STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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

APPLICATION OF BLACKBUCK RESOURCES, LLC FOR A SALTWATER DISPOSAL WELL, LEA COUNTY, NEW MEXICO. CASE NO. 20463

APPLICATION OF SOLARIS WATER MIDSTREAM, LLC FOR A SALTWATER DISPOSAL WELL, LEA COUNTY, NEW MEXICO. CASE NO. 20465

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

July 22, 2019

Santa Fe, New Mexico

BEFORE: WILLIAM V. JONES, CHIEF EXAMINER
MICHAEL McMILLAN, TECHNICAL EXAMINER
BILL BRANCARD, LEGAL EXAMINER

This matter came on for hearing before the New Mexico Oil Conservation Division, William V. Jones, Chief Examiner; Michael McMillan, Technical Examiner; and Bill Brancard, Legal Examiner, on Monday, July 22, 2019, at the New Mexico Energy, Minerals and Natural Resources Department, Wendell Chino Building, 1220 South St. Francis Drive, Porter Hall, Room 102, Santa Fe, New Mexico.

REPORTED BY: Mary C. Hankins, CCR, RPR
New Mexico CCR #20
Paul Baca Professional Court Reporters
500 4th Street, Northwest, Suite 105
Albuquerque, New Mexico 87102
(505) 843-9241

APPEARANCES

FOR APPLICANT BLACKBUCK RESOURCES, LLC:

ERNEST L. PADILLA, ESQ.
PADILLA LAW FIRM, P.A.
1512 South St. Francis Drive
Post Office Box 2523
Santa Fe, New Mexico 87504
(505) 988-7577
padillalaw@qwestoffice.net

FOR APPLICANT SOLARIS WATER MIDSTREAM, LLC:

JAMES G. BRUCE, ESQ.
Post Office Box 1056
Santa Fe, New Mexico 87504
(505) 982-2043
jamesbruc@aol.com

FOR PROTESTER NEW MEXICO OIL CONSERVATION DIVISION:

DAVID K. BROOKS, ESQ.
ENERGY, MINERALS & NATURAL RESOURCES DEPARTMENT
Office of General Counsel
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
(505) 476-3415
davidk.brooks@state.nm.us

FOR PROTESTER AND INTERESTED PARTY NGL WATER SOLUTIONS PERMIAN, LLC (Case Numbers 20463 and 20465);
FOR INTERESTED PARTY MESQUITE SWD, INC. (Case Number 20463 only):

DEANA M. BENNETT, ESQ.
MODRALL, SPERLING, ROEHL, HARRIS & SISK, P.A.
500 4th Street, Northwest, Suite 1000
Albuquerque, New Mexico 87102
(505) 848-1800
deanab@modrall.com

INDEX

INDEX (Cont'd)

EXHIBITS OFFERED AND ADMITTED

(9:32 a.m.)

EXAMINER JONES: We're ready to go this morning. This is a special examiner hearing on Monday, July the 22nd, 2019. They've labeled it Docket 26-19.

I'm William V. Jones.

Bill Brancard is our -- has graciously agreed to sit as counsel for the examiner and co-examiners in these cases, and Michael McMillan is here also.

There are two cases that I see on the docket, Case Numbers 20463 and 20465.

Is there anything preliminarily anybody wants to --

MR. BROOKS: Yes, Mr. Examiner, Honorable Examiners. I have another appointment, which I was pledged to before this case was set, which is at 11:00, which means I need to leave about quarter to 11:00. And I realize that means we only have one hour to go on this case before a break. And I don't anticipate it will be finished in that period of time, so that means we'll come back this afternoon, if I'm excused for that purpose, which I request to be.

EXAMINER JONES: Your clients would not want to proceed without an attorney, I suppose? That's not proper?

MR. BROOKS: Well, it would be okay with me except it is somewhat irregular for one of the counsel -- for one of the parties not to be present at the hearing.

EXAMINER JONES: When would you be back?

MR. BROOKS: I can be back by 12:30.

EXAMINER JONES: Does that fit with everybody else's schedule?

Mr. Bruce?

MR. BRUCE: I'm available. I was praying to God that we would be done with these matters this morning. We've sat for three days, and we have never gotten -- neither Ernie's client nor mine have gotten to put on their cases, and we have just been spinning our wheels.

EXAMINER JONES: Mr. Padilla?

MR. PADILLA: I have the same sentiments, but I think that if we have an early lunch, maybe we could get back at 12:30 and continue. But I certainly don't want to be at the end of 5:00 or 4:30 with not having finished. And I think that Jim and I are going to be much quicker than the Mesquite cases, so we'll get right to the heart of the matter without unduly prolonging these cases.

EXAMINER JONES: These cases are going to

be combined, or do you guys want to hold them separately?

MR. BRUCE: Well, I mean, Ernie can present his case first, and I'll present mine second, but combine them, yeah. Might as well.

EXAMINER JONES: I'm going to call the cases, and I'm going to ask the counsels to briefly state what they're going to talk -- why they're here and what they're going to talk about today.

Let's call Case Number 24063, application of Blackbuck Resources, LLC for approval of a saltwater disposal well in Lea County, New Mexico.

Call for appearances in that case.

MR. PADILLA: In Case 20463, Ernest L. Padilla. I have three witnesses.

MR. BRUCE: And Jim Bruce representing Solaris Water Midstream in that case.

MR. BROOKS: David Brooks, assistant general counsel, Energy, Minerals and Natural Resources Department, appearing for the Oil Conservation Division.

EXAMINER JONES: Any other appearances? Any other appearances that anyone is aware of?

MR. BRUCE: I think Deana Bennett entered an appearance. She objected to at least Solaris' application, then withdrew that objection. And I don't

know if she was entering an appearance for NGL also. But there is an email I just saw that said she's going to be late and proceed without her.

EXAMINER JONES: Okay. We'll let her make that appearance when she arrives.

Let me call the other case also, Case 20465, application of Solaris Water Midstream, LLC for approval of a saltwater disposal well in Lea County, New Mexico.

Call for appearances.

MR. BRUCE: Mr. Examiner, Jim Bruce of Santa Fe representing the Applicant, and I have three witnesses.

EXAMINER JONES: Other appearances?

MR. PADILLA: Ernest L. Padilla for Blackbuck Resources.

MR. BROOKS: David Brooks for OCD.

EXAMINER JONES: Any others?

Okay. We'll let Ms. Bennett pipe up when she shows up.

Will the witnesses who are going to testify today please stand?

Mr. Brooks, do you have a witness today?

MR. BROOKS: We might, but we'll only use him for rebuttal, if any. I guess he should be sworn.

EXAMINER JONES: Will the court reporter please swear the witnesses?

(Mr. Alleman, Mr. Tomastik, Mr. Arthur, Mr. Walk, Mr. Wood, Mr. Dixon and Mr. Goetze sworn.)

EXAMINER JONES: Okay. Mr. Padilla, can you tell us why we got to this point and what you're going to show us today?

OPENING STATEMENT

MR. PADILLA: What we're going to show today is the typical C-108 application for a deep saltwater disposal well that will dispose into the Devonian Formation and associated stringers within an approximately 1,000-foot disposal interval. You will hear what the upper and lower containment strata is going to be. You will also hear engineering and geologic testimony about -- including seismicity and that this well should be approved and that any notions in terms of site specificity are just not present and wouldn't pose a danger to faulting or any of that sort that has been brought up by the Division's presentation here. So that's basically our case.

In the interest of time, I don't want to go into a big, long opening statement, but, again, this is state-of-the-art. We have very good witnesses who I

think are, in my opinion, very impressive in terms of the technical presentation that we will be making.

EXAMINER JONES: Okay. And this case, did it get protested? Is that why it got set for hearing?

MR. PADILLA: It got protested by the Division. And, of course, Solaris and Blackbuck have competing applications because their proposed wells are very close to each other, as the evidence will show.

EXAMINER JONES: Mr. Bruce?

MR. BRUCE: Maybe before I begin my presentation, but right now, let's get into it.

EXAMINER JONES: Okay.

MR. BROOKS: We'll only be presenting rebuttal.

EXAMINER JONES: Okay. We're ready to proceed.

EXAMINER BRANCARD: May I raise a procedural point? At the last hearing, because this is a different hearing, there was an assumption by the parties that the testimony of Mr. Goetze in the Mesquite cases can be placed in the record for these two cases. Is that still the assumption of the parties?

MR. BRUCE: Yes.

MR. PADILLA: Yes.

EXAMINER JONES: Thank you.

Mr. Padilla, would you like to proceed with your case?

MR. PADILLA: Mr. Examiner, call Nate Alleman.

NATHAN ALLEMAN,

after having been previously sworn under oath, was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. PADILLA:

Q. Mr. Alleman, for the record, please state your name.

A. Nathan Alleman.

Q. By whom are you employed?

A. ALL Consulting.

Q. And what do you do for ALL Consulting?

A. I'm a project manager and regulatory specialist and have been helping oil and gas clients throughout the nation for the last 11 years with various environmental and regulatory issues.

Q. You have testified before the Oil Conservation Division before today?

A. That's correct.

Q. And have your credentials as a regulatory specialist been accepted by the Division?

A. Yes.

Q. Let me ask you to acquaint the examiners with your educational background before we move on.

A. I have a bachelor's in biology from Pittsburgh State University and a master's in environmental policy and management from the University of Denver.

Q. And give us a short synopsis of your background in the oil and gas industry and what you've done in connection with regulatory matters.

A. For the last 11 years, as I mentioned, I've been helping oil and gas operators with regulatory environmental issues. We've done due diligence on over 1,500 oil and gas well sites, usually for acquisition assessments. I have managed the -- managed disposal facility audits for over 150 saltwater disposal facilities and solid waste disposal facilities. I've permitted over 500 oil and gas wells and have been involved in stray gas investigations and do seismicity investigations and supported those efforts in the midcontinent.

Q. In connection with this case, did you -- what did you do for preparation of the C-108?

A. I was the project manager for this -- the Olive Branch Saltwater Disposal Well application and compiled a team of experts -- landmen, geologists, engineers geophysicists -- to prepare the necessary information,

and then I oversaw the completion and preparation of the application and its submission to OCD.

Q. So when we look at the C-108 that has been marked as Exhibit Number 1 -- I won't have you refer to that -- you had -- you managed all of the information to put in that; is that right?

A. That's correct.

Q. Okay.

MR. PADILLA: Mr. Examiner, we tender Mr. Alleman as a regulatory specialist to testify here today.

EXAMINER JONES: Any objections?

MR. BRUCE: No objections.

EXAMINER JONES: Mr. Brooks?

MR. BROOKS: No objection.

EXAMINER JONES: Mr. Alleman is so qualified as a regulatory expert.

Q. (BY MR. PADILLA) Mr. Alleman, let's jump into Exhibit Number 1, which is the C-108. Is that your signature on the first page?

A. It is.

Q. And you submitted this to the OCD on -- by letter dated March 15th, 2019?

A. That's correct.

Q. What happened to the administrative application

as it was filed with the OCD?

A. In terms of -- so we filed it, and then we received notice of protest from -- from NGL and then OCD.

Q. And that's why we're here?

A. That's why we're here today.

Q. Let's go to page 2 of that application. What does that contain? That's just a cover sheet; is that right?

A. That's correct. That's the administrative application checklist.

Q. Okay. Where does the meat of this application start?

A. The C-108 starts on page 3. We began responding to the information request in the C-108 on page 5.

Q. Okay. And who is Mr. Oliver who signed this third page?

A. Samuel Oliver is the chief commercial officer for Blackbuck Resources.

Q. And you tendered this to Mr. Oliver for his signature, I take it?

A. That's correct.

Q. Okay. Let's go on to page number 5. Is that where the meat of the application starts?

A. That's correct.

Q. What's on page 5 of this Exhibit 1?

A. Page 5 generally goes over the location of the -- of the well being 979 feet from the south line and 2,620 feet from the west line of Section 17, Township 24 South, Range 32 East in Lea County, New Mexico. It also provides the proposed injection interval of 16,825 feet to 18,290 feet. And then it moves down into the casing information and then just general well construction, showing how the well will be constructed. Our engineer can talk more about that later, about the appropriateness of that construction.

Q. Okay. And anything else significant on page 5?

A. We do have a -- again, it'll be open-hole injection between 16,825 and 18,290 into the Devonian-Silurian Formations.

Q. And that's a little over 1,000 feet; is that right?

A. That's correct.

Q. Let's go on to page 6. Tell us what's on that page.

A. Page 6 generally lists the information that's going to be provided. Later in the application, there is supplemental information with maps and such. It gives -- it states that our proposed maximum injection

rate is 30,000 barrels of water per day, with an estimated average of 15,000 barrels of water per day. It'll be a closed system with a proposed maximum injection pressure of 3,365 feet, which is based on the .2-pound-per-foot gradient. That's OCD's regulation.

Q. Now, with respect to the geologic description on Part A, you're going to defer to our geologist, right?

A. Yeah. Our geologist can talk more in depth about that.

Q. Will you move on to the attachment portion of the C-108? Yes?

A. Yes.

Q. What's Attachment 1, which is on page -- starting on page 9?

A. Attachment 1 shows the wellbore diagram for the Olive Branch Saltwater Disposal Well. It shows the general well construction. And, again, our engineer can talk more about the specifics and the appropriateness of that well construction.

Q. It's cemented all the way down, correct?

A. That's correct.

Q. Okay. And that shows the location of the packer, too, correct?

A. That's correct.

Q. Anything else?

A. Not specific to this at this time.

Q. Okay. What's on page 11?

A. Page 11 and page 12 give general information about a representative packer that might be used in this well, not the exact one, but just to give a representation of the type that we might use.

Q. Okay. What's on Attachment Number 2 starting on page 13?

A. Attachment 2 has several maps, including oil and gas well lease maps -- oh, sorry -- oil and gas well maps, lease maps, deep saltwater disposal maps and the potash lease map.

Q. Okay. Let's start out with the first map on page 14. What does that -- tell us about that one.

A. Sure. Page 14 shows all of oil and gas wells that are within a one-mile radius, which is our AOR for this well and also the notification radius, and it also includes a two-mile buffer to document that we showed all wells out to two miles, which is per OCD's requirements.

Q. Do any of these wells have any significance in terms of risk?

A. No. None of these wells penetrated the top of our injection zones, and there are no deep saltwater

disposal wells into the Devonian or Silurian within this one mile or within a mile and a half.

Q. Now, you used one mile because?

A. Because that was the requirement for the deep saltwater disposal wells.

Q. You heard Mr. Goetze's testimony the other day about something that he brought up -- I forget what the exhibit was -- and it's some kind of checklist or something like that. Were you aware of that?

A. Checklist?

Q. Yes.

A. We received the permitting --

Q. In the C-108.

A. I'm not aware of another checklist aside from the administrative checklist that was at the beginning of the C-108.

Q. You met with Mr. Goetze at some point --

A. Correct.

Q. -- through this application process, right?

A. That's correct.

Q. Were you told that there was a new requirement of a 1.5-mile AOR?

A. At the time that we made this application, we did know that there was a screening tool or a guideline for a 1.5-mile setback between deep saltwater disposal

wells.

Q. Was that in the form of a rule?

A. No, it was not.

Q. Was that in the form of the C-108 or part of the C-108?

A. No.

Q. Did Mr. Goetze at that time tell you you had to follow that?

A. He did not say that we had to follow that. He did reiterate that that was the guideline that they were using -- that OCD would be using as a screening tool. But that did not change -- that did not change the one-mile AOR requirement.

Q. Okay. Let's go to page 15. What is that map about?

A. Page 15 shows the oil and gas leases within -- within two miles of the Olive Branch SWD location, and it has a buffer -- a radius showing -- it's a one-mile radius that indicates the leases that are within -- within one mile where those leaseholders would need to be notified.

Q. Okay. Where did you get this information?

A. We had a landman prepare this information from available data, and some of it came from OCD's own database.

Q. Now, your lease is on federal minerals, correct?

A. That's correct.

Q. Or your application, I should say.

A. Right. Yes.

Q. Anything else on this map?

A. No. I think we've covered the salient points.

Q. Page 16, what does this show?

A. This is a one-and-a-half-mile radius around the Olive Branch Saltwater Disposal Well location, and it shows that there are no active deep saltwater disposal wells within that one-and-a-half-mile radius. There are two deep saltwater disposal wells shown on the map, but they were both outside the radius.

Q. Page 17, what is that?

A. Page 17 is a list of the oil and gas wells that are within a one-mile radius of the Olive Branch location, and it indicates that none of these wells within a mile -- within a mile penetrate our injection zone.

Q. So on the last column -- the last column of page 17 is where you show that there are no penetrations to the disposal zone?

A. That's correct.

Q. Let's go on to page 18.

A. Page 18 just shows the proximity of the Olive Branch location to the Secretarial Order Potash Area, and it simply indicates that we are not within the potash area.

Q. Where is the potash area?

A. The potash area -- there is a rectangle up in the northwest portion of the map. It's kind of colored gray on this copy of the application.

Q. It's crosshatched, right, on the northwest corner?

A. On the northwest corner, I only see shaded gray for that.

Q. Okay.

A. The potash leases themselves would have been crosshatched if they were in there, but the SOPA, the Secretarial Order area, is just the gray portion.

Q. Okay. Let's go to Attachment 3. What's contained in Attachment 3?

A. Attachment 3 shows the source water -- the representative samples of the source water that would be injected into the -- injected into the Olive Branch disposal well, and we have an analysis of a Wolfcamp and a Bone Spring produced water.

Q. Okay. And in terms of -- does that show compatibility with what's in the reservoir at the

disposal interval?

A. Yes. We've seen no issues with the compatibility of the formation water.

Q. So what's the likelihood that you would be disposing of the water in the Wolfcamp?

A. Both the Wolfcamp and Bone Spring are likely -- likely formations that our produced water -- that the produced water, the injectate, would come from.

Q. Let me ask that a different way. Is there a big market for that?

A. Yes. There is plenty of saltwater disposal demand in this area based on the -- based on the production -- current production and the future production within a five-mile radius.

Q. Okay. Page 21 just simply Bone Spring, right?

A. That's correct.

Q. Attachment 4, what's there?

A. This is the injection water analysis for the Devonian Formation. We were unable to find analysis for the Fusselman nearby. But, again, using this with the -- the source water from the Bone Spring and the Wolfcamp produced water, we don't anticipate any -- any interactions that would cause problems in our well.

Q. Okay. Let's go to Exhibit 5, Attachment 5. What is this?

A. Attachment 5 is simply a -- it's a water well map showing the water wells from the Office of the State Engineer and indicates that there are no water wells within one mile. Therefore, we're not required to sample any water wells as part of this application, based on OCD's requirement.

Q. And that's on page 26, right?

A. Yes. We go ahead -- even if we do not have any water within a mile, we go ahead and prepare a table, and we insert a note at the bottom. The bottom note of that table says that there are no water wells present.

Q. Turn to Attachment 6 dealing with the induced seismicity assessment letter, and tell us, first of all, who wrote that letter.

A. This letter was prepared by Dan Arthur, who will be speaking later, one of our experts.

Q. And as far as you understand, what is his conclusion in this letter?

A. The general conclusion of this induced seismic potential letter was that the Olive Branch Saltwater Disposal Well does not -- does not pose a risk for induced seismicity based on proximity to faults and the orientation of any faults that are within the region.

Q. And Mr. Arthur will go into more detail as to the guts of this letter; is that right?

A. That's correct.

Q. Let's move on to what you have. You have attached exhibits to this application on page 32. What are they designed to do? Let's go to page 33. What is on there?

A. Page 33 is a map showing the proximity of seismic events and faults to the Olive Branch Saltwater Disposal Well location.

Q. And this Exhibit 1 is part of the letter, right?

A. That's correct.

Q. Okay. And Mr. Arthur will go into further detail on this particular information?

A. That's correct.

Q. All right. And then page 34 is something we've seen very often in these cases, and that's the Snee and Zoback mapping for southeast New Mexico --

A. Correct.

Q. -- correct?

And you'll have our geologist talk about this one as well; is that correct?

A. Correct.

Q. And page 35, same thing, right?

A. Yes. It's just a strat column showing the formations in the area. And, again, our geologist will

discuss that in more depth.

Q. Okay. Attachment 7 is your Affidavit of Publication and the publication requirements, and let's go through that. On page 37, what is that?

A. This is our public notice affidavit just showing that we -- we did publish a public notice in the newspaper of general circulation in the county of -- Lea County.

Q. And then the rest of this, page 38, is the same thing, right?

A. It's a copy of the actual -- the actual public notice.

Q. Okay. And page 39 is what?

A. Page 39 shows the -- the parties that were -- that were notified, both the operators and leaseholders within a mile.

Q. And this corresponds to one of the maps that you talked about earlier. Let me see. Is that the one on page 15?

A. It was page 14, the operators of the oil and gas wells within one mile on the map on page 14 and then the leaseholders within one mile that are shown on page 15. All of those parties were included in our -- in our table on page 39 to indicate that they all received notice.

Q. And attached to that are all the green cards that you received back from giving notice by certified mail?

A. That's correct.

Q. Mr. Alleman, do you have anything further on Exhibit Number 1?

A. I do not.

Q. Okay. Let's go on to Exhibit Number 2 and tell us what that is.

A. Exhibit 2 is a -- is a map that shows the Olive Branch location. There is a -- there is a red one-and-a-half-mile circle around the Olive Branch location that shows the location of pending applications within -- within that mile and a half, and then there are also some active deep saltwater disposal wells. When I say the pending applications, these are pending deep saltwater disposal applications within a mile and a half.

Q. Why did you choose a mile and a half?

A. Again, the mile and a half was the guideline or screening tool that was -- the OCD indicated they would use in considering the applications.

Q. So are there any wells within the mile and a half deep-water applications or -- well, you've already testified that there are no existing disposal wells --

deep-water disposal wells within a mile and a half, correct?

A. That's correct. There are no -- no active deep saltwater disposal wells within a mile and a half of the Olive Branch.

Q. What applications are before the Division at this point as shown on this exhibit?

A. The data that we received from the OCD indicated that we have -- .6 miles to the north is Solaris' Predator Federal 17 SWD No. 1. 1.3 miles to the southwest is PSE Trove --

Q. Let me stop you there. You have that exhibit -- well, let me ask you first: Where did you get this exhibit?

A. So this map was made -- was prepared based on the data provided by OCD.

Q. Okay. So with respect to the Predator Federal 17 well application, when was -- does this indicate when that was received by the OCD?

A. Yes. OCD's data indicated that the Solaris' Predator Federal 17 was received on April 2nd, 2019.

Q. Okay. And that would be the administrative application?

A. That's correct.

Q. Okay. And looking at your Olive Branch Federal

right below it, what is the date of receipt by the OCD?

A. Again, OCD's data indicated that the Olive Branch Federal SWD No. 1 application, administrative application, was received on March 22nd, 2019.

Q. Okay. Let's go down to the southwest, to the PSE Federal SWD No. 4 of the Trove Energy and Water. When was that received?

A. OCD's data indicated that was received on April 8th, 2019, which was also after our Olive Branch application was received.

Q. Let's move on further to the west, the Cotton Draw SWD No. 1. When was that received?

A. OCD's data indicated that that application was received on October 25th, 2018.

Q. Last year?

A. Yes. That was last year.

Q. So that predates your application and the Solaris application, correct?

A. It does.

Q. But based on the existing rule of one mile, that's outside the one-mile rule, right -- area of review?

A. Yes. It is outside of our one-mile area of review.

Q. Okay.

A. One of things I'd like to note with regard to that Cotton Draw SWD No. 1 that's to the southwest of the Olive Branch, there is -- there is an active deep saltwater disposal well located 1.2 miles northwest of -- 1.2 miles northwest of the Cotton Draw application location. And based on -- based on the 1.5-mile guideline, we believe that this Cotton Draw application would not be viable, if we use the 1.5-mile screening tool.

Q. Do you have anything further on Exhibit 2?

A. On Exhibit 2, Solaris' Predator Federal 17 is shown as having an active deep saltwater disposal well. It's 1.4 miles to the -- to the northwest, so it's within the 1.5-mile radius. And then there was also an active deep saltwater disposal well that's right around 1.5 miles to the east of Solaris' Predator Federal 17.

Q. Okay.

A. But using -- looking at both Solaris' C-108 application and with the map that was provided by OCD as part of the -- entered as an exhibit in our previous --

Q. Which exhibit are you referring to?

A. There's -- this map (indicating) was put together by OCD. It says "Cases 20463," which is our case, and "20465," Division Exhibit Number 1, Figure 3."

Q. And what does it show?

A. Similar to Solaris' C-108 application, this map shows that the active deep saltwater disposal well that is to the east of Solaris' Predator Federal 17 is actually within 1.5 miles. So OCD's data and Solaris' application data show that they have two active deep saltwater disposal wells within 1.5 miles. Whereas, the Blackbuck -- the Olive Branch location does not have any deep saltwater disposal wells within 1.5 miles.

EXAMINER JONES: Mr. Alleman, is there a date on the bottom of that, the date that that --

THE WITNESS: The date here says "May 22nd, 2019."

EXAMINER JONES: Thank you.

Sorry. Go ahead.

Q. (BY MR. PADILLA) Mr. Alleman, do you have any further testimony with regard to Exhibits 1 and 2?

A. I do not.

MR. PADILLA: And, Mr. Examiner, the OCD exhibit has been already entered into evidence, so we'll ask for admission of Exhibits 1 and 2.

EXAMINER JONES: Before we start, Ms. Bennett --

MS. BENNETT: Good morning. I apologize for being late.

My name is Deana Bennett. I'm here from

Modrall, Sperling on behalf of NGL for both the Blackbuck Predator -- I'm sorry -- Blackbuck Olive Branch case and the Solaris Predator case.

And, again, I apologize for being late.

EXAMINER JONES: For NGL?

MS. BENNETT: For NGL in both cases.

EXAMINER JONES: So you're going to be here all day, and you're in these cases. Do you mind coming up?

MS. BENNETT: No. I just didn't want to disrupt the hearing when I got here.

EXAMINER JONES: Any objection to the exhibits?

MR. BRUCE: No.

EXAMINER JONES: Mr. Brooks, any objection?

MR. BROOKS: No objection.

EXAMINER JONES: Ms. Bennett, any objection?

MS. BENNETT: No.

May I have a packet?

MR. PADILLA: Yes.

EXAMINER JONES: Exhibits 1 and 2 for Blackbuck in Case 20463 are admitted.

(Blackbuck Resources, LLC Exhibit Numbers 1 and 2 are offered and admitted into

evidence.)

MR. PADILLA: We tender Mr. Alleman for cross.

EXAMINER JONES: Okay.

CROSS-EXAMINATION

BY MR. BRUCE:

Q. Just very briefly, looking at your C-108, toward the end of the notice materials, was -- did you send a letter giving notice of an actual hearing date to any of these parties?

A. So Mr. Padilla sent the -- sent the notices to the affected -- affected persons.

MR. PADILLA: And I haven't tendered my affidavit yet.

MR. BRUCE: Okay.

Q. (BY MR. BRUCE) And, Mr. Alleman, the only other question: Your C-108 is dated March 15, 2019. It was this C-108 which was received by OCD on March 22nd?

A. That's what OCD's data indicated. Yes.

Q. What date was an application for hearing filed?

A. I'm unclear on that. I'll let Mr. Padilla respond.

MR. PADILLA: April 2nd, 2019.

MR. BRUCE: That's all I have.

EXAMINER JONES: Ms. Bennett, any

questions?

MS. BENNETT: Yes. Thank you. Just a couple of questions.

CROSS-EXAMINATION

BY MS. BENNETT:

Q. Good morning, Mr. Alleman.

A. Good morning.

Q. And I apologize. I haven't had a chance to look over your exhibits, and you might have answered this question. But is the Olive Branch located on federal lands?

A. It is.

Q. And do you know if those federal lands are on the exterior boundaries of the NGL McCloy Ranch?

A. I don't have that information in front of me, but I believe -- I believe that they may be.

Q. And is NGL's -- the boundary of NGL's McCloy Ranch, is that identified on any of your materials?

A. It is not. We did not have that data available to us at the time.

Q. And you mentioned that the Olive Branch well is .6 miles to the north of Predator; is that right?

A. The Olive Branch location is .6 miles to the south-southwest.

Q. To the south. Okay. Thank you.

And you also mentioned that it was 1.3 miles away from Trove's application?

A. That's correct.

Q. Do you know the status of Trove's application?

A. I do not know specifically the status of that application.

Q. Do you know if it was set for a special hearing?

A. I do not know that.

Q. Do you know how close the Olive Branch is to any of NGL's active or proposed wells?

A. No, I do not. We didn't -- we were not required to -- to map those because they were not within the AOR, so I'm not familiar with how close those are.

Q. When you did -- when you prepared your C-108 or in the materials you're presenting today, is there a study by the reservoir engineer showing how far the plume will travel over time?

A. We do have a -- we have a volumetric fill-up analysis that we will -- that we will present later by one of our experts.

Q. Thank you.

EXAMINER JONES: Mr. Brooks?

CROSS-EXAMINATION

BY MR. BROOKS:

Q. Yes. First of all, you said something about a one-mile requirement that was existing -- I forget exactly how you characterized it -- for SWDs at the time you planned this well; did you not?

A. So the one-mile requirement -- as far as we are aware, the one-mile AOR where we're required to look for penetrating wells within a one-mile area of review and notify affected persons within one mile.

Q. That correctly characterizes what I believe there was, but did you interpret that as being a well separation requirement?

A. No. To my knowledge, it is not a well -- it's not a well separation requirement. It's simply an area of review and notification requirement.

Q. And are you aware that OCD has no well separation distance that's prescribed by rule?

A. That's my understanding. Yes.

Q. And are you also aware that the Environmental Protection Agency, in connection with the Underground Injection Control Program, has no such requirement of a specific distance?

A. I'm not aware of such a requirement, but we have UICs experts that can testify to that if they need

to.

Q. Okay. Thank you.

So you're not contending that this is a situation where the case is governed by the law enforced at the time the application was filed and that it was different from the law being applied by the Division now?

A. I'm not sure that I understand the question.

Q. Well, there is a rule in judicial proceedings that decided in accordance with the law in force at the time that the case was filed. Now, what I'm trying to make clear is that you're not arguing -- or you're not presenting any evidence for an argument that there was a rule in force at the time you planned this well or at the time you filed the application that allowed a one-mile -- that required a one-mile separation or implicitly did not require a larger separation?

A. Right. We are not trying to make the point that there is a rule -- that there is a regulation for a one-mile separation.

Q. Okay. Thank you.

I had one other question, but this has to do with my antics. Probably everyone noticed that I dropped my exhibits -- my copies of the exhibits. There was a map somewhere that you talked about about the

potash area. Can you find that for me --

A. Yes, sir.

Q. -- and tell me what page it's on?

A. The potash map is shown on page 18 of Exhibit 1, which is the C-108.

Q. Page 18. Okay. Yes. I was trying to find that when I dropped my exhibits.

But there was a discussion of the northwest portion of the map and the northeast portion of the map, and there was a discussion of crosshatched and dirty gray. I don't think you meant to say dirty gray, but I don't hear very well so that's what I interpreted. In the northwest -- is it not correct to say that in the northwest portion of the map, there is an area that is in a fuzzy gray that is partly within one and a half -- is partly within two miles of the proposed location?

A. That's correct.

Q. And that is not the crosshatched area?

A. That's correct.

Q. And that is the potash area?

A. That is the Secretarial Order Potash Area. Yes.

Q. Yeah.

And the crosshatched areas in the northeast corner of the map are not what you were referring to in

your testimony?

A. That's correct.

Q. Thank you. That's just a point of clarification.

MR. BROOKS: Nothing further.

EXAMINER JONES: Mike?

EXAMINER McMILLAN: Go ahead.

CROSS-EXAMINATION

BY EXAMINER JONES:

Q. Well, you do applications in other states also, right, for SWDs?

A. That's correct.

Q. Do you ever do have the ZEI calculation?

A. I don't personally, but we have -- we have done those in certain situations as needed.

Q. I just have a comment on your -- your newspaper notice. It's really well done. I like the digital presentation there. But we also -- for future ones, we ask that you also include a layman's -- a layman's location, like so many miles from -- southeast of Eunice, something like that.

A. A general location? Sure. We'll make that change.

EXAMINER JONES: That's all the questions I have.

Mr. Brancard?

EXAMINER BRANCARD: No questions.

CROSS-EXAMINATION

BY EXAMINER McMILLAN:

Q. I'm on page 15. If I'm understanding -- tell me when you're there.

A. I've got it.

Q. If I'm understanding, it looks like in the east half of Section 16 is EOG Resources, correct?

A. That is correct.

Q. And there's the State Land Office. Am I reading that correctly?

A. Yes. That looks to be correct.

Q. And I need to be -- if I'm understanding the regulations, which I want to make sure I'm clear on, doesn't the State Land Office have to be notified?

A. Yes. We -- we did not notify the State Land Office as a part of this initial application, but they have since been notified.

Q. Where is it?

A. Where is the notification?

Q. Yeah.

A. Do we have -- did we bring --

MR. PADILLA: I don't have it. When I sent notifications, I didn't include the State Land Office,

but the State Land Office has entered appearances in every case where they felt they needed to be in and have contested, I think, three of our saltwater disposal wells.

EXAMINER McMILLAN: But aren't they supposed to be notified for affected persons?

EXAMINER BRANCARD: Yes.

CROSS-EXAMINATION

BY EXAMINER BRANCARD:

Q. Looking at 19 -- state regulation 19.15.2.7 --

EXAMINER McMILLAN: Yeah.

Q. (BY EXAMINER BRANCARD) -- A.(8), the definition of "affected persons," D, "if the United States or the State of New Mexico owns mineral estate in the spacing unit or identified tract or any part thereof," you have to notify the BLM or the State Land Office as applicable.

A. So we don't have that confirmation in front of us here today, but they have been notified. And we can -- we will -- we can send that. We can follow up with that.

Q. And it's hard to read this page 15 because we don't have the colors here -- there are a lot of different colors on there. But I'm assuming that the entirety of Section 16 is the State Land Office section.

So both the EOG and the OXY half sections are both state minerals. The State normally owns Section 16's.

A. That's correct.

Q. So they're within not only the mile but the half-mile radius.

A. Right. They are -- they are within the one-mile notification radius.

Q. Well, also within a half mile.

EXAMINER JONES: Any more questions?

EXAMINER McMILLAN: Those are all my questions, were notification.

THE WITNESS: We'll send that to you to make sure that you --

EXAMINER McMILLAN: You have to notify -- you have to send it to all affected parties.

And send the map in color. This is extremely difficult to read.

THE WITNESS: Yes, sir. The map that was -- the application that was submitted to OCD for the actual application submission was in color, but we'll make sure to do that on future hearings.

EXAMINER JONES: And just a reminder to all parties here today that where exhibits are admitted, please send PDF versions of those in to Kathleen.

Is that it for this witness?

MR. PADILLA: That's all I have.

But in terms of the State Land Office notification, I would interpret that rule to say unleased -- unleased minerals. The rule doesn't say that. I don't want to argue about it, but after Mr. Brancard read it, it occurred to me that the lessees of the State Land Office did receive notice.

EXAMINER BRANCARD: We modified this rule last year. We changed the definition of affected person. And so the first three portions of that definition are determining if you're an operator. If you don't have an operator, then it's a leasehold interest, et cetera. But then when you get to the end of the third, it says "and if the U.S. or State of New Mexico owns the minerals," they get notice.

EXAMINER JONES: That was in the horizontal well rule, during that proceeding.

EXAMINER BRANCARD: And the injection rule refers back to this definition.

EXAMINER JONES: They took it out of the injection, Part 26, and moved it up to Part 2, I think.

EXAMINER BRANCARD: Right, the definition section.

EXAMINER JONES: Okay. Is that it for this witness?

MR. PADILLA: That's it.

EXAMINER JONES: Okay. Please call your next witness.

MR. PADILLA: We'll call Tom Tomastik.

THOMAS E. TOMASTIK,

after having been previously sworn under oath, was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. PADILLA:

Q. Mr. Tomastik, please state your name.

A. Thomas E. Tomastik.

Q. How do you -- how do you spell your last name?

A. T-O-M-A-S-T-I-K.

Q. Mr. Tomastik, you're a geologist, correct?

A. Yes.

Q. You also do a lot of work with underground injection control projects, correct?

A. Yes.

Q. You've testified before the Oil Conservation Division as a geologist and as a UIC expert?

A. Yes.

Q. Tell us when you did that.

A. That would be at the Goodnight Midstream hearings, which I believe were in early July. I'm trying to remember when that was. It kind of all runs

together.

Q. Mr. Tomastik, tell us a little bit about your educational background.

A. Yes. I have a bachelor's and a master's degree from Ohio University in geology. I have 37 years of diverse experience in the energy sector, government and consulting.

The first five years of my career I spent as a consultant geologist drilling and completing oil and gas wells and Class II injection wells. And then I spent 25-and-a-half years as senior geologist in the Underground Injection Control Section for the Ohio Department of Natural Resources where I oversaw issuance and regulatory authority over Class II and Class III injection wells. I also served seven years on the U.S. EPA National Technical Work Group for the Underground Injection Control Section and was involved with the Induced Seismicity Report for Class II injection that was published by U.S. EPA in the fall of 2014. I've done hundreds of groundwater investigations related to oil and gas and mining complaints. I've done stray gas investigations and have permitted, you know, hundreds of wells.

And then for the last almost five years, I've been a senior geologist and regulatory specialist

with ALL Consulting. And I've done work in expert witness induced seismicity, seismic monitoring and mitigation, oil and gas stray gas investigations, gas storage, and have worked with litigation on -- ongoing expert witness work on induced seismicity in Oklahoma and Ohio.

Q. Have you published any papers?

A. I've presented or published papers over 61 times both internationally and within the U.S., everything from oil and gas to gas storage to groundwater investigations, Class II injection. I've done Class II injection workshops. I've done induced seismicity workshops, published on seismic monitoring and mitigation.

Q. Have you familiarized yourself or worked in southeast New Mexico in the area of the application of the Blackbuck well?

A. Yes.

Q. Have you prepared exhibits for introduction here today?

A. Yes.

MR. PADILLA: Mr. Examiner, we tender Mr. Tomastik as a geologist and a UIC expert.

EXAMINER JONES: Any objection?

MR. BRUCE: No objection.

EXAMINER JONES: Mr. Brooks?

MR. BROOKS: No objection.

EXAMINER JONES: I remember you from the GWPC meetings.

THE WITNESS: Thank you.

EXAMINER JONES: Did Ohio ever get their Class VI primacy?

THE WITNESS: No. That would have been Ohio EPA, and they were not pursuing Class VI.

EXAMINER JONES: He's qualified as stated.

Q. (BY MR. PADILLA) Mr. Tomastik, let's look at Exhibit 3.

A. All right.

Q. What's on Exhibit 3?

A. Exhibit 3 is the evaluation of the Devonian and the Silurian injection reservoir and the confinement zones. The type of confining zone obviously is the Woodford Shale. In the area looking at the deep Devonian-Silurian, there was about approximately 25 wells within a ten-mile radius. The Woodford Shale ranges from about 100 to 200 feet thick as a confining unit for an upper confining zone.

The injection zone in the Devonian-Silurian is the Thirtyone Formation, which is predominantly in Lea County. And then the Wristen Formation and the

Fusselman Formation, the injection zone in that area runs from about 1,200 to 1,500 feet thick. And then the lower confining zone would be the Montoya and the Simpson Group.

But I would also mention, in evaluation that I've done on geophysical logs within the Devonian and Silurian, the bottom part of the Fusselman Formation is fairly tight, so in itself, it will act as a lower confining zone within the reservoir.

Q. Let's look at the second page of this exhibit. Is that helpful in explaining your description of the injection zone?

A. Yes. This is a generalized stratigraphic section that was published by Broadhead at the New Mexico Bureau of Geology and Mineral Resources.

Q. What other papers did you rely on for your analysis of the confining zones?

A. There were multiple papers that we relied upon: Broadhead, his paper from 2005; Carol Hill's 1996 paper from the geology of the Delaware Basin; and Steve Ruppel's paper on the Fusselman in the Permian Basin and Steve Ruppel's paper on the Devonian-Thirtyone Formation in the Permian Basin.

Q. What conclusions do you draw from your study of whether or not the upper and lower confining zones here

are going to be -- are going to actually contain the injection fluid?

A. Based on our geologic evaluation and assessment, the Woodford Shale will operate as an upper confining zone to prevent fluid -- injection fluid from migrating upward. And then the lower confining zone not only will be the Montoya and the Simpson Group but perhaps the lower part of the Fusselman Formation that is fairly tight with no porosity and permeability development.

Q. Is there any difference here between -- you've heard the testimony of Dr. Zeigler with regard to the geology in the area --

A. Yes.

Q. -- correct?

Is there any mystery about what's down there more or less?

A. No. It's fairly consistent with what she testified to.

Q. There's been some notion, as I understand the testimony from Mr. Goetze, that maybe the lower confining zones would not hold the fluid -- the injection fluids. Do you have an opinion as to -- in more detail about the confining -- lower confining zones?

A. Based on the published works that have been done, it looks like there is very little porosity and permeability development. Unfortunately, we do not have a lot of deep penetration wells into the Montoya and Simpson Groups. But, again, my analysis of the geophysical logs in the lower part of the Silurian indicates that we have a fairly tight zone that is going to act as a lower confining zone within the injection zone.

Q. When you say fairly tight, what do you mean by that?

A. Basically no porosity or permeability development.

Q. Okay. Anything else on Exhibit 3? Anything else on Exhibit 3?

A. No.

Q. Let's go on to Exhibit 4. What is that?

A. Exhibit 4 was the ten-mile radius map that we did around the Olive Branch -- proposed Olive Branch SWD Fed No. 1 to evaluate all of the other penetrations into the Devonian and Silurian wells within that ten-mile radius.

Q. Are there any wells that you found that actually penetrate the Devonian-Silurian Formation?

A. There was a number of wells that penetrate into

the -- into the Devonian-Silurian based on predominantly the well completion records. There were three Devonian-Silurian wells that actually had geophysical logs that were open-hole geophysical logs that provided evaluation. Either many of these wells are not logged through the Devonian and Silurian, or there are some partial penetrations that have been logged so they don't log the entire section. Some of the oil and gas expiration wells would be partial penetration into the Devonian-Silurian.

Q. So what does all of this tell us in simple words that I can understand?

A. Based on the analysis of the data that we have pulled from these deep Silurian -- Devonian-Silurian injection wells and oil and gas wells, we were able to provide a geologic assessment that we have sufficient reservoir capacity for disposal in porosities ranging from about 2 to 15 percent.

Q. Now, let's talk about the wells that do penetrate the Devonian-Silurian. Are those the ones on the second page that have numbers at the end? For example, let's take the eighth well down. There is number 1,369 on the last column.

A. Yes.

Q. What does that mean?

A. That's the thickness of the Devonian-Silurian section at that well site.

Q. And what does the first column tell us in terms of Woodford top?

A. That basically tells -- tells me that the information came from a well completion report, and the top of the Woodford was not reported, as the Woodford thickness was not reported in that well either. There was no geophysical log available to perform a net evaluation on that.

Q. Let's go on to -- let's skip Exhibit 5. Let's go to Exhibit Number 6. What is Exhibit 6?

A. Exhibit Number 6 is a graph that was prepared by ALL Consulting showing the total volume injected since 2009 through 2018 versus actual seismicity that was reported in that area of Eddy and Lea Counties during that time frame.

Q. What's the blue line about?

A. The blue line is the Lea County injection rates over that time period.

Q. And the black is the Eddy County, right?

A. Correct.

Q. And tell us about the orange colors. What do they -- how are they relevant in this case?

A. The orange -- the orange bar graphs are the

number of seismic events that had occurred in the 2009 to 2012 time frame, and there has not been any seismic activity since 2012 in Lea or Eddy Counties. And what this graph shows is we've had a significant increase in injection volumes in both Lea and Eddy Counties since that time, and we have not seen any additional seismic activity from that.

Q. Does that mean that injection is not creating increased seismicity?

A. Correct.

Q. And what this shows is injection rates have actually increased in Lea and Eddy Counties?

A. Correct.

Q. Anything further on Exhibit 6?

A. No.

Q. Let's go on to Exhibit Number 7. What is that?

A. Exhibit 7 is a map prepared by ALL Consulting showing the distances of seismic events and the closest known fault in relation to the Olive Branch SWD location.

Q. How is that relevant to this case?

A. That's relevant to the case to provide evidence that we are significantly away from any known seismic event or any known faulting within the Precambrian basement.

Q. For this to be relevant, how close would you have to be, I mean, to where we would then be concerned about faulting in the area? How close would that fault have to move west in order to --

A. Obviously, I would -- we would be concerned if it moved a lot closer to the well location, but Mr. Arthur will testify as to the fault slip analysis that ALL performed based on the information that we input for potential, for known faulting, if it were to occur within the area of the Olive Branch SWD.

Q. Did you prepare this exhibit?

A. It was prepared by ALL staff with my review and input.

MR. BROOKS: Mr. Examiner, at this time I need to leave to go to my appointment. If Mr. Brancard does not object, I have no objection, in view of the limited amount that -- and the examiner does not object, I have no difficult -- I have no objection to allowing my client to remain here as the only representative of OCD without my presence. However, I do recognize it's irregular, and if there is any objection to it, I will ask for a recess. Otherwise, I have no objection to the rest of the parties continuing the hearing.

EXAMINER BRANCARD: How much further do we have of this witness, Mr. Padilla?

MR. PADILLA: I'm pretty much done.

EXAMINER BRANCARD: Well, let's see if we can get through with this witness.

MR. PADILLA: I have one more exhibit, actually.

EXAMINER BRANCARD: Okay.

EXAMINER JONES: Can you stay to ask questions of this witness?

MR. BROOKS: No, because I have to leave --

EXAMINER BRANCARD: Why don't we get through the direct examination of this witness?

EXAMINER JONES: Okay.

MR. BROOKS: I don't think -- so far, I wouldn't think I have any questions of this witness, although I haven't had a chance to confer with my client and he might think otherwise. Yeah. I should have the opportunity to cross-examine this witness if there are any questions. Thank you.

EXAMINER JONES: Back at 12:30.

EXAMINER BRANCARD: At 12:30, we're going to restart.

(Mr. Brooks exits the room, 10:46 a.m.)

Q. (BY MR. PADILLA) Mr. Tomastik, do you have anything further on Exhibit 7?

A. No, I do not.

Q. Let's go to Exhibit 8. We've seen that many times in this type of hearing. Is that the Snee and Zoback map?

A. Correct.

Q. What does this show in terms of this case?

A. Basically this is from the paper published by Snee and Zoback in 2018 from Stanford University utilizing their fault slip analysis tool that was developed by Stanford with the input from the oil and gas industry. This map shows basically the majority of known faulting in the area is oriented in the north-south direction. And based on Snee and Zoback's analysis, these faults are not oriented in the critically stressed direction, so there is very, very low potential for fault slip potential from these faults that are known in the area.

Q. Anything else?

A. No.

Q. Let's go back to Exhibit -- I'm reminded, on Exhibit 5, you have something to say about that.

A. Oh.

Q. Correct?

A. Yes.

Q. That's labeled "Volumetric Fill-Up Analysis." But on the second page of that, there are some

assumptions and methodology. Did you work on that?

A. Yes. I participated with additional ALL Consulting geologic staff in coming up with some of the formation characteristics and the injection rates and the equations that we used to assume the volumetric calculations.

Q. What kind of assumptions did you make on this?

A. Basically on these assumptions, we're assuming homogeneous and isotropic conditions within the Devonian and Silurian. Based on my analysis of the geophysical logs, we used an average of 8 percent. The porosity in the Devonian and Silurian is predominantly secondary porosity from fracture and vugs and dissolution features. And then based on the interval thickness, again, and the evaluation of the porosity feet within the 12- to 1,500 feet of the three geophysical logs, we used a porosity interval thickness of 20 percent.

And then we went in and evaluated injection rates from volumes that have been submitted to OCD through March of 2019, and we used existing deep-well calculated daily injection rate data over the lifetime of the well. We used the average rates on the permit application for Blackbuck Olive Branch and for Solaris Predator, and then 15,000 barrels a day, we used as the pending SWD applications.

The maximum injection rates, we also used and ran calculations on that, and we actually included an annual injection decline rate of 5 percent based on the fact that in all reality, the injection operations, supply and demand and the potential for formation damage in that can cause a decline in injection rates over time.

Q. And that's an assumption?

A. Correct.

Q. Okay. As far as the calculations, Mr. Arthur prepared those?

A. Correct.

Q. Do you have anything further on Exhibit Number 5?

A. No, I don't.

Q. Okay. Let's now jump back to Exhibit Number -- or I don't know if we talked about it, Exhibit Number 9, of the fault slip potential analysis. What part of that exhibit did you work on in terms of the conclusions that will be made by Mr. Arthur in terms of the methodology of calculating fault slip potential?

A. Yes. I worked directly, again, with an ALL staff geologist in coming up with the parameters that we needed to use for the inputs into the fault slip, the potential model that is used.

Again, we used an injection interval thickness ranging from 100 to 200 feet -- 250 feet, a porosity from 5 to 10 percent, a permeability of 10 to 100 millidarcies. And then a lot of the stress gradient and the stress direction, fault slip, minimum dip, that is all derived from Stanford's fault slip potential model and from the Snee and Zoback report.

Q. And you're looking at page 3 now of Exhibit Number 9?

A. Correct.

Q. And those are the parameters you worked on to make the evaluation as to whether or not this application should be granted, correct?

A. Correct.

Q. Okay. And you took that information from Snee and Zoback or other papers?

A. Other papers and other expert witness testimony. Mr. Reynolds provided a lot of that data that we reviewed and utilized what we needed.

Q. When you say Mr. Reynolds, you're talking about Todd Reynolds --

A. Correct.

Q. -- who testified for Mesquite, right?

A. Correct, and Mr. Wilson who testified for Mesquite.

Q. All right. And the rest of the information on this is prepared by Mr. Arthur?

A. Correct.

Q. Okay. Anything further that you have to add to your testimony concerning Exhibit Number 9?

A. No.

MR. PADILLA: Mr. Examiner, we offer Exhibit 5, to the extent that Mr. Tomastik's testimony as to how -- as to the assumptions and methodology, which is basically on page 2 of that exhibit, Exhibits 6 and 7, Exhibit 4 and Exhibit 3 and 8.

EXAMINER JONES: Okay. What I hear is you're moving for Exhibits 3, 4, 5, 6, 7 and 8, but 5 only to the extent that he's testified to.

MR. PADILLA: Right.

EXAMINER JONES: Any objection?

MR. BRUCE: No objection.

MS. BENNETT: No objection.

EXAMINER JONES: Okay. We're admitting them right now, and we'll break for lunch until 12:30.

(Blackbuck Resources, LLC Exhibit Numbers 3 through 7 are offered and admitted into evidence.)

(Recess, 10:54 a.m. to 12:36 p.m.)

MR. PADILLA: I think we had tendered Mr. Tomastik for cross-examination.

EXAMINER JONES: Okay. Ms. Bennett?

MS. BENNETT: I don't have any questions.

EXAMINER JONES: Okay.

MR. BRUCE: I have no questions for Mr. Tomastik.

MR. BROOKS: I've got a couple.

CROSS-EXAMINATION

BY MR. BROOKS:

Q. Good afternoon. I'm sorry. I've forgotten your name already.

A. Tom Tomastik, T. T.

Q. Mathis?

A. Tomastik.

MR. BRUCE: Like fantastic.

THE WITNESS: Tomastik is fantastic. There you go.

(Laughter.)

Q. (BY MR. BROOKS) Okay. On page 7 of the C-108 application --

A. Yup.

Q. -- there is a statement made that there is no evidence of a hydrologic connection between the disposal zone and any underground source of drinking water.

A. Yes.

Q. Did you affirm that statement?

A. Yes.

Q. And what underground sources of drinking water, if any, did you consider in connection with that affirmation?

A. The 25 feet into the Rustler anhydrite.

Q. That's quite a long way above this.

A. Correct.

Q. Is it correct that you found no underground sources of drinking water anywhere close?

A. You mean deeper geologic formations?

Q. In the deeper formations.

A. No.

Q. Okay. Let's look at page 10 --

A. Yes.

Q. -- the well construction diagram. What casing will insulate the Salado Formation or salt [sic]?

A. That would be 13-3/8. That will be set into the top of the Permian Delaware Mountain Group.

Q. Is that 13-5/8? No. It's --

A. 3/8.

Q. -- 13-3/8. I see what you're talking about.

A. Yeah. Right.

Q. 13-3/8.

A. Yeah.

Q. Okay. And also on page 10, the well construction diagram, the placement of the diverter tool for cementing of 9-5/8-inch casing is proposed at 3,300 feet. Typically, the Division requires placement of DV tool below the shoe of the intermediate casing. In this case the 13-3/8 casing is to ensure the circulation of the cement to the surface while covering the shoe of the intermediate casing. Now, do you understand those -- those -- what I just read?

A. Yes. Yes. And we can -- we can obviously change the depth setting of the DV tool to, you know, comply with the regulations.

Q. Okay. I was asking about the recommended placement, as you did --

A. Yeah. We -- we can -- we can move that farther down.

Q. Okay. I believe that's all my questions.

A. Okay.

EXAMINER McMILLAN: Go ahead.

EXAMINER JONES: You want me to go ahead?

EXAMINER McMILLAN: (Indicating.)

CROSS-EXAMINATION

BY EXAMINER JONES:

Q. Okay. The coverage of the -- looks like the

formation is covering the salt and the Delaware. To me it's 13-3/8. Is that -- it seems like 4,680 ought to be basically the base of the Delaware. Is that the base of the Delaware or the top of the Delaware?

A. That would be into the top of the Delaware. Yes.

Q. Okay. So that -- so that's covering --

A. Yeah. So the Salado would be -- that would be covered also within that, and then the Delaware Mountain Group, Bone Spring and Wolfcamp will be covered by the 9-5/8.

Q. Okay. So you've got almost 3,000 feet of salt -- or salt interbedding anhydrites here; is that correct?

A. Again, that's based on the evaluation of the well completions. I mean, obviously you're not going to find many, if anybody, running shallow geological physical logs. I would like to see a lot more of those (laughter). It would be nice. I mean, that obviously is based on mostly the well completion records and doing the subsea elevations, subtracting at ground levels.

Q. Yeah.

You've talked to geologists with Blackbuck, correct?

A. No, we didn't, not with Blackbuck.

Q. So Blackbuck isn't really staffed up with the normal staffing of a team that would be doing development or exploration? They just -- they're a saltwater disposal company; is that correct?

A. I don't know as much of what their internal expertise is.

Q. Okay. This Exhibit Number 6, where there are the seismic events, the last one -- the last year was showing 2012. Is it not available, the seismic events, in the other years?

A. From our investigation, we did not see any seismic activity that was recorded since 2012 in Lea and Eddy Counties.

Q. And the source, it says here, is U.S. Geological Survey.

A. Right.

Q. Okay. So say again. You're saying there is no seismic activity that happens since 2012?

A. None that have been recorded in those two counties.

Q. Okay. Do you remember the level on the Richter scale of these -- I guess that's the scale we're going by still.

A. Right.

Q. -- of this level -- of these numbers? In other

words, was it 3 or above or --

A. Yeah. I would -- some of them were, I think, in the lower 2 range of magnitude. I would have to go back and look.

Q. USGS found -- they can measure those.

A. Yeah. I mean, again it depends on the placement of the seismic monitoring stations around the state and what's recording as to how low of a reading they can get on magnitude.

Q. Okay.

A. I mean, typically below 2, without actually having a very dense seismic monitoring network, is going to be hard to pick up below a 2.

Q. Okay. Have you seen any seismic -- process seismic in this area of this proposed well that would -- that you could look at to see if there are any faults?

A. We have not seen any 2D or 3D in this general area. I have seen 2D seismic in the area where Goodnight was doing their applications.

Q. Okay. So you haven't seen it here because, just to date, you haven't really paid for obtaining a look at it; is that correct?

A. Correct.

Q. And how much would that cost, and what is -- what is the process of that? You approach one of

these -- one of these seismic brokerage companies and --

A. Correct. If -- if -- if it's seismic 2D or 3D shoots that have been available, then you obviously contact them and then purchase that. Obviously, 3D seismic is far more expensive than 2D. Seismic reflection work, again, is subject to a lot of interpretation, reprocessing. Our experience, particularly with dealing with a lot of the induced seismicity in Oklahoma and Ohio, a lot of these end up being strike-slip faults that you may not even see with seismic reflection work. So that --

Q. In Oklahoma.

A. In Oklahoma and Ohio, yes. But we have not at this point inquired about acquiring any 2 or 3D seismic reflection work.

Q. Do you think that's a prudent thing to do here or not, and why not?

A. I mean, one -- one of the things -- and Mr. Arthur will testify to that also -- is -- is the Silurian -- Devonian-Silurian injection zone, in this area, we're approximately 1,000 to 1,200 feet above the Precambrian basement where -- the majority of your seismic activity is going to occur in the Precambrian basement rocks. So the farther you are away from the Precambrian, the more lower the level of potential for

an induced seismicity event. Everything that we see in Oklahoma, Ohio, Texas has all been related to injection into formations that sit directly above the Precambrian -- sit on top of the Precambrian basement rocks. So I think with the fact that we are 1,000 to 1,200 feet above that is just an added layer of protection that will help us, you know, not have any induced seismicity events.

Q. Before I forget to ask, this -- this separation -- you had mentioned the Lower Fusselman being also kind of a low-permeability barrier?

A. Yes. Based on my analysis of the geophysical logs that I've been able to look at, you're seeing that lower -- you may have one zone in there that's 4 to 6 feet that has some porosity. But, I mean, I looked at a zone of over 100 feet thick in the Lower Fusselman that resistivities were up to 2,000 ohms, which means literally it's very, very tight. Nothing is going to move through that.

Additionally, in carbonate rocks -- and I've done a lot of work, when I was with the Ohio Department of Natural Resources, with quarry dewatering, so I dealt with fractured carbonate rocks extensively in quarries and also in groundwater investigations with downhole video camera. Bedding planes act as sufficient

barriers to flow. We'll see fluid and gas moving vertically through fractures, but the bedding planes actually will act as a barrier. So there is -- there -- tight carbonate rocks, particularly the limestones of the Church [sic], will act as a barrier for fluid flow.

Q. Okay. So what I hear you saying is the ratio of vertical to horizontal permeability is really low, and so you end up --

A. Yes.

Q. -- you end up inverted along bedding planes?

A. Correct.

Q. Okay. So that would be -- basically, the Lower Fusselman would be basically the Ordovician?

A. Uh-huh.

Q. So the Ordovician; Montoya below that and the Simpson. Can you talk about those rocks and --

A. Well, they're just -- with a little bit of the data that we've been able to acquire, there is not a lot of wells penetrating those formations and particularly not a lot of geophysical logs that are available for review. So there's -- it's pretty scant information other than what's been published on those formations to evaluate.

Q. And what are the publishing documents saying? What -- what were they -- what was the focus of these

published documents? Was it just a geologic description of stratigraphy?

A. It would be -- I, mean obviously -- maybe they're doing some -- they've had some core evaluations to look at. So obviously you're looking at the changes in the types of the geologic facies in the rocks. And, you know, the porosity -- like I said, the porosity is predominantly going to be secondary development. So your matrix porosity within those limestones are literally hardly nothing from that standpoint. And that's pretty common with carbonates. So, I mean, unless you have dolomitization that then allows the development of that secondary porosity, most carbonate rocks are pretty tight.

Q. Okay. So is the carbonate -- you're talking the Lower Fusselman and the Montoya being carbonate?

A. Yes.

Q. And the Simpson, what is that?

A. Simpson does have some shales mixing in with it.

Q. Okay. So the shales, it's not -- it's not like the Woodford, right? I mean, it's not --

A. Correct. It's not a continuous 100 or 200 feet of the black shale.

Q. Is it fractured up any, or has it metamorphosed

any?

A. That, I don't know.

Q. Okay. Are there any cores available like at the New Mexico Geological Library to look at on this?

A. I haven't really looked into this, but I think there may be some available at New Mexico Tech.

Q. Okay. The business about how far -- okay. It seems like everybody's -- everybody says stay away from the faults and stay away from the basement rock. But the big question seems to be how close can you put these wells together and cause issues? Well, what is your take on that? Have you got any concern about that?

A. No. I don't see any concerns. I mean -- I mean, where you would get into -- potentially where you would have well interference, you're going to impact your ability to inject fluids more than anything.

Q. How would you do that? How would that happen?

A. Basically, if -- if we had a pore pressure front that migrated and both wells interfered -- like, you know, I've seen well interference in groundwater wells where you have two wells pumping and your cone of depression overlaps, and you can impact both water wells from that. And that's -- that's obviously the reverse scenario of injecting in.

But on the injection side of it, if you

have well interference -- and I've seen this in Ohio, where you would -- maybe you drill a second well and the well -- you have a pressure front and drill into it. But at a mile and a half, that's unlikely in this scenario at this case.

And based on -- which Mr. Arthur will testify on the volumetric calculations and fill-ups we've done, which are fairly conservative-based. We do not see the potential for well communication within a mile and a half.

Q. Okay. I guess the engineer will -- we'll be able to talk to him some more --

A. Yes.

Q. -- about that.

EXAMINER JONES: I think I may have a couple more, but Mike --

CROSS-EXAMINATION

BY EXAMINER McMILLAN:

Q. My only comment is on your Exhibit Number 8, your well location is in the wrong county.

EXAMINER BRANCARD: I don't think there is a well location in Exhibit 8.

Q. (BY EXAMINER McMILLAN) Isn't Exhibit 8 the Snee map?

A. Right.

Q. That's actually in Eddy County. Isn't this in Lea County?

A. I don't -- I don't believe we put the well on here.

EXAMINER JONES: There's a circle there.

THE WITNESS: That's a seismic event.

EXAMINER McMILLAN: Okay.

EXAMINER BRANCARD: We don't have the location on Exhibit 8.

EXAMINER McMILLAN: Okay. That was my only question then.

EXAMINER BRANCARD: You guys are stealing my questions.

CROSS-EXAMINATION

BY EXAMINER BRANCARD:

Q. So just to clarify on -- I get to ask the really dumb questions being a lawyer.

So on Exhibit 6, in response to the examiner, I didn't really get a definition of what a seismic event is. Did you give us a definition? You say that you have seismic events here. What's the definition of a seismic event?

A. It depends on which -- I mean, the U.S. Geological Survey considers an earthquake of a magnitude of 2.5 or greater. Below that, they would consider it a

microseismic event. But you see a lot of published papers that they call everything earthquakes, even below magnitude 1. But I think if you look at the USGS standard, typically a magnitude 2.5 and then below is considered microseismic events versus an actual earthquake.

Q. Okay. You have a chart here and you're getting data from somewhere, and you're calling it seismic events. So the USGS --

A. Right. This is based predominantly on the USGS data from their website.

Q. So do you think to qualify as a seismic event, for the purpose of this chart, it had to be a 2.5 or higher?

A. No. That would be an earthquake. A seismic event would be -- probably the lowest magnitude that the USGS seismic monitoring stations can pick up is magnitude 2.

Q. So these are probably 2. --

A. 2 and above, correct.

Q. Okay. So you're saying that in the last five years -- six years, there have been no seismic events in Eddy or Lea Counties of 2.0 or higher?

A. That's based on the evaluation of the USGS data, yes.

Q. All right.

Okay. Exhibit 5, "Assumptions & Methodology."

A. Yes.

Q. Under "Maximum Injection Rates," you list the Olive Branch as 15,000 barrels per day. Isn't it 30,000 barrels per day maximum injection rate?

A. Maximum injection rate, was it 30?

MR. ARTHUR: 15 is the average.

THE WITNESS: 15 is the -- well, we've got it as maximum and average.

So that should be 30, right, Nate?

MR. ALLEMAN: 30 would be the maximum.

THE WITNESS: Okay.

So that's a typo.

Q. (BY EXAMINER BRANCARD) That's a typo?

A. Yes.

Q. So the data that follows in these fill-up charts here, you think is based on the 30, or do I need to ask Mr. Arthur?

A. Yeah. That's based on the 30, the maximum. Yes. Correct.

Q. I think you indicated Mr. Arthur is the one to talk to about these.

A. Correct.

Q. That's good. Save you some questions there.

So Exhibit 7 and Exhibit 8 -- you know, I am not a scientist and I don't pretend to be one, but the testimony at the last hearing -- well, the prior date, the testimony focused on faults and the need to have faults as indicators of potential induced seismicity. And that was what -- Mr. Reynolds?

EXAMINER JONES: Mr. Reynolds.

Q. (BY EXAMINER BRANCARD) -- testified to.

A. Correct.

Q. So when I look at these maps on Exhibits 7 and 8 and I see where the fault lines are and then I see where the seismic events are, to my untrained eye, I don't see a correlation. I see lots of fault lines that have no seismic events attached to them and lots of seismic events that are well away from fault lines.

A. Yes.

Q. Or am I missing something here?

A. No. That's -- that's correct. Again, the Snee and Zoback map is based on known faults. The thing that -- the discussion of well, you have to have a fault, but you have to have a fault that is critically stressed, ready to fail and optimally oriented to induce an event. So not every fault is going to induce seismicity, even if you were near it. If that fault is

not critically stressed and optimally oriented into the stress field, it will not potentially fail from an injection operation. So do we have to know where every exact fault is?

I mean, it's -- again, the 2 and 3D seismic reflection work is going to be based on interpretation, reprocessing, but it's very possible that these seismic events are related to unmapped faults at this point. Depending on your seismic monitoring network that is used to detect these events and the place -- the surface location and the depth of the seismic event, if your monitoring stations are quite a ways away, you induce an error ratio into your actual locations and your depth of your seismic events. I mean, if you look at the USGS website, typically their default for depth is five kilometers because they really don't know how deep the seismic event is, unless you have a fairly dense seismic network that will be able to pick up that a lot more accurately.

And I don't know, you know, what the scale of this was. I mean, obviously, it's published and we use this, but we don't know particularly, you know, how they -- I assume they pull it from the USGS data, too. So --

Q. And I don't think your testimony disagrees with

Mr. Reynolds because I think in the end, under questioning, he also admitted that there are probably a lot of unmapped faults.

A. Correct.

Q. Okay. So who is going to testify here about who should win?

(Laughter.)

EXAMINER JONES: That was my question.

MR. PADILLA: That's for --

EXAMINER BRANCARD: We've got Solaris versus Blackbuck. Who is going to win?

MR. PADILLA: Blackbuck, of course.

(Laughter.)

EXAMINER BRANCARD: Who is going to be the witness on that?

MR. PADILLA: Mr. Arthur.

RECROSS EXAMINATION

BY EXAMINER JONES:

Q. Okay. I guess to clarify these faults that are mapped here on your exhibits --

A. Yes.

Q. -- what -- they're areally located. So what -- what depth are they areally located? I assume they have some dip to them. So if you go -- in other words, you go down, they would move over depending which --

A. And, again, go back to looking at the Snee and Zoback paper. You know, a lot of the information is based off of that, and most -- in the case, north-south normal type faulting. So the maps, you know, that we pulled the known faults off of is either from published literature or from, you know, New Mexico Tech's websites or wherever that data is coming from, from that standpoint.

Q. Okay. Because -- but if they're normal faults, they have a dip to them and --

A. Correct. And we've used some of that from Snee and Zoback's paper in our fault plane -- or slip analysis.

Q. Okay. But nobody marks the strike and dip. I mean, obviously, the strike is along the fault, the way it's mapped here.

A. Correct.

Q. But the dip is not on any of these -- any of these maps, it seems like. We don't see that.

A. I don't know whether, in the published literature, if that's known or assumed or -- I mean, I've seen seismologists guesstimate on dips and things from seismic events, but based on -- I'd have to go back and look at the published papers to see if there is any reference to the dip -- of the known dip of the fault,

obviously. So --

Q. So when you say it's a normal fault, you're talking about either it's a purely normal fault or it's a partial strike slip and the rest normal? And we don't know that here either, but we -- in other words, if you have a strike-slip fault, I can imagine it would have a lot of the drag faults along the side. In other words, it might -- they might split the rock quite a bit out away from the fault --

A. Most of the strike slips that we've seen in other states that have induced a seismicity, you probably wouldn't even see on the seismic reflection data.

Q. Okay.

A. Those are very, very difficult to pick up. It's not like you have a lot of displacement where you can see it.

Q. Okay. So there are not a lot of drag faults?

A. Correct.

Q. What about on these normal faults?

A. I mean, obviously --

Q. How far away from the fault, in other words, is this affecting --

A. Again, I'm assuming a lot of the published data is based on some seismic reflection work. Again, I

would have to go back and see where Snee and Zoback has -- you know, obviously, I think they used all public accessible data to do that work. And I know they're still obviously working on a new actual -- a new model is being developed and going to be released that's more based on heterogeneity versus homogeneous isotropic conditions. So --

Q. Okay.

A. Stanford has funded a lot of money from the oil and gas industry to do a lot of this research.

Q. Okay. But it does -- it really was a pertinent question that Mr. Brancard had asked about. If little seismic events are happening but there are no faults mapped around those, what's up with that?

A. I mean, obviously, it's got to be a fault.

Q. Right. Or a little --

A. I mean, you could have splitters or branches off of a main fault that's mapped that we don't -- that we don't see, and that could be where the seismic event picks up. I mean, for instance, at the Prague magnitude 5.7 in Oklahoma, those earthquakes actually occurred on a splitter that was not mapped on the major fault that was there and everybody knew about. So, I mean, that's -- can happen.

Q. Okay. When you said 1,000 feet or so --

A. 1,000 to 1,200 feet of separation between, yeah.

Q. You're not talking 1,000 feet to 1,200 feet to the Ellenburger, right? It would be --

A. No. That's to the top of the -- top of the Precambrian, yes.

Q. Okay. So how much would the -- a high-stress barrier would you have underneath this injection interval? In other words, the Simpson --

A. Right, Montoya Group, the Simpson Group.

Q. How many feet?

A. Again, not a lot of penetrations that we've seen. I did not look at all -- all we looked at was the depth between the bottom of the Fusselman -- the base of the Fusselman and the top of the basement on a couple of -- we didn't look at what kind of thicknesses of the Simpson or the Montoya Groups.

Q. Okay. So geologically speaking, which well would you approve, the well proposed by Solaris or the well proposed by Blackbuck or both of them?

A. I mean, based on the analysis of the 1.5 mile, it's -- you know, we don't see -- see that's based on any kind of technical assessment at this point. But --

Q. Okay. Thank you.

A. Uh-huh.

EXAMINER JONES: Any other questions of this witness?

MR. BROOKS: I have one follow-up. You want -- you want to go ahead?

MR. PADILLA: Sure.

REDIRECT EXAMINATION

BY MR. PADILLA:

Q. You were asked about correlation between the well site and the faults shown on Exhibit 7, and you said there is no information to suggest there is any correlation between that fault and the proposed well, right? Is that your testimony?

A. It's -- it's -- our testimony is it's sufficient distance away from our proposed injection well that it shouldn't have any impact. And, again, Mr. Arthur will testify to the fault slip potential and how we went about that to demonstrate -- even putting faults within the area, that there is an extremely low potential for fault slip.

Q. In terms of correlation between Oklahoma seismic events in this area of the proposed well, is there any correlation?

A. No.

Q. Is there any correlation between any of the -- well, the Raton Basin that Mr. Goetze testified about?

A. I'm not totally familiar with a lot of the seismicity. Mr. Arthur maybe can testify on that. The information I looked at, at the Dagger Draw that's in the same area, was injection in the Ellenburger, which sits atop the Precambrian Basin. Again, that's the scenario that we see that is more likely to induce seismicity, is an injection zone that sits directly above the Precambrian basement rocks.

Q. And how far away is that from this area?

A. The Raton?

Q. No, no. The Dagger Draw.

A. Oh. Don't know that either for sure.

Q. Different county, I believe, right?

A. Yes.

Q. Okay.

MR. PADILLA: That's all I have.

EXAMINER JONES: Ms. Bennett?

MS. BENNETT: This is a bit unorthodox, but may I enter my appearance on behalf of Mesquite in this case to ask a question to follow up on Mr. Brancard's question about Mr. Reynolds's testimony?

EXAMINER JONES: Are you entering on both cases for Mesquite?

MS. BENNETT: Just this case.

EXAMINER JONES: Just this case. Now, what

case are we on?

MS. BENNETT: This is the Blackbuck Olive Branch case. I don't know the case number.

EXAMINER JONES: It's 20463.

MS. BENNETT: And I just want to ask one follow-up question based on Mr. Brancard's question on Mr. Reynolds testimony in the prior case, if that's acceptable.

EXAMINER JONES: Okay.

MS. BENNETT: Do you mind if I sit here?

MR. PADILLA: Go ahead.

CROSS-EXAMINATION

BY MS. BENNETT:

Q. Good afternoon.

A. Hi.

Q. Were you here all day on June 28th when we had the follow-up hearing on the Mesquite application?

A. With Mr. Goetze's --

Q. Yes.

A. No, I was not.

Q. Were you -- was anyone else from your team here that day?

A. Yes. Mr. Arthur and Alleman were here.

Q. Okay.

MS. BENNETT: I'll reserve my question for

the folks that were here when Mr. Reynolds testified.

EXAMINER JONES: Mr. Brooks?

RECROSS EXAMINATION

BY MR. BROOKS:

Q. Yeah. Something you said in your last answer to Mr. Brancard's question -- no. It was from the examiner's question, of the separation from the base of the injection zone to the top of the -- of the Precambrian.

A. Yes.

Q. That was what you measured, right?

A. Correct.

Q. And that includes the Ellenburger?

A. Correct.

Q. And you did not measure from the base of the injection zone to the top of the Ellenburger?

A. No, we did not.

Q. And you will concede, will you not, that the Ellenburger is not a barrier?

A. Most likely, it's not.

Q. Okay. Thank you.

A. Uh-huh.

EXAMINER JONES: Okay. Thank you, Mr. Tomastik.

MR. PADILLA: We'll call Dan Arthur at this

time.

JAMES D. ARTHUR,

after having been previously sworn under oath, was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. PADILLA:

Q. Mr. Arthur, please state your name for the record.

A. James Daniel Arthur.

Q. And you're with ALL Consulting here?

A. Yes, sir.

Q. And what is it that you do for ALL Consulting? What discipline do you -- are you involved with in terms of your expertise as an engineer?

A. My title is president and chief engineer for ALL Consulting. I'm a petroleum engineer.

Q. And you're hired by Blackbuck as --

A. As a professional registered engineer, it's my responsibility to say who I'm representing. Today I'm representing Blackbuck Resources.

Q. Okay. You've testified before the Oil Conservation Commission before, haven't you?

A. Yes, during the PIT hearings.

Q. The PIT hearings?

A. (Indicating.)

Q. Okay. And for whom did you testify?

A. New Mexico Oil and Gas Association.

Q. Have you since testified as a petroleum engineer before the Division?

A. No, sir.

Q. Tell us what your educational background is as a petroleum engineer.

A. I've got a petroleum engineering degree from the University of Missouri, Rolla.

Q. And what is your experience in the oil and gas industry?

A. I'm a registered professional petroleum engineer in 34 states, including the state of New Mexico, and I also hold a professional petroleum engineering registration through the Society of Petroleum Engineers, which also allows me to practice on an international basis, which I have in a couple dozen countries. I'm a certified project manager and have been sworn as an expert on several dozen various types of disciplines, including petroleum engineering, induced seismicity. In fact, I was the first engineer in the United States to be certified as an expert on induced seismicity during a hearing.

Q. Where was that?

A. In Ohio.

And I also served as a national expert in the Underground Injection Control Program while I was employed with the U.S. Environmental Protection Agency.

Q. What has been your activity of work in Underground Injection Control projects?

A. So that's a great question but one that is awfully broad based on the discussion that we've seen during this hearing. So I started my career with Halliburton doing cementing, acidization. And those, as you're aware of, are very critical aspects of any injection well or disposal well or underground injection control type activity. I worked in the oil and gas industry, permitted my first injection well in 1979. So that was in the state of Oklahoma. Tim Baker was not there yet, if you know Tim.

And then after getting my degree, I went to work for the U.S. Environmental Protection Agency in the Enforcement Program. I served for about three years on the National Technical Working Group where we developed several new tests for mechanical integrity testing. I got to be involved in several new regulatory development programs. I got to --

Q. Are these for underground injection?

A. For the Underground Injection Control Program specifically, including working with a lot of the

researchers early in the program. At that time the US EPA was spending a lot of research dollars. So back in mid-1980s, I got to work with a couple of the national labs on a variety of issues, including the potential for induced seismicity, the zone of endangering influence, which you referred to earlier, and countless other things in preparing for the program's midcourse correction effort. I got to work with a lot of senior researchers and consultants from a variety of areas.

In that, I've also participated in the Class I Injection Well Land Ban Program and the development of those regulations and looking at things like pressure buildup in injection reservoirs, injectate compatibility. I actually responded to a well in Illinois that had an injectate incompatibility that wound up being a blowout.

I also have worked with a number of states on issuing their -- their primacy for the UIC Program under both 1422 and 1425. I have assisted in managing directly the UIC programs for Class II in Indiana and Michigan while I was at EPA and the Class I programs outside of there, as well as doing program reviews through that.

I will also note that during that time

frame -- this was early in the UIC Program. At that time EPA really didn't think they needed petroleum engineers. They didn't produce oil. So for about a year and a half, I was actually the only petroleum engineer employed by EPA on a national basis, so I got brought into a lot of other regions to help on things. So I got to work on some of the issues at Rocky Mountain Arsenal and a number of other places, including the midcontinent and some of the geothermal stuff and gas storage and a lot of waterflooding and other sorts of issues that were -- that were active at the time.

Q. Mr. Arthur, you worked on the exhibits that we have for introduction here today, correct?

A. I did.

Q. And did you participate in the filing of the C-108 in this case?

A. So I served, essentially -- in my role for the application is what I would say would be essentially equivalent to the engineer of record for this. So --

Q. Okay.

MR. PADILLA: Mr. Examiner, we tender Mr. Arthur as an expert in underground injection control and as a petroleum engineer.

EXAMINER JONES: Any objections?

MR. BRUCE: No.

EXAMINER JONES: Mr. Brooks?

MR. BROOKS: No objection.

EXAMINER JONES: He's so qualified.

Q. (BY MR. PADILLA) Before we start, the question was asked earlier about whether -- essentially who Blackbuck is in terms of the way your connection is to whether there is any expertise at Blackbuck other than a water well or an injection well operator. Can you tell us about the internal composition of --

A. Blackbuck has a variety of staff members. They're a growing company. So some of their staff are former oil and gas people, former people that have dealt with water infrastructure and water disposal. For these projects, with the permitting and so forth of this, is that they have looked to ALL Consulting to essentially be their technical arm on these issues.

As -- as a mind-set -- and I know we're already past that, but from ALL's perspective, we've been in business 20 years, and over that 20-year period, we've permitted a little over 2,000 injection wells in the United States. So I'd probably put those numbers up against Chevron or EOG or most anybody.

Q. Okay. Let's turn to Exhibit Number 5 and tell us what contribution you made in preparing Exhibit Number 5.

A. So I oversaw the preparation of Exhibit 5 from -- from working with Tom and others on some of our assumptions and methodologies, as well the approach used in doing this, and a little bit based on discussions that I had had in the past with both Mr. Goetze and Mike here.

Q. Did you meet with Mr. Goetze at some point?

A. I did.

Q. And when was that? A couple of months ago, three months ago more or less?

A. Oh, probably three or four or five months ago. I'm an old guy where time runs together pretty quick.

Q. What was the nature of your meeting with Mr. Goetze?

A. Essentially what we were hoping to do was to talk about not only this Olive Branch application but some of the other applications that we had put in place. We were trying to understand the Division's position and, you know, and look towards solutions that we could work with them on and be able to move forward with permits. So through that discussion, I think that Mr. Goetze and I got to know one another but then talked about some of the solutions and things that we were looking at from a regulatory program, as well as some of his priorities like the mile-and-a-half kind of de facto

regulation.

Q. When you say de facto regulation, what do you mean by that?

A. So -- so -- so what -- in that -- in that discussion, OCD had worked with industry. Industry had done some modeling. And -- and -- and Mr. Goetze explained that in that modeling, for the Devonian injection horizon, that fluids -- that what that modeling resulted in was fluids could get as far as a mile and a half away from that. He was also concerned, with kind of the activity and the permitting activity that was going on, was that -- one of his concerns was that the Devonian was starting to look almost like a waterflood unit as opposed to what would be or had been maybe a more typical disposal well horizon out there. And he was concerned about a lot of things that have been being expressed here through his testimony but have been brought up even today, you know, pore pressure, confinement, induced seismicity, et cetera.

Q. You were here for both prior hearings --

A. Yes, sir.

Q. -- on the Mesquite and the Division's presentation?

What's your opinion of the Division's presentation in terms of how it affects this specific

area of Lea County?

A. So -- so that's a broad question, so -- so please let me provide you with my opinion.

So first off, I think that Mr. Goetze has -- has a rough job here with essentially, in his words during our meeting, a land run going on with regard to disposal wells, which I agree with. At the same time, that's trying to be managed with a division who is 55 percent understaffed. So that -- that alone makes it a very, very difficult situation.

Mr. Goetze, admittedly, including during the last hearing, is not an expert on induced seismicity but certainly presented a lot of information, has read a lot of information, I think made some great points during his -- during his testimony and even during that -- through the cross-examination.

Part of the challenge is that -- you know, from my perspective, I was involved in supporting industry on the EPA National Technical Committee that did the -- the -- the guidance document on that. Mr. Tomastik of my office participated in that and throughout a lot of the other stuff that's going on. I'm also personally serving as a testifying expert on about 100 different induced seismicity litigation cases, so I've seen a lot of testimony from a lot of different

sides and worked with industry on that. And I've studied a lot of the initial induced seismicity events like in Arkansas at VFW and Pecos and many in Oklahoma, West Virginia, Ohio. So we've seen a lot of those similarities. A lot of what's happening, I've been to a lot of those events where we've had technical workshops on induced seismicity.

And what I think Mr. Goetze did is he looked at the fear of that and he has done his best at trying to create a proactive regulatory program.

For the most part, regulatory programs -- and speaking as a former regulator and not only at EPA, I served a year as the UIC director on a contract basis for the state of the Montana after I helped them get their regulatory program. But most regulatory programs are reactive. You know, something happens. Horizontal drilling comes in or hydraulic fracturing or public disclosure of hydraulic chemicals. You name it. Usually something happens and then that prompts an action.

And what Mr. Goetze is trying to do here -- and I appreciate that -- is trying to be proactive, because they don't want to -- they don't want to have the seismic events that, say, Oklahoma has or that you've had in a variety of other areas. So what he's

done is taken information provided by industry. He's taken an approach that he believes he can develop, at least to my understanding of what he described to me through listening to him, that he could implement on an understaffed basis, and that's, you know, a mile-and-a-half separation.

And, furthermore, you know, with all the applications coming in, he's looking at this like, you know -- and what he also expressed to us is it's whoever gets their application in first, you know, that's -- that's the pathway that he can take. And I understand that logic.

The challenge I have is when we went to talk to Mr. Goetze and what we can talk about more here is some of the concerns that the Division has raised about, you know, is the Montoya-Simpson a good confining unit, and will it confine from below? Will the bottom of the -- you know, that lower part of the Fusselman, is that a confining zone? You know, is the separation adequate? You know, are we going to build up pressure? You know, what all is going to happen? Those are reasonable questions, but those are not new questions. Those are questions that have been asked of the UIC Program, the types of questions, elsewhere.

So what we tried to propose to Mr. Goetze

was to do pressure falloff testing, you know, like you do in the Class I injection well program, and you can do that on an annual basis and then see how the reservoir is reacting from a pressure standpoint so you can find out if it's building pressure, not building pressure, what's happening.

We can do radioactive tracer surveys at the well to be able to see is that fluid that I'm injecting -- where is it going down? Is it going down? Is it going out in the formation? Where? You know, there's a number of -- you know, we actually also proposed doing -- putting seismic monitors in. So like one of the things that we could do, as Mr. Tomastik talked about, that is a bit of an issue is the accuracy and so forth is difficult. So, you know, I'd be looking at least to have a seismic monitor on-site and also an accelerometer so we can -- you know, we can look at ground motion movement. So that's one of the things -- like, if you go to the USGS "I Felt It" map -- you know, we might get a 2.0 earthquake in New Mexico that somebody in New York says they felt it because they saw something on the news. Well, if I have an accelerometer, I can go back to Mr. Goetze and say, "Well, you know, you didn't feel that."

And the challenge is if I have a 3.0

earthquake that occurs, you know, really deep, I'm not going to feel it at the surface. But if I have one that occurs pretty shallow, I might, you know. So that depth is significant, you know. So a lot of those things, you know, we could look at.

We also talked about doing a monitoring and mitigation plan that's been talked about in this hearing in the past by, I believe, one of the Mesquite experts, you know, like the stoplight program. That got put in place initially in the geothermal environment, you know, because you'd get a lot of events there. But during the States' first initiative -- and I can't remember if New Mexico participated in that, but it was an IOGCC-GWPC event. Mr. Tomastik and I, again, participated in that. And that was part of the issue, was having a stoplight program, having a monitoring and mitigation program. And that's essentially even what Oklahoma is doing now. A number of states got together and looked at with experts from around the country. We even had some international guys in there looking at this. You know, the U.K. has got issues, you know, Alberta, British Columbia. But nonetheless, there are options.

So one of the things, as an example --

Q. Options aside from just simply --

A. Saying no.

Q. -- arbitrarily --

A. Yes.

Q. -- going to the 1.5 miles?

A. So, for instance, we worked with the Pennsylvania DEP to develop their induced seismicity rules and how they implement that program. And so we looked at a systemic monitoring program, having an accelerometer, development of a monitoring and mitigation program so that not only you but the State would know what you're going to do in different circumstances. And we felt that would be -- would be very effective and -- and allow you to know.

Because if you get into the Devonian, I mean, it's a carbonate reservoir. And I know there are -- you know, we don't -- you know, it's not like there are a billion penetrations into it, right? So when you -- when you think about that, we know about it. We don't know everything about it. But that's not any different than, say, a groundwater remediation program. That's not any different than the air program. That's not any different than a lot of environmental programs that are implemented by the State of New Mexico, by every other state in the country, by the U.S. Environmental Protection Agency, the BLM, the Forest

Service, et cetera. So what you do is you look at the things that you want to do, and then you put things in place to help make sure that you don't -- you don't cause a problem.

So if I know -- if I'm -- if I'm measuring what my pressure buildup in the reservoir is, that might account for the fact that -- when we do, you know, volumetric fill-ups or pressure buildups, we're primarily assuming that this is a homogeneous reservoir with isotropic flow, which is wrong. You know, we talked about this with Phil. And I said, "You know that that's not right," and he agreed, you know. We all know that's not right.

Like, we're making circles on this Exhibit 5. It's not going to be that way. Right? You're going to have preferential flow paths and more. You're going to have -- you know, the porosity that we're looking at in this formation is primarily secondary porosity. You know, it's got primary porosity, but mostly it's secondary porosity.

So when we start looking at what's going to happen, it's heterogeneous. It's not a homogeneous reservoir. And what you see in a lot of homogeneous reservoirs that have fracturing like this, they have a lot more capacity to take in water than you might think.

I've been seeing this over 35 years, including in New Mexico and the Permian Basin. It -- it -- it works that way. And when we look at the idea of, say, a zone of endangering influence calculation, where we're seeing problems in an area of review that might contaminate groundwater, generally that's been when people have gone into shallow zones and are overpressuring these. This is a deep zone, 16- to 18,000 feet deep. If we really ran a zone of endangering influence, it's going to be about a foot from that wellhead, you know.

So -- so that goes back to the days when the U.S. Department of Energy worked with us on doing the area of review Variance Program, if you remember that. So that was where they said the whole area of review like that in a lot of areas is really a waste of money to industry. This is different than that. But if we're concerned about this going down, let's put things in place so that we can look at that.

We can present the data that we have here, you know, on volumetric fill-up, but it's -- it's making improper assumptions just like the model made there. We don't know. And when we look at that and having that strict one-and-a-half-mile setback, it really has no technical basis, you know. It's an assumption. It's a conservative policy.

So when I look at this, in my opinion, you know, you've got -- you ask: Who is going to say -- should it be Blackbuck or Solaris? I don't think that there is technical justification to say is that. You know, what you -- what you should be doing is you should be issuing Blackbuck's permit application and Solaris' permit application and having them collect data, and you could do that with -- with assumptions. That's how most regulatory programs work. This is what you think. This is what the data is showing. But if you start building up pressure or you start, you know, seeing issues, you're going to have to cut back your rate, or you're going to have to, you know, do something different. But that's then based on real data, facts, things that we can control. I can -- I can run logs to be able to show that my fluid isn't going down.

And then, you know, to Mr. Brooks' point in saying that, well, the Ellenburger isn't -- isn't a confining unit -- right? -- well, it's not. It could be an injection interval, and it has been in a lot of different places.

But now let's look at that, you know. So if we look at the point of injection -- and this is no different than -- than Class I, II. You know, the basis of the UIC Program, when I'm injecting, my highest

pressure is at the wellhead, is at the wellbore. And as I move away from the wellbore, that pressure reduces really fast. Right? So I may be filling things up in that reservoir, but I'm not necessarily, you know, building massive pressures. So the most critical point where we're going to see that go down is near or at the wellbore. So when I start looking at radioactive tracer surveys or temperature decay logging, I can see. Is my -- is my injection fluids moving down?

Now, what we saw in the logs and from talking with Tom, the logs that we did have, they weren't consistent of where we saw permeability, of just the geology of like the -- of the injection interval. So that gave us more of a lead that it was homogeneous and that you're going to have things moving out.

Moreover, the liquid that we're going to be injecting is a little bit lighter than the fluid that is inherent in the Devonian Formation, so that alone is going to be looking at it to come -- to move upward or stay about where it is.

Q. Let's -- let's look at your circles on Exhibit 5. First of all, injection rate is going to be 30,000 barrels per day, right? You're proposing maximum injection rates of 30,000?

A. Of 30,000 barrels a day, with an average of 15.

Q. An average of 15?

A. Uh-huh.

So what we did here is -- is, as I think Nate and Mr. Tomastik looked at, is -- is over those three time periods, what would that do assuming the maximum injection rate, and for our well and the proposed ones, as well as looking at data for the existing ones in the area? And in that time period, even if we go out to the 30-year volumetric fill-up analysis, we don't get out from the Olive Branch well -- we don't get out to the one-and-a-half-mile radius from the proposed well.

Q. How far do you go out?

A. We get out a little over a mile. What this showed, I believe, was about 6,100 feet -- or 6,000 feet. Sorry.

Q. Both wells, the Predator and the Olive Branch, were injecting at the same time?

A. So what we did on this -- this is -- that is a relatively simplistic analysis. We didn't run a true reservoir model from that. So if -- if -- if assuming this homogeneous isotropic analysis and, you know, the model that we did, which is a rather simplistic arithmetic model -- we didn't try to calculate a dual injection of what that would be. But I would suggest it

still would be less than a mile and a half.

Q. Somebody asked at the last hearing -- I think it was Mr. Brancard -- about what happens at the end of 30 years. What happens at the end of 30 years?

A. So, you know, I've been -- I've been doing this whole injection well stuff for 35 years and have seen massive changes in both the producing wells that are accepting -- that are delivering water-disposal wells and what we see now. So in the past, you know, oil and gas wells would turn into stripper wells and, you know, would maybe produce a barrel of oil or a half barrel of oil and 100 barrels of water, maybe more than that. Certainly when we look at the other wells that have produced in the Devonian, they produce gas and a massive amount of water. But -- but what has happened with kind of the unconventional development world that we're seeing now is it's vastly different.

So we're using -- we're using, you know, big fracs with a lot of water and a lot of sand so that we can accelerate production. You know, we want to fracture that formation around our horizontal-producing wells like -- you know, like safety glass on a windshield, so you get all these -- you know, this complex fracture network, and then you want to produce that as fast back as you can. So what you see is --

from a water perspective but also a hydrocarbon perspective is you generally see a pretty big increase in what those wells initially produce but then a pretty sharp decrease. As opposed to historically where we would start off producing a little bit of water and go to massive volumes of water, now we'll get a lot of water during flowback and then maybe water after that. But over time, that water goes down.

So when I start looking at an area like we looked at, a five-mile area, looking at is there a need for disposal in this area and there is certainly even now more water than there is disposal capacity, but that doesn't last forever. This doesn't -- you know, this massive waterline doesn't last for eternity, which is, I think, one of the words I heard used in one of the prior hearings. So certainly there will be, you know, produced water that's going to need to be disposed of but in far lesser amounts that you'll see early in the development of these fields. So what you see is really a big flush until development is gone -- or completed and then over time, that water production from those wells is going to go down and stabilize far less than it was during the early production portion of the project.

Q. Do you have anything else on Exhibit Number 5 in terms of calculations?

A. I don't think so. I'm happy to take questions about it.

Q. Well, let's go on now to Exhibit Number 9, and let's talk about the fault slip potential analysis. And I take it you prepared this Exhibit 9?

A. So I worked with our team on Exhibit 9 and the fault slip potential modeling. I think that -- I think that it's important to note what we did as we get into -- into this modeling, is we went through a couple of scenarios and different time durations. But what we had to do to be able to arrive or -- or -- or have a chance at arriving at some sort of number is we added fictitious faults. And this isn't something that is -- I mean, this is pretty common. But when you do this FSP model, if you don't have any faults, you get -- the answer is zero. It just is.

Now, therein lies --

Q. What is fault slip? We use that term, "fault slip analysis." What is fault slip?

A. So essentially what we're trying to assess is a potential for injection through increased pore pressure and so forth -- and it really has to do with a number of issues that wind up getting into viscosity and other things -- that would -- would cause a fault to slip, thus creating some sort of seismic event.

Q. Okay. It slips from its current position?

A. Whether it's a strike-slip fault, a normal fault or, you know, some combination therein.

Q. Okay. So what did you do to -- I see on page 4, you have injection data.

A. So we really ran -- we ran two scenarios that I describe because we don't know the -- you know, the exact details of what we're going to see at this well because we haven't drilled it yet and we don't have that data. So we did one with the permeability at ten millidarcies, porosity at 5 percent and an injection interval thickness of 100. And the second scenario, 100 millidarcies for permeability, 10 percent porosity and an injection interval of 250 feet. So we're trying to be very conservative even with both of these.

So if you look at, you know, some of the past modeling in the hearings, they used the entire interval, you know, for that assumption, so, say, 1,400 feet. Well, we're trying to use a smaller portion up because we don't, you know -- 100 percent of our injection interval isn't going to have porosity. So we have high porosity zones and other stuff, and we're still learning about it. But within all of the modeling we did, we got an answer of zero. When we added fictitious faults, we got an answer of zero. So we

saw -- we saw no -- no fault slip potential.

But I want to make sure to address a question that I know is keen on the mind of the Division, which is why we're here and why I think Mr. Goetze is being cautious and proactive, is that we don't know where all the faults are or where there could be faults. And just like Mr. Tomastik said, a lot of the fault we've seen in Oklahoma, Texas, West Virginia and elsewhere, Alberta, the U.K. have been strike-slip faults. They're just tough to detect on like 2D or 3D seismic.

Moreover, the faults that we've seen -- or the seismic events that we've seen created from hydraulic fracturing, a lot of times we didn't know were there. I've seen the 2D and 3D seismic, and you're looking -- they kind of have waves in them, and you go, "Okay. Is that wave -- is that a strike-slip fault; it could be," you know. It's really hard to understand. But what we've seen in some of the -- in some of the litigation cases -- and even what, say, the Oklahoma Geologic Survey did and what they're doing in Texas and elsewhere is they're looking for those seismic events to occur, and then they're mapping those faults.

Well, I think, you know, to be proactive is we're seeing that based on the faults that we know about

or even putting some faults in there, we're feeling pretty good that this case isn't -- doesn't have the potential in this zone to cause a seismic event. I think it's critical to think about the fact that in all the cases that we're looking at here, the instances where induced seismicity was initiated, was when injection was occurring in the formation adjacent to the basement, so the Ellenburger, the Arbuckle, the Mount Simon, et cetera. So we can look at this and say, "Well, we're really worried it could go through that confinement and then just shoot down into the Ellenburger and go down into the basement." Well, that could happen, you know. It's possible. I can't say that it can't. None of the -- none of the experts can say that it can't.

But what we can say is the data we've looked at suggests that that shouldn't happen. We can do testing to be able to see is our fluid going down. We can -- we can also think about the fact that -- of what I said a little bit ago, that we've got a pretty massive formation that has demonstrated the capacity to take a lot of fluid without a lot of pressure buildup, from what we've seen so far, but it needs time to assess that and proper monitoring to be able to have a course of action that you could take in advance of seeing

seismic events. You know, let's just have a plan. We want to have a plan.

And moreover, you're going to have that highest pressure right at the well. So we do say: Temperature decay logging, radioactive tracer logging, pressure -- you know, pressure falloff testing. We can know that. We can know that data. But that well, that's going to be the main point. And, you know, just assuming that well could go out a mile and a half, let's just say, or a mile or whatever you want to assume and that fluid at some distance, because we don't know perfectly, 100 percent the geology of that lower confining unit, that that means this is a failure is just not correct. Because now I'm injecting fluid in there that's actually a little fresher than the fluid in the Devonian, so I shouldn't get that much seepage. Most pressure is going to be right at the well. You know, from a -- from a safety standpoint, this --

Q. Let's go back to page 7 where you have an injection interval thickness of 100 feet. What happens if you multiply that ten times or 12 times, which is actually the case here in terms of --

A. So a smaller interval -- a smaller interval with that rate is going to -- is going to provide me with the greatest fault slip potential. So if I take a

bigger interval, my fault slip potential is going to go down because that pressure is going to be spread out over a thicker interval.

So this first -- you know, this first example that we have, you know, in reality, provides the greatest risking. And we see in both -- in both instances, you know, we have -- we have zero fault slip potential.

Q. And in Scenario 2, the same thing?

A. Correct.

Q. And you've increased the thickness interval to 250 feet on the second scenario. And that applies the same based on the total length of the disposal interval that's proposed, right?

A. Correct.

Q. Do you have anything else on Exhibit 9?

A. No, sir.

Q. Let's go on to Number 10. What is that?

A. So this is a map of disposal -- oil and gas wells in the area, also showing the Olive Branch well in the center. This is a five-mile radius of the -- of the wells in this vicinity, shown in the lower left-hand corner of the circle, a little less than five miles from the well. Two wells that are shown, the Cotton Draw Unit 84 and the Cotton Draw Unit 76, these are wells

that have produced out of the Devonian.

Q. What kind of production out of the Devonian?

A. I've got a couple of graphs here that -- that -- that come after this. But, you know, these are wells that I would say, for most of their productive life, did not do very well. They did have some production that -- that IP'd, oh, in the, say, 400,000 MCF-per-month range but had very high water production. I mean, which is not unexpected. So you see that in -- oh, like in parts of West Texas where they've produced out of the Ellenburger. And why isn't there a rush on Ellenburger-Devonian? Because the economics of it is just rough because you produce massive amounts of water. The water production goes up. The gas production goes down real rapidly because there is just not a lot of hydrocarbon resources available to produce.

In the case of these two wells, one was -- one of wells was plugged, and one was converted to a disposal well.

Q. In terms of impairing correlative rights in the Ellenburger, how do you rate that?

A. You know, I would guess that natural gas prices would probably have to go up to something like $100 an MCF, and everything else, you know, would be dead before -- if we're going to start making any kind of

rush to get the drippings left out of the Devonian here. So from a correlative rights perspective, I see no issue on correlative rights relative to hydrocarbons or the Division's mission on not wasting hydrocarbons.

Q. And right in the area of the Olive Branch, it is very sparse production, right?

A. That's correct, with everything else being much shallower.

Q. Let's go to Number 11. Actually, Numbers 11, 12 and 13 are pretty much the same, right?

A. Yes.

Q. What are they?

A. Those are just from those two wells. Both exhibits, 11 and 13, are production charts from those two Cotton Draw wells. We actually worked on one of these as a disposal well. But you could see a rapid decline from production from both bells and water production being pretty high.

Q. Makes for poor economics, right?

A. I'd say less than poor economics.

Q. What's Number 13?

A. So anytime -- anytime you're looking at a disposal well, especially from a commercial disposal well perspective, and recognizing that you may -- you may service a particular area, you want there to be a

market. So if you're going to be spending money on developing a commercial disposal well, you want to make sure that there is a need.

And so we looked in a five-mile radius here. We looked at current water production, and what we saw in the area around the well was that there was currently inadequate water disposal well capacity. Now, why this is significant is water has -- has a -- has a real problem. The biggest problem with water is that it's heavy. And why I say that is that if you've got a lot of water and you've got to get rid of it, you've got to put it on a truck, and it's heavy and it costs you a lot of money. So when you look at a lot of the costs that it takes you to dispose of that water, transportation is number one. And so the further you have to transport that water as a producer, the bigger economic impact it has on you and your development.

So you want to -- you want to find disposal wells that are as close as possible. And so we looked in -- you know, a five-mile radius is not -- I mean, that's a pretty good area. But within that -- just within that, there is currently inadequate disposal capacity. And, you know, you're still seeing a lot of permits issued for oil and gas wells and wells that haven't yet been drilled. So from a -- from a need

basis, there is -- there is insufficient capacity. There is a great need. It shouldn't be an issue with even competition with other wells in the -- you know, within miles from the Olive Branch well.

Q. Would approval of the Olive Branch promote the conservation of oil and gas?

A. I think it would certainly help, because what you're trying to do from the Division's standpoint is not -- not necessarily add unnecessary economic burdens so that more of those oil and gas resources are producible. And so by putting the Olive Branch well in and proving that in this particular area, I think would be -- would be positive and in line with the Division's objectives and goals.

Q. So let me -- let me ask you to summarize your testimony, and let me ask it in the form of a question. Are you saying that approval of this application would, number one, not cause any seismic events based on your -- on your calculations? Number two, would promote the conservation of oil and gas because water's got to go somewhere, right? And anything else?

A. So we've tried to, you know, look at -- and even in our FSP modeling and our seismic analysis, not only the faults are there but also the seismic events. So USGS is only recording a 2.0 seismic event in the

data that they have -- in the data that they've published, but we've tried to look at both of those instances, where there is a known map fault versus, you know, an event. And the events may not be exactly where they actually occurred. The faults may be a little different. There may be some other faults in there. But from a seismic event potential, considering where we are, separation from basement, the other things I've testified on, I don't see a good -- I don't see a significant seismic -- induced seismic potential caused by the Olive Branch well. I believe that what we've done with the construction of the well, that it's protective of USCWs, which is part of the mission of the UIC Program under the Safe Drinking Water Act, as well as it's supportive of -- of -- of the Division's mission.

MR. PADILLA: I have no further questions.

EXAMINER JONES: Okay. Let's take a ten-minute break.

MR. BROOKS: Can we make it 15?

EXAMINER JONES: We can, but we're in a rush today.

MR. BROOKS: Whatever you designate, I'll conform.

(Recess, 2:04 p.m. to 2:23 p.m.)

EXAMINER JONES: Let's go back on the record and get ready for cross-examination.

MR. PADILLA: Mr. Examiner, before I do that, I'd like to tender Exhibits 5, 9, 10, 11, 12 and 13.

MR. BRUCE: No objection.

EXAMINER JONES: Any objections?

Mr. Brooks, any objections?

MR. BROOKS: No objections. No questions and no objections to exhibits.

EXAMINER JONES: We're tendering Exhibit 5 for the second time, but also 9, 10, 11, 12 and 13 are admitted.

(Blackbuck Resources, LLC Exhibit Numbers 5 and 9 through 13 are offered and admitted into evidence.)

EXAMINER JONES: Ms. Bennett, any questions?

MS. BENNETT: No. Thank you.

MR. BROOKS: No questions.

EXAMINER JONES: You're in a hurry. Everybody's in a hurry.

MR. BROOKS: Everyone's in a hurry.

CROSS-EXAMINATION

BY EXAMINER McMILLAN:

Q. Okay. Let's see. The first question I've got -- just for clarification, you said that -- this is paraphrasing -- porosity and permeability was not consistent. So are you saying that the porosity -- you say the porosity occurred at different levels? Is that kind of right?

A. So when we -- you know, we're looking at a pretty massive formation.

Q. Yes.

A. Okay? And -- and when you look at things like what has been done so far in the hearing, even what we did -- because what else are you going to do -- we assumed that things were homogeneous, you know, just to do a model. That's pretty often done. Most models, when you do them, you know they're going to be wrong, but you're trying to see how wrong they're going to be.

And when Tom and I looked at the geophysical logs for this, we didn't see that each log through our proposed injection zone had the same, you know, wiggles and squiggles at the same, you know, portions of that, which kind of gave us the idea that the high-porosity zones, for instance, occurred at kind of different areas within that, which leads me to believe that there is some heterogeneity.

Q. Okay. I think that answers that question.

And then the question that also I have: I think you said that -- in who should be picked, you said you should pick both. But then the problem you're getting is what happens if there is an event? How, as a regulator, can the Oil Conservation Division determine the responsible party?

A. Okay. So let's -- let's look at that from a broader picture. Let's first look at should you pick Blackbuck. And I would say to do this from a very cards on the -- faceup on the table sort of perspective. If you look at this, who should you pick -- and this is from me as a former regulatory guy and talking with you and Phil based on the stuff that you guys explained to me.

So if I look at this, the Blackbuck well was kind of first in order, you know, so the first received without having an issue with the mile-and-a-half kind of de facto rule that you guys are implementing. There is another one that was submitted before, in '18, but it's within a mile and a half of an active well. Moreover, the Solaris well is closer to active wells. And if you are going to look at this from a pure technical standpoint on pressure, it's going to have more influences from an existing disposal well than

we would. So if you take out the proposed wells, we're more than a mile and a half away from any other well. So from that, based on the criteria that you guys describe, Blackbuck would be the easy choice.

Now, with saying that -- so first, what you did, was you jumped -- so next. That's kind of the first part of my response to you.

Q. Okay.

A. So for the second response, you jump to what if there is an event? Who would you find, you know, responsible? What would you do as a division, a state agency or whatever. So let's back up from that perspective, because you're trying to have a proactive regulatory program, right?

So the first thing you look at is not when there is an event. You look at what can I do to make the best decision I can at attempting to assume that there -- that there shouldn't be an event or to prevent an event or to get a warning of an event. So I realize this is a little different than the question you asked, but I'll answer that question, too.

So this is not unlike what you do in Superfund or air or whatever. You put things in place. You do monitoring. You use best management practices. This is what we did with Saudi Aramco in developing best

management practices for their entire unconventional program, including injection. But when you do that, you do those things, and you look at things like, you know, annual pressure falloff test. Am I building pressure? You know, am I building pressure that is somehow concerning? Am I seeing flow going down? Am I seeing things that would give me pause? So irregardless of the fact that we're not injecting in the Ellenburger, irregardless of the fact that we've got 1,200-something -- you know, 1,000, 1,200 feet of separation to the basement and that the risks are low, we're trying to be very, very, very ultraconservative even on that. So the thing -- the thing that I would look at first is -- is what am I doing to be able to put things in place so that I can try to operate either one well, multiple wells in a fashion that is -- that would be safe?

So what we talked about when I was in your office talking with you and Phil, what you guys explained to me -- or what Phil explained was that I understand that, I'm familiar with it, but we don't have the staff to be able to look at those things, to be able to enforce those things, to be able to do anything with those things, to be able to interpret those things. And my response there is: It's not appropriate to be able

to not issue a permit or to deny a permit because of a staffing issue. That doesn't seem fair. Now -- so one is, I think, that if you do those things, you have justification where you're at to issue the permits.

Now, let's just say that, worst case, something happens. Right? We don't know where all the faults are. It's the underground.

I tell people, as a petroleum engineer, that I have the oddest engineering degree of any that there is because all the other engineers get to build something and look at it. Right? Geologists, too. You might go to an outcrop, but everything that you're doing, you're interpreting, and you can't get two geologists to agree with the same data, right? So same with a geophysicist or a seismologist, which really is just a geophysicist with training or an engineer with training.

So within those things, this is the discussion that we had with the State of Pennsylvania, that Tom had in Ohio, that we've had at the States' first work group, is let's just say there is an event. What do you do? And we're doing this not only on injection but also hydraulic fracturing. So when you think of hydraulic fracturing, hydraulic fracturing, by its nature, you are causing at least a microseismic

event. You break that rock; that's a microseismic event. Now, in general, those events are less than 1, .1. Maybe they're a negative number. But sometimes those events can spark other events. So we've seen events from hydraulic fracturing spark events as high as 3.7 magnitude earthquakes. Right?

Now, within that, what do you do? So what some regulatory agencies have chosen to do, including the State of Ohio, State of Pennsylvania, and just as examples and what we even talked to them about in proposing injection, is if you want to do that, you can -- you can do something to install either a seismic monitoring network that is structured for the activity being regulated so you could -- and so you could triangulate what's happening. Right?

So with the current network -- and Mr. Tomastik touched on this a little while ago. The current network that's out there, it's difficult to triangulate things. It's generally -- what the USGS has historically done is set up a network where they can find, you know, a 4.5, 5.0-something earthquake over here. And the exact location of it isn't necessarily critical. Even if you look at the 7.2 earthquake that happened in Anchorage I think last year -- I have a bunch of relatives there -- they moved the location of

that earthquake 12 times trying to -- you know, they changed the magnitude of it three times. You know, they changed the depth on it -- I don't know -- half a dozen times? So being able to have -- you know, for the stuff that we're talking about that might be a 2.0 magnitude earthquake or something like that, it's difficult to triangulate to find that. That's what Ohio found when Tom was looking at the earthquake stuff there.

So if you have a proximal network of, I would say, at least three but ideally four to five monitors, you can do a really good job at triangulating both the lateral and depths of that. Now, that's a little bit of a challenge in the disposal well world because where are you going to put these things, you know? But you can put them -- like, we'll typically put them on the well side of an injection well and then maybe other well pads or something in the area. But I believe that you have some operators here that are putting monitors on their well pads, and you have the existing network.

So if you have just one monitor on your well pad, plus also having an accelerometer on your well pad, if there is an event, you can, one, see what the ground motion is, you know, what shaking you're seeing at the surface right there where your well is, and you

can have an additional close proximal point of being able to identify an earthquake. And the other thing with that in being able to have a monitor so close is that you're not going to be stuck with only being able to detect, say, a 2.0 earthquake.

So one of the things in earthquake mitigation is I want to be able to detect an event that's maybe .5. Okay? So if I can detect a .5 earthquake -- nobody's going to feel that, but I can start seeing that. And I can see it, and as I inject, am I seeing more of these microseismic events? And then what I can do is I can -- I can do things such as, you know, adjusting my rate or, you know, looking more at my fluid makeup. You know, one of the things that we're working on right now for the disposal well industry is realtime monitoring of scalability and some of those factors so that you're assuring you're not damaging the formation as the water's going into it. It's a real big problem. How much scale inhibitor do I put in there? How much frozen inhibitor do I add? You know, what other kind of chemical program do I need to be able to make this well operate as efficiently as possible and not do that.

The other thing that I'll say, there is just a real basic best practices. I'm giving a paper

here in a couple of weeks on disposal well best practices. And when you look at some of those things, some of the other things that are critical are having realtime monitoring of your injection pressure as opposed to what has been historically happening where I go and put a gauge on it and I take a routine measurement. I want to have realtime continuous measurement of not only my injection pressure but my flow, and ideally I'd like to have it of that specific gravity, too, because that's going to allow me to make some things, some determinations and calculations downhole. So those are just a few of the things I can do. But if I do those things and I have, say, a monitor on-site at least or a monitoring network, if you want to be real good, I can say, you know, "It's him, not me." Or I can say, "This is me, not them."

Furthermore, what we do in some states, like with the Pennsylvania DEP, we publish that up to the Irish website, and it's just public knowledge. So now I can take that data, combine it with any of these other ones, these other monitors that are out there, and use those to help me triangulate to get a real accurate location of any event that might occur.

But, again, I want to make sure that it's clear that we're getting real fired up about seismic

events in the Devonian that's 1,000 to 1,200 feet above the basement. And if you've ever seen -- I don't know if you've seen 2D or 3D seismic that shows basement. A lot of the basement has faults going all over the place. I mean, it's just been there for, you know, billions of years, and it can be really messed up, and there could be faults that are at risk. So a lot of the events that we've seen have been not only injection into that overlying strata but actually into the basement. So that was one of the things that Oklahoma did, Ohio did and Texas did, where people weren't keeping real good track of even staying out of the basement.

You know, that was -- when the Barnett Shale first came in, one of the issues they had is they were fracturing from the Barnett into the Ellenburger and producing a whole bunch of water. I mean, that was a big issue. And then, you know, operators were like, okay, we have to control our fracs, and we want to create a more complex fracture network as opposed to big factures that are going to go right down the Ellenburger and then I've got to pay to produce water up from my -- from my disposal zone.

So I don't know if I fully answered your question, but if I look at those on kind of a three-phase basis, that's how I would look at it. And

I'm really trying to answer your question as absolutely clearly and good as I can.

CROSS-EXAMINATION

BY EXAMINER JONES:

Q. As far as the -- this permit that we're looking at today, what would be the water coming in? The flowlines? Flowlines coming in?

A. So the plan for Blackbuck is -- they're -- they're -- they're a developing midstream operating company, so their -- their strategy -- and they're already doing this. They have wells in Texas and doing recycling. You know, we're doing this stuff for them there, too. But their plan here is to, you know, own the permit, drill the well, operate the well, manage the well long term. And what their -- their strategy is and what they've been talking with their customers about is all pipelines in trying to minimize trucking to the maximum extent possible.

Now, that could be hard sometimes, and I would still think that they may have a truck unloading station at the well just for instances where, you know -- where something comes out of the pipeline. But their primary method of getting water to the well is going to be pipeline and saving money and long-term contracts and all that.

Q. Okay. Do you know anything about the rights-of-way or the progress on this pipeline to this well, or is it all pending this action?

A. So a lot of the stuff that we're trying -- they have -- they have some of that planned. We've talked to BLM. So -- so we have -- we have plans for some of that, but one of the challenges that we have is BLM is saying, you know, hold on until you get that permit from OCD, because when you start applying some of this stuff to BLM, there are some pretty high costs that if you need to change it, you've got to repay over. And, I mean, this is -- this is not insignificant dollars. This could add tens or hundreds of thousands of dollars to the overall cost of the project.

Q. Yeah.

What about if something happens MIT-wise on this well? Can the well be shut in, and could you divert water? Do you have tankage? Are you going to have tankage to that?

A. So the plan is to be able to have storage so we could run necessary testing as needed. Now, we've looked at a lot of -- I mean, so we do a lot of well integrity stuff. I mean, that's kind of a big background for both myself and Mr. Tomastik and several other guys in our firm. We've done a lot of that

actually here in New Mexico. And we have a lot of these wells that have hangers and stuff, and you've got a lot of little zones on the way that aren't necessarily production zones but will have a little bit of gas in them.

And what we've seen on a number of injection wells is that where you have those hangers, you'll have maybe some gas coming in or something like that. So we've run like temperature audio logs on some of the wells around here, helping -- helping companies, not necessarily in relation to the OCD but in trying to evaluate that and what they do and build up testing and that on those annular spaces and so forth.

So what we're trying to do here -- and some of what we've seen are a little different on some of those other wells like those Cotton Valley wells that I said. One of them was converted to --

Q. Cotton Draw?

A. Cotton Draw, yeah, an injection. We're trying to plan the cement program and cementing to surface on stuff so that we can minimize some of those issues that we've seen on other wells in the region. Okay? And -- and -- and looking at -- so like we're pretty anally retentive on getting cement lab reports and just how we do those things and so forth, trying to make sure we're

using the right cement and all that, to minimize that but then to do the right testing so we can keep an eye on it.

But let's just say we did have some sort of shutdown or just had to do maintenance on the well, to do an acid job or to change out a packer or something, we've got storage that we should be able to accommodate that for a short period. Now, if it went a long time, they would be -- they'd have to be looking at notifying their customers that, you know, the well blew up or, you know, is going to be down for some extended period.

Q. Or you can make a deal with a neighbor --

A. Right. We could go to Solaris and say, "Hey, you know" --

Q. Yeah. In that case it would be good to have them close together.

(Laughter.)

A. Maybe it's better in the interest of the OCD to have that.

Q. Might be.

The pressure buildups, would you have enough storage to have a six-hour pressure buildup?

A. So are we talking on the annular spaces?

Q. Oh, no. On the -- on the actual -- I'm talking pressure.

A. Are you talking about the pressure falloff -- pressure falloff test? Okay.

Q. Yeah.

A. So if we were going to do a pressure falloff test -- the data -- the data you get from those really depends. So if we're really trying to -- so, essentially, you design those tests based on what you're trying to determine.

Q. Right.

A. Right?

So if I'm -- if I'm on a well and I'm trying to look at -- at -- at damage and determine -- get permeability or whatever, but typically you're going to do those on more -- on like a sandstone op or something. Here, you know, what we see is -- is the Devonian, when you shut the well down, pressures decline pretty quick. So I think that -- that probably a six-hour test -- I think you probably chose a pretty good number -- would probably get us a nice curve to be able to see where that is and be able to compare that over time. But my hope is that we would have storage for at least 12 hours.

Q. Okay. But you do see the value in doing falloff testing on a periodic basis?

A. I think so, especially with the -- especially

with the concern here from -- that OCD is expressing. And moreover, you know, getting data like that will, I think, really add to OCD's and industry's arsenal of understanding that injection horizon.

Q. Yeah. Well, we're worried about pressure buildup in the formation. That's the only way to get it.

A. Yeah. Then you've got data to come back at.

Q. Mr. Wilson's model that he set up and ran, were you here for him --

A. Yes, I was.

Q. -- presenting that?

What do you think the biggest takeaway from that was?

A. So when you start -- when you start looking at that, at models and pressure buildup models, I would say that part of my reference is that in a lot of the earthquake litigation cases that I've done, a lot of -- a lot of the experts that I've opposed have done models. Okay? And in every case -- and if you look at a lot of the papers -- the technical papers that are out there on induced seismicity -- because that's why we're talking about his model -- will make assumptions, whether, you know, it's a homogeneous reservoir, isotropic analysis or some -- some input that they put in the model. And

generally what I find is that in those assumptions, if you -- you can make assumptions to achieve what you want to -- you know, what conclusion you want to make. I'm more of a "let the data drive what we do."

So what he did is he did a model that showed an unrealistic situation that we know is wrong, that we have to take that model and say, Okay. If he -- if he made these assumptions -- which he's kind of being conservative and he said that, I believe, in his testimony -- we've learned something. But I don't believe that that's it. So he did a -- he did a few things, you know, and really a number of those -- a few things that I think that are significant, worth mentioning from all of Mesquite's experts.

So, for instance, if you look at some of the papers that have been published, you'll see the same Stanford guys that we're referring to say: Well, hey, you can have -- you can have an injection well, you know, induce an earthquake under the right scenario a long distance away. You may have preferential flow paths or other things that a well farther away may be more of a threat to maybe an unknown fault or a known fault than a well that's close by. But that's not generally how we think because we don't get to see that underground.

So my only point here is to realize that what he presented, what I've presented is kind of a scenario based on a whole bunch of assumptions in every one of those cases, which are probably wrong, but that's the best that -- that we can do. So I think within that, he did an okay job at trying to come up with different scenarios to be able to show that this would be safe over that, say, extended 30-year time frame, if I remember what he did.

Q. Yeah.

A. And I agree with that in general. I think that what you're going to find is the pressure increase is going to get a lot less, but, you know, that's just some kind of my experience with these kind of reservoirs and so forth. So let's get data over long term and see.

Q. Yeah.

It's kind of understood that you're always going to do open-hole injection completions in the Devonian, but you really don't know where the water's going. And people are telling us they don't want to run temperature tracer surveys. And, of course, they're going to show different things depending on different rates. And so how would you design a way to know where your injection is really going or whether it's going out the bottom of the hole, going down?

A. So I'll say this. Anytime you get into a carbonate formation over, you know, a pretty big injection interval is that you can have a risk of losing a tool, you know. But what you can do in some of those cases is -- that doesn't mean that -- that -- that can be a -- that can be a fear and maybe it can be substantiated. But as both an engineer and a former regulator, what I'd say is let's -- let's evaluate that and see if that's real. So do we want to run a wiper run? Are we seeing a lot of -- like, in some of these wells, I'll see a lot of fill-up at the bottom of the hole, you know, that's maybe giving me an indication that, you know, I'm getting some collapse or something like that.

But if I am getting that, those things may be negatively impacting my injectivity. So, you know, from seeing where that's going to go, you know, I can use spinner surveys, radioactive tracer surveys, temperature logs, I can do those things. So now do I want to make sure things are safe in doing that? Yeah, I do. Do we want to look at, you know, potential cased-hole completions? We could. But just in looking at the logs, it's difficult, essentially like you just noted, to be able to tell exactly where those are. We picked some based on the data that we got, but we kind

of think that there could be a lot more than that, and it's just hard to see that.

So what I would really like to be able to see, you know, are some spinner surveys, some temperature logs, radioactive tracer, some other logs that we could run in that interval to make those determinations, and we're prepared to do that.

Q. Okay. Yeah. We had some testimony earlier that the caliper was essentially a gun barrel going down, so the calculations were pretty straightforward.

A. That's what we've seen. And so which -- and I think that -- I can't remember in the prior hearing, but I think you're the one that mentioned it, that some of the other -- the large producers didn't want to go below the base of the casing for fear they'd lose a tool. And just the caliper data we've seen in there, you know -- I mean, I'm used to, like, thinking Louisiana or the Florida Boulder Zone. I mean, I've worked in a bunch of those, and we run logs routinely. But even in the Arbuckle, there are times where we're seeing a lot of fill-up, so we will run a wiper run and try to clean the hole out and making sure we do not see the risk before we run those tools. And if I'm seeing, you know, problems, I'm going to be raising my hand going, "Okay. Here's this data that we have showing that this is a

risk" as opposed to I'm looking at data going, "I'm not seeing data that gives me that indication in this injection zone."

Q. Are you ever -- in other states or in your experience had some sort of pressure sensor down close to the packer to be long-term installed that would somehow transmit pressures to the surface? In other words, you can't run a Hall Plot really on these surface pressures because it's -- if it's on a vacuum?

A. So we've done this on producing wells, where you can -- you know, you've got that technology that's available, but it's pretty tough in a -- I mean, if you look at the kind of well construction that we have here, we've got hangers and that. It would be -- it would be tough. But what you can do is, you know, you can -- you know, we can do -- like, we could even modify a falloff test to be able to do a falloff injection test, you know. So there are some different things, you know, that we can do once we do put a downhole pressure transducer in there.

Moreover, even if you wanted to say, "Okay. We're not -- we're going to do this and maybe not every -- every annual test have downhole pressure transducer. Let's monitor temperatures." Like in Wyoming, you know, we'll have something down there where

we're monitoring not only -- not only downhole pressure but also temperature. And this is not that inconsistent with a lot of places. But -- but if I can do that compared to my pressure to surface, I can do future -- like a step-rate test or something like that, you know, without having to go to the trouble of putting a downhole pressure sensor by then. If I'm measuring that data and I can do the corrections, I have a lot better way to be able to get that. But I've got to get some kind of starting point. And we've done that even without. So -- but usually every time we've done -- we've had at least one downhole pressure sensor specific gravity and temperature.

Q. You've got a nodal -- nodal analysis program, or did you do any kind of friction calculations to see if you can get 30,000 barrels a day in your design and tubing and packer?

A. We didn't do specific for this, but we've done so many of these that -- I mean, we go from, I think, a 5-1/2 to a 4-1/2-inch tubing. And, you know -- and from that perspective, I think we'll be fine. We're looking at an average, you know, in the 15,000 range, you know. So we may have maximums or whatever, but just in the other data that we've seen out there, you know, and that we've seen in countless other wells that we've been

engaged with or evaluated, you know, I think from a 4-1/2, we should be fine. I mean, we just did a well for another large company with the same tubing and a higher capacity.

Q. The Devonian would not be a constraint then as far as your injection?

A. We don't believe so.

Q. So why not? How can it be such a good injectivity zone? What are the parameters, as an engineer?

A. So if you look at the -- and I'll just give you an example. If you look at the Arbuckle, you know, it's -- you know, it's a heterogeneous carbonate, you know, with a lot of secondary porosity. I think the Devonian has, you know, mostly secondary porosity, not unlike the Arbuckle, but, you know, it has -- it has other features in it that also add to that.

So I know we talked about -- I think Mike asked during one of the prior hearings, Well, does vug porosity, you know, transmit flow? And under certain circumstances, it might not, but under a number of circumstances, those kind of things do. So, you know, I think we're on the beginning portions of exploring this, and I think what we're finding is that the Devonian is a massive fractured reservoir with good capacity for

injectivity. And when I say a fractured reservoir, I don't mean big faults and all that. I mean, you know, microfractures that allow it to take a lot of fluid. It's not real pressured, so I can do this without, you know -- you know, putting 10,000 psi at the surface. I mean, this is just a good zone.

Q. Thank you.

EXAMINER JONES: Anybody else have any questions?

RECROSS EXAMINATION

BY EXAMINER McMILLAN:

Q. For your seismic monitoring network, would you be willing to make it compatible with what the Railroad Commission or New Mexico Tech is trying to do? My only concern is that no one has discussed compatibility differences. And would you be willing to make sure your system is completely compatible with it?

A. So what I was -- one of the things I mentioned is like the stuff that we're doing in other places -- and we're actually -- our company has a seismic monitoring system, so we put in and install seismic monitors, accelerometers. And we upload those to IRA [sic; phonetic]? So we use that national standard. So the data that comes off of there can be used with the USGS, with the Railroad Commission, and yes, it is

compatible.

Q. Okay. That is my overriding concern with this. That's fine, if you're saying it. If it were required, you'd be -- you're sure that it's compatible with what the Railroad Commission or New Mexico Tech, both, are going to be able to do?

A. Yes. But what we're going to do is we're going to put in monitors to allow us to see those -- to see more microseismic events. So it'll still be compatible but we're going to be -- you know, a lot of the monitors that are out there are really structured to see events over a 3.0. So we want to be able to see those smaller events. We want to see the 3.0s, but we want to see those smaller events, too. So it will be compatible -- you know, we're -- it'll still have the compatibility. So let's say if we put a monitor and accelerometer outside, we can take those, you know, compare it -- pick data from other monitors in the area, do our triangulation and achieve the earlier question you -- you had on where is it at and who's -- who's the issue.

MR. BRUCE: Mr. Examiner, before there is another question, I'm going to lodge a protest like I've never done before. My clients been here three-and-three-quarters days of hearings now. Blackbuck has been up for three-and-a-half hours. There

are two hours left in the day. I'm really going to object to any more questions until I can put my client's case on. I'm sorry, but I do not want to come back with my clients for another day's testimony.

EXAMINER JONES: We understand.

Do you have a quick question?

EXAMINER BRANCARD: Well, on the point that Mike made -- and I'll just say this, which is part of what I said at the end of the last hearing which is why we wanted proposed findings -- why I wanted proposed findings. If you've got proposed conditions that you want to offer in lieu of a setback scenario, then you better put them in your proposed findings and conclusions. I mean, lay them out. I mean, rather than us trying to figure out what a pressure falloff test should look like and what a seismic monitor should look like in this hearing, I think the onus is on you-all to sort of say, "We're willing to accept the following conditions in lieu of a more solid" --

THE WITNESS: We'd be happy to do that. Okay? And tried to do that with staff already.

EXAMINER BRANCARD: Okay.

THE WITNESS: We actually offered to write permit conditions for the permit.

MR. PADILLA: I don't have anything further

other than my Affidavit of Service, and that's Exhibit 14.

EXAMINER JONES: Thank you, Mr. Arthur. Appreciate it.

EXAMINER McMILLAN: Actually, I do have another point. I think Blackbuck tried to send me an email of New Mexico State Land Office notice. That's not acceptable. It's got to be done through the respective attorneys. We're not going to honor that. Is that perfectly clear?

MR. ALLEMAN: Got it. Yes, sir.

EXAMINER JONES: Okay. Exhibit 14. Any discussion on this exhibit? Self-explanatory.

Are you moving Exhibit 14?

MR. PADILLA: Move Exhibit 14.

EXAMINER JONES: Any objection?

MR. BRUCE: No objection.

EXAMINER JONES: Exhibit 14 is admitted.

(Blackbuck Resources, LLC Exhibit Number 14 is offered and admitted into evidence.)

MR. PADILLA: We rest at this time.

EXAMINER JONES: Fair enough.

Okay. Mr. Bruce.

OPENING STATEMENT

MR. BRUCE: I was going to hold this off

until closing, but time is running short and I want to put in perspective what my clients are going to testify about.

I appreciated the testimony of Blackbuck's witnesses, but we really have no issue with the technical testimony, and we'll state that in the hearing. We just want to run through our application.

Secondly, we're here today due to the Division's objection primarily on the 1.5 policy. Solaris has no particular objection to that policy. They slightly violated -- obviously, the Blackbuck well is close, but insofar as the other wells, they slightly violate that, and there are reasons for that, which we will go into.

But Mr. Arthur, when you started saying why should their application be granted, he said -- he started off with "first in time, first in right." The evidence we will present will unequivocally show that's Solaris was first in time in applying for approval of its saltwater disposal well.

Secondly, using what Mr. Padilla got admitted into evidence, which was already admitted into evidence, Division Exhibit Number 1 in this case, Figure 3, shows that if we look at all the wells out here in this area, the Solaris Predator well fits more in with

the existing wells and has minimal impact on all of the other wells. It kind of just fills in a vacancy. Whereas, if the Blackbuck well is approved and the Solaris well isn't, it kind of messes up the development on the northeast corner of this plat.

And one of the other things we'll go into is that Solaris -- as I said, there are factors which result in a slight imposition on that 1.5-mile rule. Solaris' application minimizes surface use and really makes things really quite easier to deal with.

EXAMINER JONES: Okay. We've already sworn the witnesses so --

MR. BRUCE: Yeah.

LANDON DREW DIXON,

after having been previously sworn under oath, was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. BRUCE:

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

A. Yes. My name is Landon Drew Dixon.

Q. And who do you work for and in what capacity?

A. I work for Solaris Water Midstream as the vice president of land, regulatory and permitting.

Q. And have you previously testified before the

Division?

A. Yes, I have.

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

A. Yes, they were.

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

A. Yes, I am.

MR. BRUCE: Mr. Examiner, I tender Mr. Dixon as an expert petroleum landman.

MR. PADILLA: No objection.

MR. BROOKS: No objection.

MR. PADILLA: Mr. Examiner, my clients need to catch a plane and -- my witnesses, so may they be excused?

MR. BRUCE: Fine with me.

MR. BROOKS: Fine with me.

EXAMINER JONES: Thank you. Thank you-all for coming.

Q. (BY MR. BRUCE) Mr. Dixon, could you just briefly identify Exhibit 1?

A. Yes. Exhibit 1 is a map that we created off of Google Earth that we typically use when trying to preliminarily spot wells for our upcoming applications.

Q. And you were here listening to all the

testimony, correct --

A. Yes, I was.

Q. -- Blackbuck's?

And Mr. Alleman testified that Solaris' application was filed April 2nd. That's not quite correct, is it?

A. That's not correct.

Q. Could you identify Exhibit 2 and discuss its contents for us?

A. Yes. Exhibit 2 is something that was prepared under my direction that confirms the -- when we were made aware of this by the OCD, we went through our own kind of internal timeline. That's what this depicts. It shows that as it relates to the Predator Fed 17, which is our well, that legal notice was provided 11/15/2018. I can tell you well in advance of that, we started contemplating this well back in the summer of 2018 actually. We had our federal on-site for this well on October the 2nd of 2018, and so legal notice followed from that point. And then the C-108 was delivered to the OCD by our permit consultant on March the 4th, 2019 --

Q. Okay.

A. -- completed.

Q. And I imagine that Mr. Wood will testify to

that also; will he not?

A. Yes, he would.

Q. Now, on Blackbuck's exhibit -- I think it was Exhibit 2 that had the April 2 filing date, once this was protested -- once your administrative application was protested, did you instruct me to file an application with the Oil Conservation Division for a hearing?

A. Yes, I did.

Q. Okay. Is Exhibit 2A a copy of the cover letter which enclosed the application for hearing?

A. Yes, it is.

Q. And so that's the date that was on Blackbuck's exhibits saying the filing date?

A. That is correct.

Q. Just because Solaris and NGL have been in a few contests already, what is Exhibit 3?

A. So Exhibit 3 is a map that was put together under my direction, once again, depicting the nearest NGL fee-owned property to the Predator application location.

Q. Okay. So they're a little more than a mile and a quarter away?

A. Correct. They're 1.38 miles away.

Q. And what type of -- who owns the surface where

the Predator well is located?

A. So the Predator is located on federal lands, so it's Bureau of Land Management.

Q. Now, did Solaris cause the records -- pertinent records to be searched, whether by Mr. Wood, our next witness, or me or a landman that you hired, so that all parties -- all affected parties received notice of this application?

A. Yes. So all affected parties received notice of our original application for administrative approval and, subsequently, notice for the hearing.

Q. And does Exhibit 4 contain notice letters and certified return receipts for the parties that were determined to be affected parties?

A. Yes, it does.

MR. BRUCE: There are only a couple of things on here, Mr. Examiner. Attachment A was the letter mainly to the oil and gas lessees or operators. The second letter was to NGL, who protested the application. And then there is a third letter -- Exhibit A, I'm going to have to send in. I just noticed that. This one didn't copy properly, but it was letters to other mineral owners such as the Commissioner of Public Lands.

EXAMINER JONES: Okay. I'm not sure we --

I think we called for appearances in the first case. I'm not sure we did in this case totally. Do you remember us doing that? I want to make sure on the record we've got all of the parties hearing in Case 20465.

MR. BRUCE: I think I entered my appearance.

MR. PADILLA: Ernest L. Padilla for Blackbuck Resources, LLC.

MR. BROOKS: David Brooks for the Division.

MS. BENNETT: Deana Bennett on behalf of NGL Water Solutions, LLC.

EXAMINER JONES: How about Mesquite?

MS. BENNETT: Not Mesquite.

EXAMINER JONES: Sorry. Go ahead.

MR. BRUCE: And, Mr. Examiner, Exhibit 5 is simply a publication from the Hobbs newspaper because certain green cards never came back.

Q. (BY MR. BRUCE) Getting back to the timing of the filing, what is Exhibit 6?

A. So Exhibit 6 is an email from the Oil Conservation Division, in particular Mr. McMillan, confirming that Occidental -- excuse me --

Q. No, no. Exhibit 6. Exhibit 6 (indicating).

A. Oh, I apologize. Sorry. Yes.

Exhibit 6 is an email from Occidental's counsel to the NMOCD on November 30th objecting to the placement of our well.

Q. Okay. So did Solaris then spend a substantial period of time trying to come to terms with OXY?

A. That is correct. Immediately upon notification of their objection, we commenced discussions with them about what we could do to satisfy their concerns. We worked, well, throughout the holidays into the upcoming year, and we finally reached resolution, which is evidenced by the letter attached as well that OXY consented to our location.

Q. So OXY is no longer protesting the application?

A. That is correct.

Q. And that letter is dated March 6th and signed by representatives from OXY; is that correct?

A. Yes. That's correct.

Q. And this has been addressed by Blackbuck's witnesses. But Exhibit 7 is the land plat. In your opinion, is there a need for saltwater disposal in this area?

A. Yes. There absolutely is.

Q. And this plat shows -- I don't know exactly if they're all drilled or permitted wells, but there are a substantial number of wells?

A. That is correct.

Q. And probably will be a substantial -- substantially larger number of wells eventually?

A. Yes. That is correct.

Q. And then getting -- Solaris does spend time -- a lot of time and effort and care in placing its saltwater disposal wells; does it not?

A. It does, yes.

Q. And this kind of plays into -- going back to the OCD's plat, there are about 1.43 miles, I think the plat shows, from a well to the northwest?

A. That is correct.

Q. If you look at Exhibit 8, it identifies the Predator well and the well to the northwest, which is a permitted well, correct?

A. That is correct.

Q. And then if you look at it over to the east-southeast, there is another well, and then further to the east, there is another well. They're all kind of located right along the state highway; is that correct?

A. Yes, Highway 128.

Q. Is that one reason you placed the well where it is?

A. Yes. It is one reason, among others.

Q. Will having it at that location minimize

surface use and actual roads being built and pipelines being built?

A. That is correct. We also have pipelines in that area as well that have already been granted by the Bureau of Land Management.

Q. So you have rights-of-way in place for this well?

A. We have rights-of-way on the south side of the highway, and so as part of our APD, will be the short [sic]. It's a few-hundred-foot well associated with this particular well, and that would be obtained when the APD is received.

Q. And this not only minimizes surface use, but it reduces well costs; does it not?

A. Absolutely.

Q. And as I said, other saltwater disposal companies have done the same, placed their SWD wells right along the state highway?

A. Absolutely. There are a number of reasons for that, but yes, that is correct.

Q. Now, looking at this -- but you have to look at it in conjunction with that OCD plat -- you could -- so that you wouldn't be 1.43 miles away from the -- I forget what the name of the well is.

A. Mesaverde, I believe.

Q. It is the Station?

A. Oh, I'm sorry. Station.

Q. Station SWD.

If you had initially looked at this and said, "Well, we can move it -- we could probably move the Predator well, say, to the northeast a little bit," but then you're getting into -- you could potentially impair well development up in that area. Is that a point?

A. That is correct. Yes.

Q. And you already had some issues with OXY, and you wanted to minimize that?

A. Yes. That is correct.

Q. So what you're asking here is for a slight variance in that 1.5 mile?

A. Yes. In this instance, we are asking for a slight variance.

Q. Maybe less than 5 percent?

A. Correct.

Q. And based on testimony that's been presented not only today but in the prior two hearings, that shouldn't have a big effect. You sat through all those hearings, unfortunately --

A. (Indicating.)

Q. -- right?

A. Yes.

Q. That shouldn't have a big impact on the -- on the -- whatever you want to call it, the pooling of the reservoir?

A. Yes. That's my understanding from the experts that have previously testified.

Q. And, again, Solaris isn't really here contesting that generalized 1.5-mile rule?

A. That is correct.

Q. Were Exhibits 1 through 8 prepared by you or under your supervision or compiled from company business records?

A. Yes, they were.

Q. And in your opinion, is the granting of Solaris' application in the interest of conservation and the prevention of waste?

A. Yes, it is.

Q. And will it serve the need that oil and gas operators have?

A. Absolutely. Yes.

MR. BRUCE: Mr. Examiner, I move the admission of Exhibits 1 through 8.

EXAMINER JONES: Any objections?

MR. PADILLA: No objection.

MR. BROOKS: No objection.

EXAMINER JONES: Ms. Bennett?

MS. BENNETT: No objections.

EXAMINER JONES: Exhibits 1 through 8 are admitted.

(Solaris Water Midstream, LLC Exhibit Numbers 1 through 8 are offered and admitted into evidence.)

MR. BRUCE: Pass the witness.

EXAMINER JONES: Mr. Padilla?

CROSS-EXAMINATION

BY MR. PADILLA:

Q. Mr. Dixon, did you change the public notice that you filed with the administrative appeal -- with your administrative application?

A. I don't know that I follow what you're asking.

MR. BRUCE: We will present that with the next witness.

Q. (BY MR. PADILLA) Do you have a complete C-108 with the notices that you sent?

A. I have one in front of me.

Q. I'll defer that with --

MR. PADILLA: Is your other witness going to testify about the C-108 and all that?

MR. BRUCE: Yeah. We'll have a witness who will testify to the C-108.

MR. PADILLA: I don't have any further questions.

EXAMINER JONES: Ms. Bennett?

MS. BENNETT: Thanks.

CROSS-EXAMINATION

BY MS. BENNETT:

Q. Let me get my bearings real fast.

Good afternoon, Mr. Dixon.

A. Good afternoon.

Q. Looking at Exhibit 3, which is your exhibit that shows the distance from the Predator well -- proposed well to the NGL fee land --

A. Yes.

Q. -- this exhibit doesn't identify -- well, are you aware that the Predator Fed SWD No. 13 is proposed within the exterior boundaries of NGL's McCloy Ranch?

A. I believe that's correct. Yes.

Q. And so even though it's on federal land, it's within the boundaries of the McCloy Ranch?

A. Most likely, yes.

Q. Thank you.

EXAMINER JONES: Okay. Mr. Brooks?

MR. BROOKS: No questions.

CROSS-EXAMINATION

BY EXAMINER JONES:

Q. I really don't have any questions.

You've got your federal on-sites done.

A. Yes.

Q. You've got rights-of-way lined up, or you've got --

A. We filed for the category determination, as the other folks pointed out, which is a significant expense in the actual APD. So once the determination is made by the Division, which we hope supports us, then we will move forward with the filing of the formal APD.

Q. Okay. And OXY withdrew their protest, but NGL's protest, I think, is still -- have you talked to them?

A. We have attempted to speak with them. We still don't have resolution or really a basis for why they would have protested.

Q. That's all the questions I've got.

EXAMINER JONES: Mr. Brancard?

CROSS-EXAMINATION

BY EXAMINER BRANCARD:

Q. I got confused here. So you filed an administrative application in November of last year?

A. No, sir. We made our public notice in November. Shortly thereafter, we received from OXY some indication of opposition, so we commenced working with

Occidental at that point in time. It took until roughly the end of February before we received verbal agreement with Occidental. As we papered it up, I directed our consultants, who will speak in just a moment, to move forward with filing the administrative application. We filed it on March the 4th, and then we received, on March 4th in the afternoon and March 5th, the morning, notice from the OCD of the previous objections that had been filed. So I guess we waited until our actual application was filed for the -- for the -- because that's when it became ripe -- the objections became ripe, upon the filing of our application.

Q. The objections by?

A. Occidental and by NGL.

Occidental, within a few days, demonstrated by this letter (indicating), that they had removed their objection, and then that just left NGL remaining, at which point in time at my direction, Mr. Bruce, our counsel, filed for the hearing.

Q. So this -- I realize it's not your exhibit, but Exhibit 9 shows a C-108 with a date of November 2018.

MR. BRUCE: I will -- the next witness will address that.

EXAMINER BRANCARD: Okay. All right. That's it.

EXAMINER JONES: Okay. Thanks.

Thank you very much.

BRIAN WOOD,

after having been previously sworn under oath, was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. BRUCE:

Q. Would you please state your name and city of residence?

A. Brian Wood, Santa Fe, New Mexico.

Q. And what is your relationship with Solaris in this case?

A. I'm a contractor for Solaris. They asked me to prepare the C-108 application package.

Q. Have you previously testified before the Division?

A. Yes, I have.

Q. And were your credentials as an expert regulatory affairs person accepted as a matter of record?

A. Yes.

Q. And you are obviously looking at Exhibit 9. Is that the C-108 you prepared for this hearing?

A. Yes. It's -- Exhibit 9A is the administrative application checklist.

Q. Let's start just with Exhibit 9.

A. Okay. Yes.

MR. BRUCE: And the reason I say this, Mr. Examiner, is I didn't -- Exhibit 9 is what I filed with the Division for the hearing.

EXAMINER JONES: Okay.

Q. (BY MR. BRUCE) But let's get to that notice issue first. The C-108 is dated November 15, 2018, correct?

A. That is right.

Q. And when you prepared it last fall, did you send out letters to all the pertinent parties who -- the affected parties?

A. Yes.

Q. Okay. We'll get to that in a minute.

Because of protests, did you withhold filing the completed C-108 with the Division until early March?

A. Yes.

Q. And is Exhibit 9A the administrative application checklist you filed -- you submitted with the C-108?

A. Correct.

Q. Was that submitted on March 4th of this year?

A. Yes. Jeanettte Risenburg [phonetic], who is a

Permits West employee, delivered it to the Division on March 4th.

Q. And then looking at Exhibit 9B, was that the notice you published in the Hobbs newspaper regarding the administrative application?

A. Yes.

Q. And I couldn't print up your notice letter. But when you submitted your notice in November of 2018 -- in the middle of November 2018, did you include a cover letter?

MR. BRUCE: And if necessary, Mr. Examiner, Mr. Wood has that. I cannot print it off of my computer for some reason.

Q. (BY MR. BRUCE) Did you submit the C-108 with a cover letter stating that the people had 15 days to object to the application?

A. Yes. It's Exhibit K in the C-108 application package.

Q. Is Exhibit -- behind the publication list, are they the white cards and the green cards from the notices you mailed?

A. Yes.

MR. BRUCE: Mr. Examiner, I would merely -- on the very first page, there is some handwriting. That's mine. Because certain -- what Mr. Wood submitted

to me showed that certain -- certain letters were returned, and I looked up new addresses. I noted them on his list. And at the top, the middle top one, Kerr-McGee Oil & Gas, that is actually now part of Anadarko, so instead of notifying Kerr-McGee, I notified Anadarko.

EXAMINER JONES: Okay.

Q. (BY MR. BRUCE) So when you submitted your application -- and finally, what is Exhibit 9C, Mr. Wood?

A. That is an email from the Division regarding an objection by OXY.

Q. Okay. So that's further proof that -- is that further proof that you filed the application with the Division on March 4th?

A. Yes.

Q. And in your opinion, was the application complete when you filed it on March 4th?

A. Yes.

Q. Let's move on to Exhibit 9 itself, and let's run through this pretty quickly. Could you -- I've numbered the pages, and as unusual, I probably misnumbered a page or two. Could you go to page 3 of the exhibit and discuss the -- identify the well, the well name, the location and maybe go over a little bit

how the well is going to be drilled and completed?

A. The proposed well is the Predator Fed SWD 17. It's staked at 1,465 from the north line and 1,893 from the east line, Section 17, Township 24 South, Range 32 East. Solaris is proposing three strings of casing that will each be cemented to the surface. We're also proposing a liner that'll have 200 feet of overlap, and the well will be completed open hole to 1,000 -- excuse me -- 16,965 feet to 18,149 feet.

Q. And if you turn over to page 7, could you describe the injection parameters, barrels of water per day, et cetera?

A. The maximum injection rate will be 30,000 barrels of water per day. The maximum injection pressure will be 3,393 psi. That's calculated at the standard 0.2 psi per foot measured at the top of the open hole.

Q. And where would most of the disposal water come from?

A. It's anticipated it's going to be coming from the Bone Spring and Wolfcamp wells.

Q. Okay. And there might be some Delaware wells involved?

A. Yes.

Q. And will the well be stimulated?

A. Yes, as needed.

Q. Moving on down the line to pages 13 and 14, does this identify the wells in the area of review?

A. Yes. These are the wells that are either existing or approved but not yet spudded. They're within a one-mile radius.

Q. And do any of these wells penetrate the Silurian or the Devonian?

A. No.

Q. And did you search the records for -- let me take a step back.

If you go to pages 19 and 20, is that a tabulation you compiled over the years regarding the Bone Spring, et cetera, the water and the TDS, et cetera?

A. Yes, from drill tech records.

Q. Yes.

In your opinion, will there be any compatibility problems between formation water and the injected water?

A. No.

Q. And did you try to track down any freshwater wells in the area?

A. Yes, we did. The State Engineer's Office does not show any water wells within a one-mile radius, but

we did field work, and we did find two water wells and sampled them.

Q. And does the C-108 contain information of the water analysis --

A. Yes.

Q. -- from the wells?

A. Yeah. That would be Exhibit H, like hotel.

Q. Over pages 21, et cetera.

And does the C-108 also contain a geologic assessment?

A. Yes.

Q. And that starts at page 28 of Exhibit 9; does it not?

A. Correct.

Q. And is Mr. Walk, who authored that assessment, present today to testify?

A. Yes.

Q. Were Exhibit 9 through 9C prepared by you or under your supervision?

A. Yes.

Q. And in your opinion, will the granting of this application be in the interest of conservation and the prevention of waste?

A. Yes.

MR. BRUCE: Mr. Examiner, I move the

admission of Exhibits 9 through 9C.

MR. PADILLA: No objection.

MS. BENNETT: No objection.

MR. BROOKS: No objection.

EXAMINER JONES: Exhibits 9, 9A, 9B and 9C are admitted.

(Solaris Water Midstream, LLC Exhibit Numbers 9 and 9A through 9C are offered and admitted into evidence.)

MR. BRUCE: Pass the witness.

EXAMINER JONES: Mr. Padilla?

CROSS-EXAMINATION

BY MR. PADILLA:

Q. Mr. Wood, let me direct your attention to Exhibit -- well, the Affidavit of Publication. It's Exhibit 9B. And then I want you to take a look at Exhibit 5.

A. Exhibit 5?

Q. Yes.

A. I don't have Exhibit 5.

Q. Let me show you that.

What do you have for the footage location of the Predator well?

A. I've got 14 -- 1,465 from the north line and 1,893 from the west line of Section 17, Township 24

South, Range 32 East.

Q. And then the other Exhibit 5, what location do you have there?

A. Identical.

Q. Identical?

A. Right.

Q. Isn't it different? Don't you have the -- on 9B, isn't that 1,993 from the west line?

A. Oh, okay. Yes.

Q. Do you know whether that was corrected?

A. Okay. I will tell you that it's not been corrected.

Q. It's not been corrected, right?

A. Right. It's a typo.

Q. This is a legal notice. I'm not going to ask you for a legal opinion, but they're different, right?

A. Yes.

Q. Okay. Now, let me go -- I would direct your attention to Exhibit Number 9 and ask you to turn to page 3.

A. Okay.

Q. In that schematic, you have the packer depth to be set at 15,458, correct?

A. Yeah. That is a typo. It's actually 16,915, and that's discussed in the text, as well as on the

following page.

Q. Okay. Who prepared the well schematic?

A. I did.

Q. You didn't get that information from Solaris?

A. Well, the way they drilled the well, I got that from Solaris, as far as casing, setting depths, types of casing, types of cement.

Q. Okay. So on page 4, where you have the packer setting of 16,915, that is a correct depth?

A. That is correct.

Q. So on page 5 where you have the first paragraph, the first paragraph of Exhibit 9, you have a packer set at 6,967 or at least the proposed --

A. I'm sorry. I can't hear you.

Q. The top of the disposal interval is 6,967?

A. Right.

Q. Is that correct?

A. It's off by 3 feet.

Q. And that's a typo, too?

A. Right.

Q. Mr. Wood, in your list of wells on page 13, do you know whether there is a well bearing API number 30-3025-42995?

A. 42995?

Q. Yes.

A. I do not.

Q. Okay. If I told you there was a plugged well within that distance, as shown on Exhibit 13, bearing that API number, would you accept that?

A. I'd want to see the records.

Q. Okay. Can you verify that through the Division, whether or not there is a plugged record?

A. I'd have to see the records.

Q. Okay.

MR. PADILLA: I don't have any further questions, Mr. Examiner.

EXAMINER JONES: Okay.

CROSS-EXAMINATION

BY EXAMINER JONES:

Q. You could verify that for us, couldn't you?

A. Oh, yeah. Sure. I'd be glad to. I just --

Q. Send that through your attorney.

A. Okay. 42995?

MR. PADILLA: Yes.

EXAMINER JONES: All right. Ms. Bennett?

MS. BENNETT: Thank you. I'll pull up right here.

CROSS-EXAMINATION

BY MS. BENNETT:

Q. Good afternoon.

I just had a few quick follow-up questions about the C-108. And my first question, though, just to make sure I understand what happened with the Affidavit of Publication or the notice -- publication notice, it sounds like you originally published in November 2018 but didn't submit the administrative application for about four more months; is that right?

A. We actually originally published in August of last year, but there was a change in depth and a change in the maximum volume, so we republished the ad in -- I think it was November. Yes.

Q. Okay. But then you didn't actually submit the administrative application until March?

A. Correct.

Q. And I wasn't exactly following the whole conversation about the notice. Is the location of the well proposed to be 1,893 feet from the west line or 1,893 feet from the east line?

A. Let me check.

It's from the east line.

Q. So the November 15th, 2018 notice was --

A. A typo.

Q. -- a typo.

Oh, you know, I was looking through the -- and maybe this is a question for your colleague. But I

was looking at the C-108, and I didn't immediately see the -- a signed affirmative statement that's required by Number 12 on the C-108. It says that applicants for disposal wells must make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults or hydrologic connection. Is there a signed affirmative statement in the C-108 about open faults or other hydrologic connections?

A. That's best addressed by Cory.

Q. Thank you. I'll ask him that question. Thank you very much.

EXAMINER JONES: Mr. Brooks?

MR. BROOKS: No questions.

EXAMINER JONES: Mike?

EXAMINER McMILLAN: Go ahead.

CROSS-EXAMINATION

BY EXAMINER JONES:

Q. The notice that went out to -- was it Anadarko? That didn't get bought by OXY recently?

MR. BRUCE: Mr. Examiner, only because I do title work, I'll testify. Kerr-McGee was purchased by Anadarko years and years ago, probably more than a decade ago, and it doesn't show up in the county records. I confirmed that with an attorney at Anadarko.

EXAMINER JONES: Okay. That's good enough for me.

Q. (BY EXAMINER JONES) But it was -- the open-hole interval was -- was either a five or a seven.

A. Yeah. It's 16,965 through 18,149.

Q. Gotcha. Okay. Thank you.

EXAMINER JONES: Mr. Brancard?

CROSS-EXAMINATION

BY EXAMINER BRANCARD:

Q. I think it was mentioned earlier that there was a letter sent with this notice.

A. Yeah. Well, in the C-108 -- in other words, when we initially prepared the application package and sent that to the public, Exhibit K is the cover letter. In this case it's the letter that went to the BLM, the surface owner.

Q. I'm not finding that.

A. It'll be in front of the return receipts. You're getting real close.

Now, again, Exhibit 9 that Mr. Bruce prepared may not have that in it because at that point, it had transitioned to the exhibits for the hearing.

MR. BRUCE: Mr. Brancard, I did not include that simply because -- I normally don't include that because I'm sending out new notices to everyone.

EXAMINER BRANCARD: You didn't include the notice from the original notice?

MR. BRUCE: Correct.

EXAMINER BRANCARD: Okay. I mean, it seems like that has suddenly become an important issue. Since the legal notice was incorrect, I'm wondering whether the letter was incorrect, too.

MR. BRUCE: Well, we can submit --

THE WITNESS: Yes.

MR. BRUCE: I will gladly submit a letter. I couldn't print it out.

THE WITNESS: And the C-102 was included in the application package.

EXAMINER JONES: Is that it for Mr. Wood?

MR. BRUCE: That's all for this witness. Yes.

CROSS-EXAMINATION

BY EXAMINER McMILLAN:

Q. I guess I'm not -- obviously, I put it in, but I can't remember the dates. You said this application was received on March the 4th?

A. Correct. That's when Jeanettte delivered it.

Q. Do you have the date stamp that shows that?

A. Do not.

Q. Did you receive any emails about a deficient

application?

A. Not deficiency. The same afternoon we did receive an email from you regarding -- I believe it was NGL.

Q. I'm looking. That it was protested?

A. Yeah. Yeah.

Q. The question now becomes: Why is it logged as April 2nd?

EXAMINER JONES: That's when it came in for hearing.

EXAMINER McMILLAN: Oh, it was?

MR. BRUCE: Both -- Mr. Padilla filed his application for Blackbuck for hearing on April 2, as did I for Solaris. That was just for the hearing itself.

EXAMINER McMILLAN: Okay. That's what theirs showed in the previous case? I'm trying to understand.

MR. BRUCE: Yes.

EXAMINER McMILLAN: I guess I'm having trouble understanding the dates.

MR. BRUCE: Solaris' application was filed administratively March 4th. Blackbuck's application was filed administratively March 22. Both cases were filed for hearing on April 2. That's it in a nutshell.

EXAMINER JONES: Okay.

EXAMINER McMILLAN: Okay.

EXAMINER JONES: Thank you, Mr. Wood.

CORY WALK,

after having been previously sworn under oath, was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. BRUCE:

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

A. Yes. My name is Cory Walk.

Q. And where do you reside?

A. Here in Santa Fe, New Mexico.

Q. Who do you work for?

A. I work for Permits West. We're a consulting and contract company assigned to do the permits for the --

Q. And what are you by profession?

A. I'm a geologist.

Q. Have you previously testified before the Division?

A. Yes.

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

A. Yes.

Q. And did you prepare the geologic assessment

that was at pages, roughly, 28 to 36 in the C-108 that Mr. Wood just testified about?

A. Yes, I did.

Q. Get this up front. You sat here and listened to the testimony from Blackbuck's technical witnesses. Do you have any problem with what they were basically saying?

A. No, none at all. In fact, they have a lot more years' experience than I do (laughter). But yes, I agree 100 percent with what they are saying technically.

Q. And just to be cut it short, you prepared this letter. What did -- generally, what did you rely on? What data did you use? What papers, et cetera, did you use to prepare your geologic assessment?

A. Yeah. So it's very similar to what was testified on earlier. I also -- I performed fault slip modeling analysis using the data provided by the Snee and Zoback of 2018, as well as many of the other sources that they had used, and really found very similar results in the sense of zero percent probability. We are roughly ten miles away from the nearest Precambrian fault. We have, as they said, roughly 1,000 to 1,200 feet displacement to the Precambrian. About 670 feet of that is the Simpson Group, which is obviously known as the impermeable boundary below the injection zone.

So what this assessment concludes with is that there is no potential structural or stratigraphic connection between the Silurian-Devonian injection zone and any subsurface water resources, as well as the zero percent probability of the fault slip based on the data -- publicly available data that I have access to.

Q. And you didn't have any -- again, just in general, in looking at the Devonian Formation, you didn't have any quarrel with Blackbuck's summarization of the Devonian Formation?

A. No.

Q. You think it's a good candidate for injection?

A. Yes.

Q. People are not drilling the Devonian for oil and gas production?

A. No.

Q. And in your opinion, as you just stated, will water injected into the Silurian or Devonian stay within that zone?

A. In my opinion, yes.

Q. In your opinion, is the granting of Solaris' application in the interest of conservation and the prevention of waste?

A. Yes.

MR. BRUCE: Mr. Examiner, to the extent

necessary, I'd resubmit pages 28 through 37 of Exhibit 9 for admission into the record, since Mr. Walk has now testified personally on this.

EXAMINER JONES: Okay. Any objections?

MR. PADILLA: No objection.

EXAMINER JONES: Mr. Brooks?

MR. BROOKS: No objection.

EXAMINER JONES: Exhibit 9, pages 28 through 37 are admitted.

(Solaris Water Midstream, LLC Exhibit Number 9, pages 28 through 37, is offered and admitted into evidence.)

MR. BRUCE: And I have no further questions of the witness.

EXAMINER JONES: Mr. Padilla.

MR. PADILLA: I don't have any questions.

MS. BENNETT: Thank you.

CROSS-EXAMINATION

BY MS. BENNETT:

Q. Good afternoon, Mr. Walk.

A. Good afternoon.

Q. I just had a question about the C-108 requirements. If you look at page -- well, it's the first page of Exhibit 9.

A. I don't have the exhibits with me. Sorry.

Q. That's okay.

Do you see Roman numeral XII there? It says something like an affirmative statement about open faults and probable hydrologic connection?

A. Yes.

Q. In your view, does your study cover that?

A. Yes. Yes, it does.

Q. So your study discusses the -- you examined the available geologic and engineering data?

A. Yes.

Q. And you found no evidence of open faults or other hydrologic connections between the disposal zone and any underground drinking water?

A. That is correct. I clearly state that in my conclusion.

Q. Can you show us where that is in your conclusion?

A. Yes. I believe it's the first page, "Geologic Data" -- sorry -- the first sentence of the Conclusions paragraph on page 30.

Q. Okay.

A. Would you like me to read it aloud or --

Q. No. Thanks.

A. Yup.

Q. And you did, it looks like, sort of a modified

fault slip probability analysis; is that right?

A. Yes. Yes.

Q. Did you do any reservoir engineering studies?

A. I did not.

Q. Any pore pressure studies?

A. No. That is outside of my expertise.

Q. In looking at the materials prepared for the hearing today, did you see any materials like that in the exhibits?

A. Sorry. Could you repeat the question?

Q. Have you had a chance to look through all the exhibits that were prepared for today's hearing?

A. In terms of the Blackbuck or the --

Q. For Solaris, just generally speaking.

A. Yes.

Q. Are there any reservoir engineering studies that you saw in the materials?

A. I didn't notice any, but I wasn't looking for it.

Q. Okay. And how about anything about pore pressure?

A. Again, I wasn't looking for it, so I didn't notice any when I skimmed through it.

Q. Okay. Thank you very much.

EXAMINER JONES: Mr. Bruce -- I mean

Mr. Brooks.

(Laughter.)

MR. BRUCE: I don't know who is more insulted.

(Laughter.)

EXAMINER JONES: I could tell you a story.

CROSS-EXAMINATION

BY MR. BROOKS:

Q. I do have one question.

A. Yes, sir.

Q. It seems to me that you referred us to page 30, the paragraph under Conclusions --

A. Yes.

Q. -- for your answer to Roman numeral XII?

A. Uh-huh.

Q. The way I interpreted it, that -- your statement does not say the same thing as paragraph XII, because paragraph XII says, "Applicants for disposal wells shall make an affirmative statement that they have examined available geologic and engineering data and find no evidence of open faults." Well, you say geologic data that you have evaluated -- geologic data evaluated. You don't say what geologic data you evaluated. "Show no potential structural or stratigraphic connection." And I think that's a little

different statement. How do you reconcile that?

A. So I guess -- well, in response to the previous question, I was simply stating -- you are correct. It's not word for word what it says in Roman numeral XII. But I think the way I understand Roman numeral XII is whether or not I've done research to understand if there is any problems with surrounding faults or subsurface, you know, potable water, and that is, I guess, my concluding statement.

Q. Well, Roman numeral XII -- I would stipulate that Roman numeral XIII is subject to some ambiguity because it doesn't say "made an affirmative statement" -- "examined all available geologic data."

And did you examine all available geologic data that you knew about?

A. Yes, sir.

Q. Thank you.

CROSS-EXAMINATION

BY EXAMINER JONES:

Q. It's probably a good idea to sign these as a geologist. But Mr. Wood signed it on top. You've got the statement in here, but you don't have a signed statement, you know.

A. Yeah. I signed the cover page of the Geologic Assessment. But it's correct; I don't have the

statement and then a signature right underneath.

Q. All right. You signed the --

A. Yeah, on page 28.

Q. -- Geologic Assessment.

What's the source for your wells that you look for in the area of review? What source do you use?

A. The NMOCD database.

Q. Do you?

A. Uh-huh.

Q. And you got the design from Solaris?

A. Yes.

Q. The well design?

A. Uh-huh. Yes, sir.

Q. And did you end up talking to anybody else, the OCD geologist or --

A. No.

Q. -- as you were preparing this?

A. No.

Q. No calls from NGL?

A. Not to me, no.

Q. Okay. Okay. Thanks.

EXAMINER JONES: Mr. Brancard?

EXAMINER BRANCARD: I don't have anything.

EXAMINER JONES: Any other questions for this witness?

Thank you, Mr. Walk.
MR. BRUCE: I have nothing else to present.
MR. PADILLA: Nothing else.
EXAMINER JONES: Okay. Any rebuttal from the Division?
MR. BROOKS: No. Thank you.
EXAMINER JONES: Okay. Mr. Brancard reminded everyone about the proposed findings. And instead of being so far away, you know, if you propose what you would do to -- in the meantime -- what your client is willing to do will be well received.
MR. PADILLA: In addition to the findings?
EXAMINER JONES: Well, as part of the findings.
EXAMINER BRANCARD: Proposed conditions.
EXAMINER JONES: Proposed conditions.
MR. PADILLA: Right.
MR. BRUCE: Proposed conditions on what now?
EXAMINER BRANCARD: I would assume you're going to argue for approval.
MR. BRUCE: Yeah. But, I mean, what type of -- and my first question is actually: Do you want a proposed order, or do you just want some findings and conclusions?

EXAMINER BRANCARD: I think it may be helpful to have a proposed order.

MR. BROOKS: What is --

EXAMINER BRANCARD: Well, we need to resolve that. Ms. Bennett has an issue about that also because the transcript is not in yet from the last hearing.

EXAMINER JONES: We did get the transcript from the last one completely in.

MS. BENNETT: It's not uploaded.

EXAMINER JONES: Oh, it's not uploaded?

MS. BENNETT: No.

EXAMINER JONES: As of last week?

MS. BENNETT: No, as of today. And, I mean, I emailed Marlene and Florene about it today, and it will be uploaded tomorrow, for the Mesquite cases, which is a different issue than these cases. But I wanted to take a minute after the conclusion of these cases and ask for perhaps an extension of time to do the Mesquite findings of fact due to the fact that the transcript will be available tomorrow. But that's a different issue, a deadline.

(Discussion off the record.)

MR. BROOKS: Well, I have no objection to extending it beyond -- (laughter).

EXAMINER JONES: Mr. Goetze might object to that.

MR. BRUCE: But if we need more time, maybe we'll request a few extra days.

EXAMINER BRANCARD: We're looking at August 2nd.

MR. BRUCE: The Friday, yeah.

EXAMINER JONES: If you want to do bullet points, that sounds good to me.

MS. BENNETT: I would also like to request that Mesquite's findings of facts also be due August 2nd. I'd like an extension of time to August 2nd to do Mesquite's findings of fact.

MR. BROOKS: We do not object to that.

EXAMINER JONES: That's just another week or so.

MR. BROOKS: No. August 2nd is one week. It's Friday. Yes. We're getting very close to August.

EXAMINER JONES: Okay. Thank you very much.

We're going to take these two cases under advisement, 20463 and 20465.

This docket is closed.

(Case Numbers 20463 and 20465 conclude, 4:09 p.m.)

STATE OF NEW MEXICO

COUNTY OF BERNALILLO

CERTIFICATE OF COURT REPORTER

I, MARY C. HANKINS, Certified Court Reporter, New Mexico Certified Court Reporter No. 20, and Registered Professional Reporter, do hereby certify that I reported the foregoing proceedings in stenographic shorthand and that the foregoing pages are a true and correct transcript of those proceedings that were reduced to printed form by me to the best of my ability.

I FURTHER CERTIFY that the Reporter's Record of the proceedings truly and accurately reflects the exhibits, if any, offered by the respective parties.

I FURTHER CERTIFY that I am neither employed by nor related to any of the parties or attorneys in this case and that I have no interest in the final disposition of this case.

DATED THIS 31st day of July 2019.

MARY C. HANKINS, CCR, RPR
Certified Court Reporter
New Mexico CCR No. 20
Date of CCR Expiration: 12/31/2019
Paul Baca Professional Court Reporters