particular map, yes. And as I was trying to elaborate a little bit I also --
Q. I'm going to stop you there because you answered my question. And Mr. Christian can certainly ask additional questions after I am done. What I just want to know is that your best estimate of the location of a Sand B gas pool when it's expressed on a two conventional map?
A. Yes. With the caveat that you try to incorporate a lot of different interpretations of the data. This is the peak event. And you can see I have, for example here, I think where you are going is, probably this --
Q. No. Please, sir, don't guess where I am going. I'm just trying to get answers to the questions I am actually asking.

A. And I'm trying to answer it.
Q. Okay. Well, your caveat -- what is your caveat to the answer you gave me previously?
A. My caveat is that we examine a lot of different processing of the data. There is not one unique volume that we interpret from. I have approximately 20 volumes right here of the data that had been processed with different assumptions, and parameters, migrations, offsets, stacks, and so forth. And I tried to put that together. And when I draw these outlines they change from one map to the next. And if I pulled up my work station I can show you probably eight different outlines that I have done. The commonality is this very strong amplitude region in the middle where there is the trough SI amplitude and peak SI amplitude. If you look at each one of those amplitude maps there is a difference in character. And so the time just before I was doing the exhibit, or to create the exhibits, this was my best guess at the time. But it does change over time. I have got probably eight different outlines of this. The commonality is this is a very strong area in the center, particularly where we want to drill, and the character around the edges does change if you are mapping the peak or the trough. And there is noise involved with this. Not everything is as precise as we



would like it to be in seismic interpretation. But even if this was the extent of the pool nobody would drill a well here. And actually if there is gas in this one little spot --
Q. Sir, are you answering -- is this part of your caveat to the question you are providing an answer? Or are you providing me with a different topic?
A. I don't know. I am just trying to --
Q. I'm asking you --
A. -- answer your question.
Q. Mr. Smith, I am going to ask at this point to please answer the question I ask. You know, if there is something in the record that is inaccurate please let us know that. I'm trying to get the facts into the record. And I'm not looking to have a full explanation of how the interpretive process is done. All I'm asking you is, at the moment you prepared Exhibit C, was that what you think is the best estimate of the location of that gas leak? Or have you improved on that estimate since then?
A. I would just go back to if I looked at another attribute that I mapped the trough, or whatever, the outline might be a little bit different. But the commonality is what I stated. Where the amplitudes are strong. I have high confidence in this region. I have



less confidence as you get into the weaker amplitudes.
Q. Okay.
A. My confidence is strong that this area would be gas productive. And less so as you get into these cooler colors where the amplitude is weaker. Based on the peak event. Or the trough event is going to look a little bit different. And another geophysicist might draw this particular line somewhat differently. And most likely would draw it somewhat differently than I have.
Q. So is the conclusion that is expressed on this document as the presumed Sand B gas pool does that depend considerably on how you choose to interpret the data. Is that why a geologist would draw a different line?
THE COURT REPORTER: I'm sorry, I am having trouble with the question.
Q. (BY MR. PIOTROWSKI) Mr. Smith, is it true that your experience and your skill and your interpretation are -- might be different than another geologist's interpretation based on their skill and experience and may result in slightly different lines than those you draw on Exhibit C?
A. Absolutely.
Q. Okay.



A. 100 percent.
Q. All right. So in fact those lines could just as easily from another geologist be drawn and either show either a larger or smaller presumed Sand B pool?
A. Yes.
Q. And the process by which you choose to make those interpretations is it to some extent subjective based on your experience, your intuition, on what you see from the data?
A. Well, I would say I try to be as objective as possible. But there is noise in the system. Again, I go back to what I said earlier about -- recall that we are essentially listening at the surface with geophones and trying to determine what is the truth at 3,600 feet below the surface. And so I try to do it as objectively as possible by processing the data multiple times, interpreting lots of different events, and then aggregating all of that information and coming up with an interpretation. How other interpreters or geologists or geophysicists would do it would probably be similar, but somewhat different. And so they would move those lines around to a certain extent. But I think people with similar experience to myself, experienced geophysical interpreters with 3D seismic data, would come up with a similar interpretation. Does that answer

your question?
Q. It does. One of things we are trying to accomplish here is translating your field of geology, in particular, seismic survey --
THE COURT REPORTER: Hold on. Mr. Piotrowski, I am having a hard time understanding you.
Q. (BY MR. PIOTROWSKI) One of the things we are trying to do here, Mr. Smith, is translate between your field and my field. One of the standards that we often use in the law, and what is familiar to most lawyers and most lay people, is we talk about whether something is more likely to be true or more likely to be false. Just that simple.
Is it fair to say that based on your understanding of the data, your experience with this type of data, and your study of a particular geology involved here, that it is more likely true than not true that the Sand B gas pool is in fact in the approximate location and of the approximate shape you have drawn on Exhibit C?
A. Yes. I would say the confidence level of where it is diminishes as the amplitudes get weaker towards the boundaries. The highest confidence is strongest where the amplitude of this peak event is strong. And the other attributes that I mentioned.



The mapping. We will map the far offsets and the medium offsets and so forth and put it all together. But as I understand my charge in creating a proposed unit and outline to the people that I work with is that it needs to be the best unit size that economically and efficiently can be tested and developed. And most efficiently and economically drained by one well. And also that it must incorporate the geographic systems. And so --
Q. Sir, where did you get the instruction that it must incorporate the geographic land survey system?
A. I believe it was in one of the orders from the state. Or at least as I interpret it being a non-lawyer.
Q. So you have got a -- I think you called it a maroon line. The proposed new unit boundary. Do you see that?
A. Yes.
Q. And did you put that maroon line there solely because it incorporates or makes reference to the geographic land survey quarter section system?
A. It's a neat fit with it; yes. It encompasses the majority of the -- it fits on the amplitude nicely.
Q. Okay. And it is basically two quarter sections; is that right?



A. Yes.
Q. And that is 320 acres; correct?
A. Yes.
Q. And are you aware, sir, that the statute presumes 640 acres in unit size?
A. I am. And I'm also aware it provides for exceptions --
Q. Sir, I simply asked if you were aware that it presumes 640 acre size. I didn't ask for commentary.
A. I am, yes.
Q. Now, are you aware that it is also possible if you are going to seek a unit size other than the standard spacing unit size that a unit can be restricted by depth?
A. To be honest with you, Mr. Piotrowski, I'm not sure of all of the unit qualifications and whatnot.
Q. Okay. The unit you have proposed is it -- this two quarter acres -- or two quarter section unit did you base that on the geological studies that you undertook as you testified about today?
A. Yes.
Q. And based on the data and the charts you have presented to us today?
A. Yes. And I know I have gone on longwinded. But there is a lot more work that goes into this than is



not presented. But that is the best shape of a proposed unit using geographic boundaries that to me encompasses the amplitude feature that we want to test.
Q. The previous exhibits that we looked at. Exhibits A and B -- well, Exhibit A went down to a time of 1.4 seconds. And back to Exhibit C. As you said there are different ways you can draw Exhibit C. Is it based on the data that you found down to that depth of 1.4 seconds? Or is it based on something else?
A. Well, this proposed -- and I don't know if I should have called it that or not. But that is what we are proposing is based on the reflections associated with Sands A and B.
Q. Okay.
A. And not specific to anything deeper. I was just making a point that our exploration strategy is to drill deep.
Q. Okay. And so there may be Sands C and D and multiple sands below that as well. It is possible. Right?
A. Evidence would indicate so based on the Fallon 1-10 well that there are other sands below there; yes. That is why we want to take the well deeper.
Q. And the Fallon well you said got to a base of about 5.400 feet.

A. 5,432.
Q. 5,432. That's right.
A. Measured depth.
Q. And it's possible you will drill deeper than that as well; isn't it?
A. Yes.
Q. Now, sir, do you understand the relationship between a spacing unit and an integration? Or a unitized well?
A. Can you rephrase your question?
Q. Sure. The company you work with here has presented in this case a spacing unit application. And at some point it may be necessary to integrate the mineral interests in that area before drilling and extraction can occur. Correct?
A. Yes, sir.
Q. And is it your understanding that integration will happen within an entire spacing unit?
A. Yes.
Q. Okay. And so by applying the space units you have you are also suggesting, are you not, that eventually when we get to that point this will also be the unit in which integration of mineral interests will occur?
A. Well, that is my understanding that that is



what we usually do. I would assume we would do that here as well.
Q. Okay. Below the 4,400 foot mark, below the 1.42 seconds, on the exhibits you have put here, have you done a detailed study of what other pools or reservoirs of gas or oil might exist?
A. Are you referring to a particular exhibit?
Q. No, sir. I'm asking you if below -- you testified today about depths down to about 4,400 feet. Plus a little more from the Fallon well. And I'm wondering if you undertaken any study or investigation below those depths the under the proposed unit here?
A. Yes, I have.
Q. Okay. But you haven't chosen to present those to this hearing; correct?
A. No, I have not. There is a lot of information that I have learned here that I haven't presented today.
Q. I'm sure there is, sir. If we ignore for a moment -- take a step back. You said that the proposed spacing unit here you said is appropriately described as one that could be drained by one well. Do you recall saying so?
A. In my declaration?
Q. In your testimony 20 minutes ago.
A. Yeah, I believe I said that. Or something to



that effect.
Q. In fact, as we look at Exhibit C, the area of the well, the well placed at the location you marked, that well would actually drain an area, based on your current data, that is significantly smaller than the proposed unit; correct?
A. You mean based on the areal extent of the amplitude?
Q. Yes. Well, based on your study here. Where you believe the pool is is less than 320 acres; right?
A. Yes.
Q. Okay. And so --
A. For example, the north side of that maroon fault I don't think would be drained by this well.
Q. Okay. That is all I was trying to get at. And do you think that the areas -- do you think that any areas beyond, so to the southwest of what you have marked as the pool boundary, and so south of that green fault, the two green faults, do you think that those areas would be drained at all if you were to drill to Sands A and B in a designated location?
A. I don't think I can answer that question confidently one way or the other. It's possible. I will say it is probably a little bit unlikely. It is a long way. That unit is about one mile from east to



west. So you are talking about a long way there.
Q. And the low amplitudes in that southwest corner would also indicate there is less likelihood of hydrocarbons there; right?
A. Yes.
MR. PIOTROWSKI: Thank you, sir, that is all the questions I have.
THE WITNESS: Okay.
THE HEARING OFFICER: Mr. Marotz.
MR. MARTOZ: Yes. Just a few.

CROSS-EXAMINATION
QUESTIONS BY MR. MAROTZ:
Q. Mr. Smith, how are you?
A. I'm fine. How are you?
Q. I'm well. Just a few questions for you. In Exhibit SR-01, within your declaration, which is Attachment D, Paragraph 18. That would be on page 13 of the PDF, I believe. You state, "Based on rigorous interpretation of the seismic data I conclude the 320 acre geographic unit encompassing the above described 2 quarter sections is the best fit to cover the lands underlain by the presumed pool at the primary objective Sand B." Is that correct?
A. Yes.

Q. So first question related to that is, could you give me an estimated vertical distance between that primary objective sand, Sand B, and the secondary objective sand, Sand A?
A. They are pretty close together. I can give you the top -- if I refer to Exhibit A, and it is also within Exhibit B, Sand A, my estimated top is 1139 subsea. And so the base would be maybe 40 or 50 feet below that. Call it 1180 or 1190. And the then top of Sand B is predicted to be 1254. So between the two tops you are looking at 120 feet or so. 122 feet. And between the base of Sand A, which we don't know how thick this sand could be, it is 12 feet, maybe 15 feet, in the Fallon 1-10. I think it is going to be thicker here because of the amplitude strength. So I think it may be 30 feet. Possibly 40 foot gross. So call it 1180 subsea for the base of Sand A. And that would give you about 70 feet to the top of Sand B.
Q. Okay. Thank you.
A. So maybe 70 feet between the two. Seventy to 80 feet roughly.
Q. And then your interpretation in Paragraph 18 of your declaration. I don't know if there is a need go back to it. But that interpretation, does that equally apply to Sand A? Or is that just specific to Sand B?



A. Sand A is very similar. And they may -- you know, again, I go back to there is a lot of detail that you can see when you drill and log something with the geophysical logs that is below seismic resolution. But the amplitude extent of A is very similar to B. So whether they are -- pool A and pool B is separate I couldn't tell you. Or if it's -- A is just the upper part of a reservoir, and B is the lower part, I couldn't tell you. But the amplitude, when I map the amplitudes up there, they are well described by this unit. And the other thing that I like about it is the units abut each other. If we go to sand -- or Exhibit C. This proposed unit boundary as outlined it is immediately adjacent with a unit that has A and B in it. And, you know, owners within here -- there is no gaps. If you own land in this area you are going to be in that well or this well. One or the other.
Q. Perfect. And I think you have already answered my next question. So forgive me if it is a little redundant. I'm just want to make sure I'm running down my list thoroughly.
Could you briefly summarize the key similarities and differences between Sand A and Sand B as it relates to your interpretation of the seismic data here?



A. Certainly. Again, moving from the known to the unknown. We know based on drilling the Fallon 1-10 well that we have a gas reservoir or pool at Sand B here. And we are producing that. And we have made 1.2 BCF from it and continuing to produce --
THE COURT REPORTER: Mr. Smith, again, you need to speak up a little and lean forward like you did right there.
THE WITNESS: To answer the question. You asked about the similarities. We know from drilling the Fallon 1-10 well -- prior to drilling the well we had predicted that we would have a pay sand at Sand A level -- I named this sand before we drilled anything out of it. I call that Sand A and I call that Sand B just based on seismic reflections.
Q. (BY MR. MAROTZ) And just to be clear. When you say a pay sand. Pay meaning hydrocarbon?
A. Yes. Gas -- in this case gas/condensate-bearing sand. We call that a pay sand. I should be more correct in the terminology. Prior to drilling we had an objective Sand A. We presumed that gas -- the gas saturated sand would be here. We named it A in the drilling prognosis and permit. And when I gave the tops -- formation tops predictions. As I do with all of these permits to drill a well. Post-drilling and post



drilling a well. Drilling a well we had gas shows in A and B. I believe Mr. Thum has made some exhibits that are part of the record that he may be going through. And the geophysical measurements we took in the well logs prove that there is a gas bearing sand there at B and A associated with these reflections in this particular character that we are mapping. We then completed the well and had produced about 1.2 BCF of gas. 1.2 billion cubic feet of gas from that zone. And so it has proven that this seismic character is associated with a low velocity, low density, gas bearing sandstone. We take that same seismic character and extend it around that wellbore to the north to a slightly structurally higher location and we see the similar characteristics at Sand B. Similarly, with the Fallon 1-10 Sand A, we found, I think it is 12 or 15 feet, I haven't looked at the log there recently, of gas bearing sand that has not been tested. But by analogy it produced -- or it had gas shows when we drill through it. And it has the same geophysical log characters. A good porosity, a good resistivity, that we associated with this here. So this is very, very likely going to be productive as well. And we can follow that event down on the next neighboring feature. And its amplitude increases of the trough and peak. And so we can map not

just on this volume -- in this window it shows what this seismic volume is. But as I said earlier I have about, I think, 15 or 20 of these. It varies on the survey. And I mapped the same events on all of those surveys. And you develop confidence if the anomalous behavior is found on multiple different processes. And you look at it in different ways. So when you have that repetition that this is the anomalous behavior at Sand A and Sand B, and it is similar to known productive areas or seismic character at Sand A and B in the Fallon well, and not just here, but in some of the -- nearly all of the 16 other wells that we have drilled -- 15 other wells that we have drilled in the basin. So you develop confidence. And you can describe that areal extent by amplitude maps of the different horizons. The trough and the peak. And so I have probably gone on too long. But the seismic character in the area of the proposed unit that we would like to form of the Sand A reflections, and Sand B reflections, are very similar to what has been proven to be productive in the immediately adjacent unit to the south. And we feel like there is very high likelihood that we will have gas pools at A and B. And we have mapped the areal extent of those. And they seem to concentrate and have a core area that is entirely within this proposed unit. If you look at



the trough or peak, when we are processing it, it might extend a little bit here or there. But in the main it is very well-centered in this -- and I'm moving my curser around the area of highest peak amplitude --

MR. PIOTROWSKI: I am going to object. We are well beyond answering the question here. We are running into a long narrative. Object there is no pending question.

THE WITNESS: I was trying to be thorough and I probably have gone too far.

THE HEARING OFFICER: That's okay, Mr. Smith. I'll sustain the objection. Mr. Martoz, do you have any further questions?

MR. MAROTZ: I have nothing further for Mr. Smith. Thank you.

THE HEARING OFFICER: Mr. Christian, any redirect?

MR. CHRISTIAN: Very brief.

REDIRECT EXAMINATION

QUESTIONS BY MR. CHRISTIAN:

Q. Mr. Smith, are you aware of any other geologist and geophysicists with more experience in the southwest Idaho basin in terms of developing information and interpreting it and putting it into practice than



you?

A. Using the 3-D seismic method I would say there are none. I would be probably the most premiere expert. In terms of fieldwork and studying the basin there are a lot of people that have been studying this area longer than I have in outcropping the field examining wells in other areas. As to the area that we are exploring in I would say that I am probably the best expert you could find.

MR. CHRISTIAN: That is all I have. Thank you.

THE HEARING OFFICER: Thank you. Mr. Piotrowski, anything further from you?

MR. PIOTROWSKI: Just two quick questions if I could.

RECROSS-EXAMINATION

QUESTIONS BY MR. PIOTROWSKI:

Q. Mr. Smith, are you aware of any reason why using a different space unit would result in waste of hydrocarbons?

A. Could you remind me again, Mr. Piotrowski, legally how waste is defined.

Q. It is the venting or loss of otherwise comparable hydrocarbons.



A. And your question regarding waste is --

Q. Does the size or shape of the unit have any effect on whether a particular well causes or results in waste?

A. Again, I believe there is something in the statute or the regulatory body that says you don't want to drill unnecessary wells. And you don't want the spacing unit to be smaller than could be effectively drained efficiently and economically by one well. So, for example, a 160 acre unit, in my view, would not be appropriate because it would be too small to cover the area. A 640 -- and I don't know if I'm on the right ground here legally. But the 640 would probably be too large because it would include quite a bit of unproductive acreage.

Q. Sir, that wouldn't result in waste of hydrocarbons; would it? You are not going to start wasting hydrocarbons just because the spacing unit is larger; are you?

A. Again, that is why I asked you about waste. I'm not really sure of context of waste in the context that you are asking me.

Q. Sir, one of the bases -- one of the legal bases to change a spacing unit size is if the -- one of the basis to amend a spacing unit is if the existing

spacing unit results in waste. But the contours of a spacing unit -- will the shape or size of the spacing unit change whether or not a particular well has to vent hydrocarbons into the atmosphere?
A. Well, we are not going to be venting any hydrocarbons. It is not something we would do or are allowed to do.
Q. Okay. And so in that sense of waste the size of the spacing unit has no effect on whether or not you or the companies you work with are going to be discharging gas into the air; right?
A. All I can say is -- and I don't control the well head operations. But we are not going to be venting any gas. As to definition of waste in the statutes or the regulatory body I don't know that I can comment on that. I'm not as up on the definition.
Q. As long as the spacing units proposed -- I'm sorry. Okay. Thank you. That is all I have.
MR. CHRISTIAN: I have nothing. Thank you.
THE HEARING OFFICER: All right. I think we are done with you, Mr. Smith. May this witness be excused?
MR. CHRISTIAN: Yes.
THE HEARING OFFICER: All right. You are welcome to stay and listen if you desire. But if you



have other things you would like to do you are welcome to log off as well, Mr. Smith.
THE WITNESS: Thank you.
THE HEARING OFFICER: Do you have any additional witnesses?
MR. CHRISTIAN: The applicant has no other witnesses.
THE HEARING OFFICER: Okay. Mr. Piotrowski, do you have any witnesses that you desire to call?
MR. PIOTROWSKI: We do not plan to call any witnesses.
THE HEARING OFFICER: Mr. Marotz, do you have any witnesses?
MR. MAROTZ: Yes. We would like to call Mr. James Thum.
THE HEARING OFFICER: Okay. While we are getting ready to do Mr. Thum why don't we take our 4:00 break. A quick ten minute break.
MR. MAROTZ: Sounds good to us.
THE HEARING OFFICER: So we'll be off the record.
(Recess.)
THE HEARING OFFICER: Back on the record. But before we start do you want to turn down the volume of the online people now that Mr. Smith is done testifying.



So if Mr. Piotrowski has an objection or when it is his turn to ask questions we don't have as much interference.
Mr. Marotz, the floor is yours.
MR. MAROTZ: Thank you. We'll call Mr. James Thum from the Idaho Department of Lands.

JAMES THUM,
first duly sworn to tell the truth relating to said cause, testified as follows:

DIRECT EXAMINATION
QUESTIONS BY MR. MAROTZ:
Q. Thank you. Mr. Thum, can you please state for me your full legal name?
A. James Arthur Thum.
Q. And are you currently employed?
A. Yes, I am.
Q. And where are you currently employed?
A. The Idaho Department of Lands in Boise, Idaho.
Q. And what is your current position title with the department?
A. I am the oil and gas program manager.
Q. How long have you fulfilled those duties?
A. Since January of 2016. So approximately eight



years and five months.
Q. And do you hold any higher education, degrees, certificates? What are those in and when did you earn them?
A. I have a bachelor of science degree in geology, which I got in 1981. And a master of science in geophysics that I got in 1983.
Q. Prior to your work with the department did you have any experience in the oil and gas industry?
A. Yes, I do. I have over 30 years experience in both USA and international onshore and offshore oil and gas exploration and development projects. As well as geothermal, coal bed methane, and underground gas storage operations and development. This experience includes design and management of seismic field operations, seismic data processing sequences, geophysical modeling, and the integration of geological data with geophysical data to interpret geologic conditions and the presence of hydrocarbons in the subsurface.
Q. So when an application to establish a spacing unit is filed with the Department of Lands do you have a role in evaluating that application?
A. Yes, I do.
Q. And what is your role in that process?

A. I review the application to ensure it contains all of the requirements of a spacing request as defined in Idaho Code 47-3. I evaluate the application for the technical content, its completeness, and whether the submitted information is sufficient for the department to consider the request for spacing. Especially if it varies from state spacing as defined in the statute. Once that information is received and complete my role is to evaluate the technical aspects of the data to make a determination regarding the geographic extent of the proposed unit. In other words, does the data support the applicant's request for spacing.

Q. Very good. And based on your training, education, and experience, what information do you need in your role to determine whether the proposed spacing unit can be efficiently and effectively drained by one well?

A. Typically in a mature oil and gas producing basin, with hundreds or thousands of wells, and long-term production history for each formation, accurate estimates can be determined from that type of information. However, the Western Snake River Basin is one of the most recently discovered conventional producing areas in the country. Consequently that volume of technical information does not exist.



Instead we must utilize available geologic and geophysical data, such as seismic, to make a reasonable estimate of the size of the hydrocarbon accumulation. Here we have the advantage of good quality, three-dimensional seismic surveys, and a well in close proximity which produces from the same formation in a similar style of hydrocarbon trap. From this information the department can determine whether or not the applicant's geologic interpretation is reasonable for the basin and the unit size is appropriate for that interpretation.

Q. Thank you. And have you had the opportunity to review Snake River Oil and Gas, LLC's application in this matter?

A. Yes, I have.

Q. And as part of that review did you request additional information from Snake River?

A. Yes, I did. I requested clarification on SR-01 Exhibit A to better identify the leased and unleased parcels on the map of the proposed unit. On the seismic profile submitted as Exhibit SR-01 I asked for better labeling of the target sands. On the seismic amplitude map I requested additional labeling on the mapped feature. And finally I asked for a second seismic profile from the southeast corner of the



proposed unit to the northwest corner to assist in evaluation of the spacing request.

Q. And did Snake River provide that information?

A. Yes. Snake River submitted revised application materials addressing my request on May 3 of 2024.

Q. And have you had the opportunity to review Snake River's exhibits in this matter SR-01 and SR-02?

A. Yes, I have.

Q. And did you listen to Mr. Smith's testimony today?

A. Yes, I did.

Q. Did you listen to Mr. Wade Moore's testimony?

A. Yes, I did.

Q. Are you familiar, generally speaking, with the types of geologic and seismic data that Snake River submitted in support of its application?

A. Yes, I am.

Q. And based on your training, education, and experience, is this the type of testing and data an accepted method in the oil and gas industry for determining the existence of subsurface hydrocarbons and the probable productive limits of a prospective pool of hydrocarbons?

A. Yes. In my experience it is the primary



method for estimating the subsurface limits of a possible hydrocarbon accumulation. Particularly in the absence of a large number of surrounding wells that are drilled to and are producing or have produced from the target formations.

Q. And in your experience is this methodology consistent with development of other pools in the Harmon field area?

A. Yes, it is consistent with all wells drilled in Payette County since the first three-dimensional seismic survey was completed in approximately 2012. It is also consistent with conventional hydrocarbon field development methodology utilized around the world.

Q. And so it is safe to say, given your responses so far, that based on your training, education, and experience, you are not only capable of reading this information, but also independently interpreting this geologic evidence attached to Snake River's application?

A. Yes, I am.

Q. Excellent. So next I would like to cover the exhibits that the department has submitted in this matter.

THE HEARING OFFICER: Mr. Marotz, I'm going to change the screen so that I can see Mr. Piotrowski.

Q. (BY MR. MAROTZ) Now we'll walk through the

exhibits the department has submitted in this matter. So starting with IDL-01. Which is pulled up on the screen right now. What does this exhibit depict?
A. IDL-01 is a map of the Harmon field area showing the proposed spacing unit, as well as existing spacing units.
Q. And to be clear the proposed spacing unit is highlighted there in yellow and with a kind of turquois dashed boundary?
A. That's correct.
Q. Are there any other nonstandard size spacing units in the Harmon field area?
A. Yes. In referring to IDL-01, Unit E, is a 480 acre unit, where the Dutch Lane 1-13 well was drilled and is producing from the C and D stands. Unit A is a 300 acre unit encompassing the Fallon 1-10 well which produces in the B Sand. Also one of the target sands in this proposed unit.
Q. And both of those units are labeled and depicted on this map; correct?
A. That's correct.
Q. So is it safe to say that a nonstandard size spacing unit like the one proposed in this current application is consistent with the historical development in Harmon field?



A. Yes, it is consistent.
Q. Next we'll move on to IDL-02. What does that exhibit depict?
A. This is a depth interval from approximately 3,590 feet measured depth to approximately 3,750 feet measured depth of the mud log, which is depicted on the left. And a density neutron triple combo well log depicted on the right for the Fallon 1-10. And that well is U.S. well number 11-075-20032. It shows the interval of the A Sand as it was encountered in the Fallon 1-10 well.
Q. And for reference these logs are all publicly available on the department's website; correct?
A. Yes, it is.
Q. And the Fallon 1-10 well is the well immediately to the south of the proposed spacing unit?
A. That is correct.
Q. And so how does this data from the Fallon 1-10 well inform your understanding of the probable presence of hydrocarbons in Sand A under the proposed spacing unit in this application?
A. The mud log on the left side of Exhibit IDL-02 is constructed from rock fragments ground by the drill bit as it encounters the subsurface formation. Any hydrocarbons encountered are detected and noted on the



mud log. This log indicates that there were quote, unquote, shows, or the presence of hydrocarbon within the A Sand interval. On the right side of Exhibit IDL-02 is the density neutron triple combo well log through the A Sand interval. The curves on the well log are generated from geophysical data gathered for measuring tools, or commonly referred to as logging tools, which are lowered into the well once it has been drilled. The response of the logging tools through the A Sand interval, in combination with the mud log information, indicates the likely presence of the A Sand. In addition, the measurements indicate the A Sand likely contains hydrocarbons. The presence of hydrocarbons in this interval in the spacing unit directly south of the proposed unit increases the likelihood that hydrocarbons will be present in the same interval within the proposed 320 acre unit.
Q. Excellent. And finally we have IDL-03. And what does this exhibit depict?
A. Similar to Exhibit IDL-02, this is a depth interval from approximately 3,710 feet measured depth to approximately 4,000 feet measured depth of the mud log, which is depicted on the left. And the density neutron triple combo well log depicted on the right for the Fallon 1-10, which is U.S. well number 11-075-20032, it



shows the interval of the B Sand as it was encountered in the Fallon 1-10 well.
Q. And so same question as for IDL-02. How does this data inform your understanding of the probable presence of hydrocarbons within the Sand B formation under the proposed spacing unit?
A. The well logs depicted in Exhibit IDL-03 are from the same well logs for the Fallon 1-10, but from a depth interval covering the B Sand. The mud log on the left side of Exhibit IDL-03 is constructed from rock fragments ground by the drill bit as it encounters the subsurface formation. The hydrocarbons again are noted as detected on the mud log. This indicates there were shows or the presence of hydrocarbons within the B Sand interval. On the right side of Exhibit IDL-03 is the density neutron triple combo well log through the B Sand interval. The curves on the well log are generated from geophysical data gathered from measuring tools that had been lowered into the drilled hole. The response of the logging tools through the B Sand interval, in combination with the mud log information, indicates the likely presence of the B Sand. In addition, measurements indicate the B Sand likely contains hydrocarbons. And as you'll note on this log this well was drilled and completed and is producing from the B

Sand interval. And based on our last information reported to the state it has produced approximately 1.2 billion cubic feet of gas. Approximately 19,869 barrels of condensate. And approximately 11,000 barrels of water. And that producing interval was between February of 2022 and March of 2024.

Q. And that is data from just above the lower purple line where it says BC, BW, BCFG?

A. That's correct.

Q. And so likewise the presence of hydrocarbons and production in this interval within the Fallon 1-10 would increase the likelihood of hydrocarbons in the same formation of the proposed unit; is that correct?

A. That's correct.

Q. And so based on your review of the application and exhibits and testimony in this matter have you received sufficient information to make a recommendation with respect to this spacing application?

A. Yes, I have.

Q. And what is your recommendation?

A. Based on the information submitted by the applicant, the supplemental information requested by the department, and the well log information for the Fallon 1-10 well directly to the south, the department feels the geologic information presents a reasonable



interpretation of the probable configuration of the hydrocarbon trap in the proposed spacing unit. Therefore, the department recommends the request for the spacing unit be approved.

Q. And what leads you to that recommendation?

A. The geophysical information presented by the applicant integrates well and is supported by the well log information analyzed by the department for the closest producing well in the same productive sandstone reservoirs. The well log information for the Fallon 1-10 is productive or likely productive in the case of the A Sand and supports the likelihood of hydrocarbons in the same interval in the proposed unit. The seismic profiles and seismic amplitude maps submitted for the proposed unit exhibit seismic responses in the intervals consistent with the A Sand and B Sand in the spacing unit encompassing the Fallon 1-10 well. The seismic responses are within the same interval in the proposed unit as the currently producing unit for the Fallon 1-10 well. They indicate a probable productive limit of the pool within the proposed unit. Therefore, in the department's opinion, the proposed unit is appropriate.

The integration of the data supports the likelihood that the proposed unit is based on a reasonable geologic interpretation consistent with a



known geology of the Western Snake River Basin. Based on the known but limited production data for the Harmon Field and the Western Snake River Basin. It is also likely that the probable hydrocarbon accumulation within the proposed unit would be efficiently and economically drained by one well.

MR. MAROTZ: Thank you, Mr. Thum. I have nothing further.

THE HEARING OFFICER: Okay. Mr. Piotrowski and Mr. Christian do you have a preference who goes next?

MR. PIOTROWSKI: No preference.

MR. CHRISTIAN: I have no preference. I'm happy to let Mr. Piotrowski go first.

THE HEARING OFFICER: Okay. Mr. Piotrowski, the floor is yours.

MR. PIOTROWSKI: Thank you.

CROSS-EXAMINATION

QUESTIONS BY MR. PIOTROWSKI:

Q. Mr. Thum, I'm looking here -- still up on the screen is Exhibit IDL-03. Do you see that?

A. I do.

Q. And it looks like -- I'm looking at the right-hand side of that exhibit and I see number 4000



towards the bottom of the chart on the right. Does that indicate the depth of that bit of data?

A. I'm sorry? I didn't catch your last word.

Q. Sure. Does that 4000, is that the depth of the well of the data from that point?

A. This is only a partial display. As I said in my testimony this is only the portion that covers the B Sand in the Fallon 1-10 well.

Q. Right. And I'm just saying it looks like it runs from -- well, a little west of 3750. Which I see towards the top of that page. Down to a little west of 4000 at the bottom of that page. So for this document does is that indicating the well depth where this data was obtained?

A. Yes, it does.

Q. Okay. And is the same thing true for Exhibit IDL-02 if those numbers in the middle of the density neutron log relate to the depth of the well where that data is coming from?

A. For that interval of the log; yes.

Q. Okay. And it looks like the deepest part of the well I see here is this 4000 on IDL-03; is that correct?

A. Yes, it is.

Q. Okay. And that is the well depth, right, as

opposed to the depth below sea?
A. That is incorrect. It says at the top that the total depth of this well was drilled to 5,434 feet measured depth. As I stated the 4,000 foot is the bottom of the interval we are displaying.
Q. And you don't have any indication -- you didn't go any deeper than that in these exhibits; right?
A. I did not.
Q. Okay. And your testimony today is based on what you -- in part on what you saw in these exhibits; right?
A. That's correct.
Q. Okay. How big are the reservoirs or pools of natural gas below 5,500 feet for this tract of land?
THE COURT REPORTER: I apologize. To make sure I got that question can you repeat it?
A. (BY MR. PIOTROWSKI) What size, shape, and shade are the reservoirs or pools of hydrocarbons below 5,500 feet?
A. I don't have that geological information.
Q. So without that data you can't come to a conclusion about that; is that fair?
A. Yes. That was not part of the request so I did not evaluate that.
Q. Are you recommending that a spacing unit be



approved for all depths in this case?
A. I believe it is appropriate for the sandstones that were asked in the request. And that is all we evaluated.
Q. Are you recommending a spacing unit that goes to all depths?
A. I'm recommending a spacing unit for the A and the B Sand.
Q. Okay. So would you agree to accomplish that it would be appropriate to limit the spacing unit to a depth of approximately 5,434 feet?
A. I can't make that assessment right now.
Q. What do you mean you can't make that assessment?
A. That wasn't part of the request.
Q. Okay. So you haven't evaluated anything below 5,400 feet, have you, for this application?
A. I have not.
Q. I'm sorry, I didn't hear that.
A. I have not.
Q. Okay. And so it is entirely possible, we don't know one way or the other, whether, in fact, there is another pool of hydrocarbons down there that extends under the whole 640 acre unit that would normally be the default spacing unit under Idaho law; is that correct?



A. Can you repeat that question?
Q. Sure. Do you agree with me that Idaho law, the law that you helped administer, expresses a default of 640 acre spacing units?
A. 640 acres is a default unit for statewide wells. But that is not what was requested here.
Q. In fact, you administered -- I believe I heard your testimony that part of your obligations are to administer the Oil and Gas Conservation Act; right?
A. I work with the rest of the department to do that.
Q. Okay. So are you familiar for instance with Idaho Code Section 47-317?
A. I am.
Q. And are you familiar with Subsection (3)(b) that says every directional well and vertical well drilled for gas shall be located in a spacing unit consisting of a 640 acre governmental section or lot or a tract?
A. I don't have the statute in front of me. But I --
Q. You are not sure whether that is what the statute provides? Or are you --
A. No, I'm assuming that what you are reading is correct. But I don't have that in front of me to



confirm that.
Q. Okay. So what is happening here is the applicant is asking for a variation from the normal 640 acre unit; right?
A. That's correct.
Q. That is not just for statewide units. All gas wells are supposed to be on 640 acre spacing units; correct?
A. Not if an applicant comes in and requests a variance. Which they are allowed to under 47-317.
Q. Right. And to get a variance the Department of Lands would have to find that that variance --
THE COURT REPORTER: I'm sorry. If you could slow down a little. I am having a hard time.
MR. PIOTROWSKI: Sure.
Q. (BY MR. PIOTROWSKI) In the same section of Idaho Code 47-317, in Subsection 5, I'll read it to you. And I'll you ask you to assume I'm reading it accurately. "To authorize an amendment, the department shall find that such amendment would assist in preventing the waste of oil and gas, avoid drilling of unnecessary wells, or protect correlative rights." Does that sound familiar to you?
A. Yes, it does.
Q. In this particular case in what way would

going from a 640 acre unit to a 320 acre unit avoid or prevent the waste of oil and gas?
A. I can't answer that.
Q. There is no way in which that would avoid waste; is there?
A. I can't answer that.
Q. Are you aware of any way which a smaller unit in this case avoids waste?
A. It is. But as I stated in the beginning of my testimony we do not have the luxury of hundreds or thousands of wells to understand how drainage will occur from a well. And the only way we can do that is to gather additional information through additional wells. So I can't make that assessment.
Q. If a 640 acre unit was approved in this case, instead of 320 acre unit, let's say it was the two quarter sections just north of the requested unit, would that cause waste of oil and gas?
A. I can't answer that question.
Q. Okay. You don't know the answer to that question; do you?
A. Again, we don't have a lot of geologic information here. So that would be pure speculation on my part.
Q. So would the size -- so you could always



speculate on how the spacing unit size might or might not affect waste. Is that what you are saying?
A. I'm not going to speculate on that.
Q. And if you were to say anything on that topic it would be speculation; right?
A. If you put it that way I suppose so.
Q. Would the size of the spacing unit in this case have any impact on healthy wells an operator is eventually allowed to drill?
A. I don't know. I can't predict what the operator is going to want to drill in the future. I'm not privy to that information.
Q. So was the desire to avoid drilling unnecessary wells a factor in your conclusion that this is an appropriate application and should be granted?
A. That is speculation on my part.
Q. It would be speculative for you to address the drilling of unnecessary wells? Or do you mean speculative as to what you rely on?
A. For any future wells I can only speculate on that.
Q. Okay. So you don't know what wells might eventually get drilled on this piece of land; right?
A. No, I'm saying in the entire field I don't know what wells will be drilled.



Q. Okay. When it comes to this particular pool of reservoir -- or reservoir hydrocarbons does the size of the spacing unit change the number of wells that will have to be drilled to access the B and A Sands that have been talked about in this hearing?
A. Based on the information presented today, and in the application, I think the one well would be appropriate to drain that. But, again, this is speculation. You never know what you are going to encounter until you drill a well.
Q. But as we sit here today regardless of the size of the spacing unit this pool that Mr. Smith identified for us can be drained by one well regardless of which spacing unit it might be in; right?
A. It likely could.
Q. Okay. And in this case if we change the spacing unit from 640 to 320 acres does that in any way protect correlative rights?
A. It depends on what is found in the well.
Q. What do you understand to be a correlative right? I'm sorry, let me withdraw that. Are you familiar with the statutory definition of correlative rights?
A. Yes, I am.
Q. Okay. And that definition provides



correlative rights are the opportunity of each owner in a pool to produce his just and equitable share of oil and gas without waste; correct?
A. That is my understanding; yes.
Q. Now, if the spacing unit is 640 acres will any of the owners of those 640 acres in any way be denied the ability to produce their oil and gas?
A. That is speculation on my part.
Q. Well, I mean, so you don't know whether it would result in any impact on correlative rights to choose a bigger or a smaller spacing unit in this case; is that fair?
A. For the information presented this is appropriate. In any sense when you drill a well you can be surprised. You may be find something else. So there may be something that is found in the well when it is drilled that may create an opportunity in another part of the section where somebody else could drill. But we don't know that until the well is drilled. But for what was applied for this is appropriate.
Q. And so as far as you can tell right now is it true that you don't know whether changing the spacing unit size will affect anyone's correlative rights or not; do you?
A. For what is presented this is appropriate.

Q. Sir, that is not the question I asked. You don't know whether it will affect anyone's correlative rights; do you?
A. Well, you are speculating on the future. And no one knows what is going to happen when you drill a well.
Q. And because you don't know what is going to happen you cannot make any prediction one way or the other about what will happen to correlative rights if the spacing unit is either approved or denied?
A. Again, that is speculation. But for this information this will --
Q. Sir, I'm just trying to reach an agreement with you. That it is speculation to make those assessments about future correlative rights; right?
A. Yes, I suppose so. I'm trying to --
Q. That's it. I'm sorry.
A. I'm just trying to understand you're questioning. That is all.
Q. Okay. So in order to authorize an amendment from the 640 acres default Idaho Code 41-317, Subsection 5, says to authorize an amendment, the department shall find that such an amendment would assist in preventing the waste of oil and gas, or avoid drilling of unnecessary wells, or protect correlative rights. And



is it true, as you just testified, that guessing whether this spacing unit would do any of those things would require to you engage in speculation that goes beyond the scientific data that is available to you right now; is that right?
A. We have limited scientific data in this basin. So we have to go with what we know. And that is what we are doing.
Q. So to reach a conclusion about the items I just listed off it is just not something you can do with the data that is available. You would need more data to reach that conclusion. Right?
A. No. As I said, for the data presented this is the best conclusion.
Q. So has the department in fact found that a 320 acre spacing unit in this case will prevent waste of oil and gas? Is there such a finding they made?
A. That is a recommendation; yes.
Q. Did you conclude that in fact a smaller spacing unit will prevent waste in this case?
A. Yes.
Q. Have you made such a finding?
A. Yes, I believe it will.
Q. In what way will it reduce waste? Explain that to me, please.



THE HEARING OFFICER: Mr. Piotrowski, we have an objection.
MR. MAROTZ: I object that the ultimate finding to be made by the department rests with the administrator. The department has yet to make a finding on that issue yet. And it would be not material for Mr. Thum to say whether a finding has been made or not.
THE HEARING OFFICER: Mr. Piotrowski, do you have a response to that objection?
MR. PIOTROWSKI: Oh, I'll happily rephrase my question.
THE HEARING OFFICER: Okay. Please do.
Q. (BY MR. PIOTROWSKI) Mr. Thum, do you believe that a smaller spacing unit in this case will reduce waste of oil and gas?
A. I believe for the sands that were requested, yes, it will.
Q. How will it reduce waste?
A. Because --
Q. In your opinion.
A. Because it will define the limits of the proposed pool where no other wells can be drilled. Just this one well.
Q. If the unit was large it would still limit to just one well; wouldn't it?



A. That is speculation. It depends on what this well finds.
Q. And is it possible, speculation wise, that we will drill more than one well --
THE COURT REPORTER: Mr. Piotrowski, you need to lean forward again and not lean back. Try again.
Q. (BY MR. PIOTROWSKI) Mr. Thum, I am having a hard time understanding why the size of the spacing unit affects waste. Can you explain that to me in simple layman's terms?
A. Because it defines a size -- a geographic size for appropriate development of this pool.
Q. And if we -- were you done? I didn't mean to step you on you. I wanted to make sure you were done with your answer.
A. Yes, I'm done.
Q. And if this unit were instead doubled in size, still focusing on the A and B Sands, but let's say we went with the 640 acre spacing unit, would it result -- can you explain to me in simple terms how that would cause the waste of oil and gas?
A. Again, you are asking me to speculate on future geology. I can't do that.
Q. And you believe that this spacing unit were less than 640 acres, instead of 320, that it would

necessarily result in drilling more wells than it would if you just left the 320 acre unit?
A. I don't know. That is speculation. That is an operator decision.
Q. In your opinion will approving a larger spacing unit result in drilling more wells?
A. I don't have an opinion on that.
Q. Do you believe that anybody will use their right to develop their oil and gas resources if the hearing officer and the board approves, the commission approves, a 640 acre unit?
A. I can't predict what they would approve.
Q. I'm saying if it were to be approved would you believe it would harm anybody's correlative rights?
A. I can't say.
Q. You are unable to say "yes" or "no" to that question?
A. Yeah, I can't answer that.
Q. Okay. If we can take a look please at -- maybe somebody can pull it up. I certainly can if necessary. Maybe it is not necessary. Do you recall Exhibit C that Mr. Smith testified about? Which is the amplitude strength map?
A. Yes.
Q. And do you agree with the conclusions and



opinions expressed by Mr. Smith in where he placed the various elements on that map in Exhibit C?
A. I don't have the luxury of all of the data that Mr. Smith constructed that map. As I stated earlier I believe that his conclusions are a reasonable interpretation of the geological and geophysical data in the basin.
Q. And so if his conclusions are reasonable then would you also agree that the proposed spacing unit is larger than it needs to be in order to drain Sands A and B?
A. I believe it is appropriate.
Q. Do you believe that the people in the northeast corner of that proposed unit have any oil and gas in Sands A and B?
A. I don't know. The well has not been drilled.
Q. According to Mr. Smith -- do you agree with Mr. Smith that with those low amplitudes, and that fault line that is marked in brown in Exhibit C, make it extremely unlikely that northeast corner contains any hydrocarbons in Sands A and B?
A. As presented, yes, that is likely correct.
Q. So Mr. Smith's opinion on that you believe is a reasonable one?
A. I do.



Q. Okay. Do you have -- why is it that you think it is appropriate to draw the spacing unit in a rectangle when we are trying to define a natural feature?
A. Because that is how spacing works.
Q. What do you mean by that is how spacing works?
A. It a geographic boundary for a geologic description. And that is virtually impossible to do with a geographic boundary.
Q. Sir, I've owned a lot of real estate in the State of Idaho over the years. None has solid section lines. Do you think there was some problem in geographically describing that property?
A. I believe the statute says that units shall be described using geographic boundaries. So that is how it is done in every state in the union.
Q. In fact, the statute says the geographic boundary of a unit shall be described in accordance with the Public Land Survey System. Do you believe that is correct?
A. Yeah, that sounds like a correct reading.
Q. Now, couldn't you describe something in accordance with the Public Land Survey System by referencing a spacing unit by identifying township and range, et cetera, and then using metes and bounds, and



measure it just like we all do for both commercial and real estate property?
A. Metes and bounds are different from point of call. And point of call is generally used as a geographic boundary.
Q. Is it possible to describe a land mass, a service area, in accordance with the Public Land Survey System, when that area that you are describing is not precisely coextensive with the section lines?
A. I don't understand what you are asking.
Q. Well, let's say I bought a round piece of property. It's a circle. On the surface it is described as a circle. And obviously it is not going to be coextensive with a section. Would it be possible to provide a geographic description of the location of that circle in accordance with the Public Land Survey System?
A. That is not how units are described.
Q. Could you describe my hypothetical circle in accordance with the Public Land Survey System?
A. But you don't describe units that way.
Q. Sir, that is not what I'm asking you. I'm asking you if you picked a unit and you decide I want a circular unit could you describe that unit in accordance with the Public Land Survey System?
A. I suppose you could. But it is not how it is

done anywhere.
Q. Okay. Now, the statute here in Idaho says you will describe -- the unit shall be described in accordance with the Public Land Survey System. And if the unit --
THE COURT REPORTER: Hold on, Mr. Piotrowski. Slow down.
MR. PIOTROWSKI: It's a long question and I went too fast.
THE COURT REPORTER: Yes, you did.
Q. (BY MPIOTROWSKI) When you describe something in accordance with a Public Land Survey System does that mean you have to make all of your borders right on the section lines?
A. I believe that is how the statute is interpreted; yes.
Q. And, in fact, in your exhibit didn't you just show us several spacing units that don't follow section lines?
A. I don't believe so. I think they all follow section lines.
Q. If we can take a look at your Exhibit IDL-01. If you look at what is labeled as Unit A. Do you see that?
A. Yes, I do.



Q. Now, there is a dashed red line that was an earlier unit, spacing unit, boundary; correct?
MR. BROWN: I'm not talking. I'm just listening to the zoom call.
THE HEARING OFFICER: Mr. Brown, can you mute yourself.
Q. (BY MR. PIOTROWSKI) So the red dotted line around Unit A it followed the section lines; right?
A. Yes, it did.
Q. Other than the Payette River which happens to be the state line in this case.
A. That's right.
Q. And the purple line inside Unit A, what is that one for? That is an approved integrations unit. That doesn't follow the section lines; does it?
A. That can be described as the -- I believe the northern 1/2 of -- I think that's Section 16 -- northern 1/2 of the NE 1/4 of Section 16. And the NE 1/4 of the NW 1/4 of Section 16. So, yes, it is using section lines.
Q. So you just described that unit in accordance with the Public Land Survey System; right?
A. More or less.
Q. And you can still do that even if the unit was not square or rectangle? You could still do that if you



use precise measurements; couldn't you?
A. I have never seen any drawn that way.
Q. Okay. Now, in fact, if we look -- still looking at Unit A. There is even a smaller dotted red line. Do you see that one?
A. I do. But that is not an existing unit.
Q. Well, what is that?
A. That is a withdrawn unit boundary.
Q. So is that a unit that was approved and then later withdrawn? Or was that a unit that was applied for and withdrawn before it was approved?
A. It was withdrawn before it was approved.
Q. Okay. So in Unit A we found a unit that is described in part as portions of a quarter section; right? The north half of the east half of whatever?
A. I believe that's correct; yes.
Q. Okay. And do you believe that that particular decision is consistent with the statute that you have to apply and enforce?
A. Yes. I believe it is appropriate; yes.
Q. Is there anything in the statute that says a spacing unit needs to be rectangular? Does it use the word rectangular?
A. I'm not aware of that wording; no.
Q. And nothing in that statute says that units



need to be square either; do they?
A. I'm not aware of that wording in the statute either.
Q. Okay. And so what is required though is that you be able to describe the property in accordance with the Public Land Survey System. I think we agree on that much. Is that right?
A. It doesn't say -- it doesn't use the word property. I'm aware of that.
Q. I'm sorry, the Public Land Survey System. So other than that statement that says that the unit shall be described in accordance with that system is there any other statutory guidance that you are aware of about what shape or what size, other than 640 acres, the spacing units should be?
A. No. Unless you want to read it to me.
Q. Yeah, I'm not aware of any. That is why I'm asking you. Are you aware of any?
A. No. And I don't have the statute in front of me.
Q. Okay.
MR. PIOTROWSKI: Thank you, Mr. Thum. I appreciate your patience. That is all I have.
THE HEARING OFFICER: Mr. Christian.

CROSS-EXAMINATION

QUESTIONS BY MR. CHRISTIAN:

Q. Good afternoon, Mr. Thum. I want to go back through some of the statutory sections that Mr. Piotrowski discussed with you. Because I think he left some things out.

MR. PIOTROWSKI: Object to the commentary. Can we strike that from the record, please?

THE HEARING OFFICER: It is stricken. Just the commentary about leaving things out. You can prove any point you would like to through the testimony of this witness.

MR. CHRISTIAN: Thank you, madam hearing officer. I would also like to ask that Mr. Piotrowski refrain from from cutting either me off or a witness off when they are speaking. He has been doing it today. He has done it before.

MR. PIOTROWSKI: When I need to make an objection I'll raise my objection. Other than that I'll do my best.

THE HEARING OFFICER: Thank you, Mr. Piotrowski.

Q. (BY MR. CHRISTIAN) Mr. Thum, Mr. Piotrowski referred you to section -- Subsection 3 of 47-317 in Idaho Code. Which is the section that deals with the



spacing configurations; right?

A. That's correct.

Q. Now, I will read to you the first part of Section 3. It says, "In the absence of an order by the department establishing spacing units, or authorizing different well density patterns for particular pools or parts thereof, the following requirements shall apply." Do you understand that to mean that default spacing system applies in the absence of an order establishing a spacing unit or units?

A. I do.

Q. Okay. Now, Subsection B of 47-317 says -- and I think Mr. Piotrowski may have read you part of this as well -- that a directional or vertical gas well shall be located in a spacing unit consisting of a 640 acre governmental section or lot or tract, or combination of lots and tracts substantially equivalent thereto.

Do you understand that to mean that ordinarily a default spacing section for a gas well -- or a spacing unit for a vertical gas well is a standard 640 acre unit?

A. I do.

Q. Okay. So in this instance the applicant has requested a different kind of -- an order establishing a spacing unit that straddles two sections; right?



A. That's correct.

Q. It is the NE 1/4 section of Section 9 and the NW 1/4 section of Section 10. In the absence of an order do you agree that the formation that is at issue here, Sands A and Sand B accumulations that the applicant is focused on, would be split up between Sections 9 and 10?

MR. PIOTROWSKI: Objection. Leading.

THE WITNESS: Can you repeat the question.

THE HEARING OFFICER: Let me rule on the objection. Do you want to respond?

MR. CHRISTIAN: I asked him if he agrees with what I have described.

MR. PIOTROWSKI: That is a leading question.

MR. CHRISTIAN: It doesn't direct him to answer "yes" or "no."

MR. PIOTROWSKI: It is still a leading question.

THE HEARING OFFICER: Mr. Piotrowski, let me rule on this. We have a lot of leeway in administrative proceedings. Including asking leading questions. But this witness is asking on cross-examination, which leading questions are also permissible.

MR. PIOTROWSKI: The witness is not hostile to Mr. Christian or his client. The witness is in line



with his client. That is why it is an inappropriate leading question.

THE HEARING OFFICER: Mr. Piotrowski, the rules of evidence do not apply to these proceedings. I'm got to permit the question to stand as asked. I will ask the court reporter to read it back, please.

MR. CHRISTIAN: How about if I just reask the question.

THE HEARING OFFICER: That works as well.

Q. (BY MR. CHRISTIAN) Mr. Thum, do you understand that in the absence of an order establishing spacing units that the formation at issue here would be split between two different sections?

A. I do.

Q. So if it were to be produced based on default spacing it would require two wells to produce the formation rather than one; right?

A. As long as they were in legal locations; yes.

Q. Yes. You would have to comply with setback requirements and that sort of thing?

A. Correct.

Q. So does that tell you whether the requested spacing unit may prevent the drilling of unnecessary wells?

A. Yes, it could potentially do that. Again, as

I stated, it depends on what the well finds.
Q. Sure. Mr. Piotrowski also asked you about correlative rights. Let's assume the spacing order that the applicant request was not granted. And that the applicant had to go drill into the formation, let's say, through a spacing unit that was the entirety of Section 9. Based on Mr. Smith's testimony is it -- do you understand that outside of the NE 1/4 section of Section 9 the rest of the section would not be prospective for Sands A and B? The portions of Sands A and B that are being pursued by the applicant here?
A. Potentially, yes. That's correct.
Q. Okay. So at least based on the information that Mr. Smith has presented, and the interpretations he has offered in his testimony, three-quarters of that -- of the default unit being Section 9 would be nonproductive?
A. That's correct.
Q. However, because of the way the statute applies, revenue from a well, encompassing all of Section 9, would be shared among all of the property owners of Section 9; right?
A. That's correct.
Q. Okay. So the correlative rights of the folks in the NE 1/4 section of Section 9 would be impacted?



A. Potentially, yes.
Q. Okay. You had a discussion with Mr. Piotrowski about the description of the unit in accordance with the Public Land Survey System.
What do you understand the Public Land Survey System to include? Let me ask the question different way. How do you understand the Public Land Survey System to describe land?
A. By section.
Q. Or portions thereof?
A. Yes.
Q. Quarter sections, for example?
A. Yes.
Q. Like we are talking about here. So it's true that the proposed unit area anyway is described in accordance with the Public Land Survey System?
A. That's correct.
Q. Okay. And the statute just says -- it is 47-317(2). Mr. Piotrowski also read it to you. It says the units established by the department shall be geographic. What do you understand that to mean?
A. That they do not follow --
MR. PIOTROWSKI: Objection. This is a legal question that he is asking. He is asking for a statement about a legislative addendum. What was meant



by the legislature by those choice of words.
MR. CHRISTIAN: Mr. Piotrowski asked a number of questions asking Mr. Thum to interpret 47-317. And I'm merely following up on that.
MR. PIOTROWSKI: And I disagree that he is qualified to answer those questions.
THE HEARING OFFICER: I agree, Mr. Piotrowski, you did spend asking a number of questions on what -- how a spacing unit shall described vis-a-vis geographic boundaries. Even including circular spacing units as an example. So I'm going to permit these questions.
MR. CHRISTIAN: You can answer the question.
THE WITNESS: Can you read the question back to me, please.
MR. CHRISTIAN: I can ask the question again.
Q. (BY MR. CHRISTIAN) I read to you the line that said these units established by the department shall be geographic. And I asked you what your understanding of that was.
A. That you would use sections or portions of sections to make those descriptions.
Q. In your experience in the industry, as you have described in response to Mr. Marotz's questions, is it ordinary to describe a spacing unit by reference to an interpreted geologic boundary of a pool?



A. Never in my experience; no.
Q. I understand I think there is one place in the country in south Louisiana where they attempted to do it and then everybody just fights about it all of the time.
MR. PIOTROWSKI: Objection. Foundation.
Q. (BY MR. CHRISTIAN) Do you have any understanding about that?
A. I have worked there, but never had to draw a unit boundary like that.
Q. Mr. Piotrowski asked you about waste. And you may recall -- do you recall his questions to Mr. Smith about the same subject?
A. Vaguely, yes.
Q. Okay. He talked about the escape or releasing of gas above ground. Do you understand -- are you familiar with the definition of waste in Idaho Oil and Gas Conservation Act?
A. Yes.
Q. And with respect to gas it includes a component that relates to operating or producing a well in a manner that results in decreased pressure, or otherwise results in a diminishment of the ultimate amount of the resource to be produced; right?
A. That's correct.
Q. And Mr. Piotrowski left that out of his

discussion; right?
A. I don't remember.
Q. If a unit is drawn excessively large or excessively small could it result in what I would call underground waste? In other words, the drilling of wells in such a manner and pattern that the ultimate recovery of the resource may be diminished?
A. In general, yes, that is correct.
Q. Okay. In your view, based on the information that you received from the applicant, and the testimony that has been presented here today, is it your view that the proposed unit area is a reasonable configuration to produce the overall resource in the area in an efficient manner?
A. As I stated in my testimony, yes, that is correct.
MR. CHRISTIAN: I think that's all I have.
THE HEARING OFFICER: Before I ask Mr. Marotz or Mr. Piotrowski if they have anything left -- well, let me ask that question and about how much. Because we are at the breaking point. I don't want to get all motherly on you. But we are getting a little bit tense and grumpy here. So I think a break could be useful. But if there is only a couple follow-up questions then I think we could probably wrap this up, take a break, and



open it up to public comment, if any.
MR. MAROTZ: I have about four or five questions.
THE HEARING OFFICER: Okay. Mr. Piotrowski, do you have a rough estimate of how much time you would need.
MR. PIOTROWSKI: I may or may not ask one question.
THE HEARING OFFICER: Okay. So let's go ahead and power through your four or five questions and Mr. Piotrowski's maybe one question. And then we'll break if necessary.

REDIRECT EXAMINATION
QUESTIONS BY MR. MAROTZ:
Q. So, Mr. Thum, spacing units, as you understand them, describe an area on the surface; correct?
A. That's correct.
Q. And oil and gas reserves are beneath the surface?
A. That's correct.
Q. So is it, in your training, experience, and education, is it possible to know with any level of certainty the boundaries of a subsurface reservoir that would allow you to draw a meaningful line on the surface



that corresponds exactly to where that pool is below the ground?
A. It is not. Based on the nature of the data acquired. And that is why you space appropriately to allow for those uncertainties.
Q. And in the event that information gleaned from a well in the spacing unit shows that the unit is either larger or -- or the subsurface reservoir, rather, is either larger or smaller than the spacing that it should provide, the department has mechanisms to update the size of those spacing units, depending on the evidence; correct?
A. That is correct.
MR. MAROTZ: Thank you. That is all I have.
THE HEARING OFFICER: Mr. Piotrowski, the floor is yours.

RECROSS-EXAMINATION
QUESTIONS BY MR. PIOTROWSKI:
Q. Mr. Thum, you're aware, aren't you, that it is appropriate to, under the statutes in this case, to ask the spacing unit be either not located within the boundaries of a section, or not within a quarter section, or even a quarter-quarter section, pursuant to Idaho Code 47-317(4)(c); is that right?



A. I don't have that section of code in front of me. So I can't confirm that.
Q. Do you recall seeing that section that allows to define the spacing unit down to a quarter-quarter section level?
A. I don't recall that wording.
MR. PIOTROWSKI: Thank you. That is all.
THE HEARING OFFICER: Thank you, Mr. Piotrowski. Do we have anybody from the public here that wants to provide public testimony, Mr. Piotrowski, on behalf of your client CAIA? Did you want to speak?
MR. PIOTROWSKI: No. I do not want to speak on behalf of the client. In fact, I understood the evidentiary portion of this hearing will be over at 5:00 p.m. I'm already well past my next appointment. Are we simply continuing the hearing into the public section? In the past these have been separate proceedings.
THE HEARING OFFICER: I just assumed that we were going to roll into the public portion of the proceedings to the extent the public could join us at this point in time since the evidentiary portion went long.
MR. PIOTROWSKI: Well, I have nothing to add in the public section.
THE HEARING OFFICER: Are you here to testify

on behalf of the public?
MS. NITZ: No, I am not.
THE HEARING OFFICER: Okay. So seeing that there is no one outside of the City Hall room waiting to testify I'm comfortable closing these proceedings with the evidentiary portion and the public comment portion. Given that these proceedings are technically open until the 17th I will permit the commission or the department to accept public written comment until the 17th. At which point the proceedings, the public comment portion, will be closed.
All right. Anything else from anybody else?
MR. MAROTZ: I would ask if the hearing officer would accept some post-hearing statements from the parties. We can do it on an expedited basis just to make sure we have clarified our issues. I believe there is some matters that would be better put on paper to assist you.
THE HEARING OFFICER: Yes. Absolutely. So, Mr. Piotrowski, written closings have been requested. I'm going to grant that request. At this point in time I ask that they be submitted no later than the 17th given our statutory deadline. I will accept them after 5:00 on the 17th to the extent the parties need that amount of time. At that point the evidentiary record



will close, thus starting the statutory 30 day clock for my decision to issue. The department has requested a copy of the transcript. I would like one as well. Mr. Christian, would you like a copy of the transcript?
MR. CHRISTIAN: Yes, please.
THE HEARING OFFICER: Mr. Piotrowski, would you like a copy of the transcript.
MR. PIOTROWSKI: No, thank you.
MR. CHRISTIAN: Madam hearing officer, on the subject of post-hearing statements if I might. We have already given you a lot. And I wonder if we might limit them to something like five pages, exclusive of certificates of services and signature blocks and that kind of thing. We ought to be able to say what we need to say that quickly. Especially since we got to file it in four days.
THE HEARING OFFICER: I'm comfortable with that to the extent someone thinks they need more than that it is fine by me. I always forget that people are more purposed than I ever was in practice. And I would never file anything longer than five pages for the most part. So thank you for that. So parties are to attempt to keep their filings to five pages. Not strictly enforced. But if I get 50 pages I will probably be striking some portions of it.



Okay. With that we are in recess. Thank you.
(Zoom recording stopped; subsequent to which, proceedings concluded at 5:30 p.m.)



REPORTER'S CERTIFICATE

I, MONICA M. FUHS, CSR No. 471, Certified Shorthand Reporter, certify: That the foregoing proceedings were taken before me at the time and place therein set forth, at which time the witness was put under oath by me;

That the testimony and all objections made were recorded stenographically by me and transcribed by me or under my direction;

That the foregoing is a true and correct record of all testimony given, to the best of my ability;

I further certify that I am not a relative or employee of any attorney or party, nor am I financially interested in the action.

IN WITNESS WHEREOF, I set my hand and seal this 24th day of June, 2024.

MONICA M. FUHS, CSR
Notary Public
1109 W. Main Street, #220
Boise, Idaho 83702
My commission expires August 3, 2024

**[& - 1:00]**

## [8 - addendum]

**[adding - answer]**

**[answered - areas]**

**[argue - b]**

**[b - bid]**

**[big - called]**

**[clay - condensate]**

## [condition - correlative]

**[corresponds - days]**

**[deadline - describe]**

**[evaluated - exhibits]**

**[following - gas]**

**[kind - leslie]**

**[log - mailings]**



**m**

**[main - measure]**

**[objections - okay]**

**[pipe - presence]**

**[qualifications - receiving]**

**[recently - remotely]**

**[repeat - right]**

**[side - sound]**

**[sound - start]**

**[started - subsurface]**

**[tell - thoroughly]**

**[thousands - trough]**

**[trough - unit]**

**[variation - wells]**