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

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

CASE NO. 20812

APPLICATION OF SOLARIS WATER
MIDSTREAM, LLC, FOR APPROVAL
OF SALT WATER DISPOSAL WELL,
LEA COUNTY, NEW MEXICO

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

October 17, 2019

Santa Fe, New Mexico

BEFORE: LEONARD LOWE, HEARING EXAMINER
PHILLIP GOETZE, EXAMINER
DEAN MCCLURE, EXAMINER
BILL BRANCARD, LEGAL EXAMINER

ALSO PRESENT: Marlene Salvidrez

This matter came on for hearing before the New Mexico Oil Conservation Division, Leonard Lowe, Chief Examiner; Phillip Goetze, Technical Examiner; and Dean McClure, Examiner, on Thursday, October 17, 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.

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I N D E X

E X H I B I T S

(Commenced at 9:02 a.m.)

EXAMINER LOWE: We will now be calling Case Number 20812, SWD application for Solaris Water Midstream, LLC for approval of a salt water disposal well, Lea County, New Mexico.

Call for appearance.

MS. BENNETT:

MR. JIM BRUCE: Mr. Examiner, Jim Bruce of Santa Fe representing the applicant. I have two witnesses. But as I emailed Mr. Goetze and Ms. Murphy yesterday, one of my witnesses had to take his wife to the doctor down in Albuquerque and will be up here about 10:30. I do have one witness I can put on in the interim.

EXAMINER GOETZE: Well, we will intercede and say, yes, we did receive the email, and we promised to drag as long as we could. But your colleagues have been way too efficient today, so on that note which of the two witnesses? Mr. Hicks will be the geologist.

MR. JIM BRUCE: The geologist.

EXAMINER GOETZE: And your other witness?

MR. JIM BRUCE: Hydrogeologist Reggie Hicks.

EXAMINER GOETZE: Yeah, okay. And your first witness is?

MR. JIM BRUCE: Jim Brannigan.
EXAMINER GOETZE: Okay. And he's --
MR. JIM BRUCE: Mr. Brannigan is here.
EXAMINER GOETZE: Okay. Well, I think what we could do right now is probably take a break. We'll have an entry of appearance, and then we'll go ahead and take a break.
MS. BENNETT: Good morning Mr. Examiners, Deana Bennett on behalf of NGL Water Solutions Permian, LLC.
EXAMINER GOETZE: So let's go ahead and take a break. How long you want go for?
EXAMINER LOWE: Why don't we take 15 minute break?
EXAMINER GOETZE: Twenty. Let's go 20.
EXAMINER LOWE: Twenty-minute break. We'll take a 20 minute break, we'll reconvene at 9"25.
(Off the record 9:04 a.m. to 9:37 a.m.)
EXAMINER LOWE: All right. We will be back on the record.
We will call Cases Number 20812, SWD application of Solaris Water Midstream, LLC for approval of a salt water disposal well, Lea County, New Mexico.
Call for appearance.
MR. JIM BRUCE: Mr. Examiner, Jim Bruce of

Santa Fe representing the applicants.

MS. BENNETT: Mr. Examiner, Deana Bennett on behalf of NGL Water Solutions Permian, LLC.

MR. JIM BRUCE: Mr. Examiner, I have three witnesses, two of whom are here and I will present the first if that's okay. And then the other witness ought to here in about 20 minutes.

EXAMINER LOWE: Okay. Will the witnesses please stand and be sworn in?

(TWO WITNESS SWORN)

EXAMINER LOWE: Would you all happen to have business cards?

THE WITNESS: Yes.

EXAMINER LOWE: And if you would, could you give a copy to our court reporter.

You may call your first witnesses, Jim -- Mr. Bruce.

DREW DIXON

(Being first duly sworn, testified as follows:)

EXAMINATION

BY MR. BRUCE:

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

A. Yes. My name is Drew Dixon.

Q. Where do you reside?

A. I reside in Houston, Texas.

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

A. I work for Solaris Water Midstream, LLC as the Vice-president of Land, Regulatory and Permitting.

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

EXAMINER LOWE: He is so qualified.

MS. BENNETT: No objection.

MR. JIM BRUCE: Examiners, if you could go to Exhibit 3 in the package. I shipped you two-page exhibit.

EXAMINER LOWE: What page is that again?

MR. JIM BRUCE: Exhibit 3, not page number, Exhibit 3. There are six exhibits, yes.

Q (By Mr. Jim Bruce) Briefly, what well are we here for today?

A. We are here for the Ironside State SWD No. 1.

Q. And where is -- what is the legal location of that well?

A. The well is located in Section 32, Township 25 South, Range 32 East.

Q. And that is -- what -- what will be the -- what is the proposed disposal zone?

A. This proposed disposal in at the Devonian -- so the disposal zone is the Devonian. If there's information, our geologist will testify as to what all the Devonian encompasses. I'm not an expert geologist.

Q. Okay. Now, you've got Exhibit 3 in front of you, correct?

A. I do, yes.

Q. What is -- was this prepared by you or under your supervisor?

A. This was prepared under my supervision.

Q. And what do the two pages of this exhibit show?

A. So, the first page shows the location of Ironside State SWD No. 1. It is located on property that is State of New Mexico. It also shows the distance to the nearest now operated NGL well, formally Mesquite well. The Paduca 6 SWD No. 1, being 1.916 miles away.

Q. And what does page 2 show?

A. So page 2 is a map that depicts the closest fee

owned property of NGL to this proposed well location.

Q. Okay. But this well is on State of New Mexico surface, correct?

A. That is correct.

Q. And has -- have you on behalf of Solaris been negotiating with the land office regarding the surface location of this well?

A. Yes. Yes, we've been working with the state land office to obtain the necessary documents, easements, for this proposed well.

Q. And you'll have to get a disposal easement, salt waters disposal easement from the state land office?

A. Yes, that's correct. We will get a commercial disposal easement from the state land office and other necessary access road easement, for example, from the state land office. We -- and as part of that, you know, we filed bonding required for it, and we've already obtained the bond. So, simply just a matter of progressing it through the state land offices salt water disposal easement group.

Q. And an APD has not been applied for yet; is that correct?

A. That is correct.

Q. Okay.

A. An APD has not been applied for.

Q. It is prepared or one is being prepared, but you're waiting to get approval from the division; is that correct?

A. Yes, that's correct. We -- in current practices goes we typically on state and fee owned property wait until we have approval from the NMOCD for the injection permit before we apply for an APD.

Q. That's really all I have on this exhibit. Are -- you said you were going for easements. A lot of BLM land out here too; is that correct?

A. That's correct.

Q. So, you'll probably have to get road easements, et cetera, from them too?

A. That is correct. The access road is -- crosses State of New Mexico property and then goes on to BLM before reaching the nearest county road. So we will obtain a -- an access easement from the BLM as well.

Q. Okay. And our next witness will get to that. But there is a fair amount of developments activity in this area for oil and gas, is there not?

A. Yes. This area is very active. But I will tell you that the way our operations work, we've also obtained pipeline easements that are in this vicinity.

So, this will be tied into an integrated system. This will bring in water from wide span of area into this particular well.

Q. And Solaris's opinion, the salt water disposal well was necessary to service the oil and gas wells in this this area?

A. Yes. That is absolutely correct.

Q. And, again, Exhibit 3 was prepared by you or under your supervision?

A. Yes, it was.

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

A. Yes, it is.

MR. JIM BRUCE: Mr. Examiner, I move the admission of Exhibit 3.

EXAMINER LOWE: Any objections?

MS. BENNETT: No objection.

EXAMINER LOWE: Okay.

MR. JIM BRUCE: I have no further questions of the witness.

EXAMINER LOWE: Exhibit 3 will be accepted for this case.

(Exhibit Number 3, marked for identification.)

MS. BENNETT: I do have a couple of questions, couple of follow-up questions.

EXAMINATION

BY MS. BENNETT:

Q. Good morning, Mr. Dixon.

A. Good morning.

Q. Just a moment ago you testified that Exhibit 3 was prepared by you or under your supervision and direction?

A. Yes, that is correct.

Q. Did you prepare Exhibit 3 or was it prepared under your direction?

A. Under my direction.

Q. On the second page of Exhibit 3 it shows the Ironside State SWD No. 1, which is the proposed Solaris well; is that right?

A. That is correct.

Q. And then you said the red is NGL's closest fee acreage?

A. That is correct.

Q. But this map doesn't show the exterior boundaries of NGL's McCoy Ranch, does it?

A. It does not, no.

Q. And do you know if the exterior boundaries of NGL's McCoy Ranch are closer than the nearest fee

acreage?

A. So the boundaries of the ranch under grazing, yes, would be closer than the actual fee owned property. But it would be -- so can I clarify that -- what Ms. -- what she's asking is, so McCoy ranch encompasses state and BLM acreage that they are the grazing lessee of. So, that is not depicted here, because they're simply a lessee. It's the -- it's the United States or State of New Mexico that's the fee owner of that property.

Q. Thanks for that clarification.

MS. BENNETT: I don't have any further questions on Exhibit 3.

EXAMINER GOETZE: I have no questions for this witness.

EXAMINER McCLURE: I have no questions.

MR. BRANCARD: I just have one question.

EXAMINATION

BY MR. BRANCARD:

Q. So, Exhibit 3 picture, this is the nearest currently permitted salt water disposal well to the proposed the well?

A. So I do not know that. This is a -- this is a -- this is actually an operational well. What it was prepared for was in response to our only protestant being NGL, so we were more concerned with identifying

their assets in the area.

Q. Okay. So, there could be other SWD wells --

A. Yes. And I --

Q. -- closer to your proposed well location?

A. That is correct. Our -- our next -- or one of our next witnesses he will testify as to the AOR. I do not believe there are any others within the mile and a half of it.

Q. So, just one more question. So, if I understand correctly, you're drilling this well on state trust land surface, but you currently don't have an agreement with the state land office?

A. So, the process by which you obtain the easement is you first do the right of entry, which we've received a right of entry. That's to do the survey, the -- you know, begin the application. So, we've already obtained that.

The next phase is you file for application with the state land office for the disposal easement. So, we've prepared the application. We've obtained the bond. We're simply waiting on the state land office to issue the easement. But they've not objected. And I would -- I would hope that if they had any concerns, they would have been here today as they were earlier. So, they've been working with us. It's just steps of a

process in which to obtain the actual salt water disposal easement.

EXAMINATION

BY EXAMINER LOWE:

Q. Okay. And I got a question in reference to what you stated this morning. In order -- so the state land office knows what you're pseudo doing, what you're going to do in the end ultimately. So, on the way to get over there you have to get all these rights of way easements?

A. Yes, that is correct.

Q. Is that the only state land office or fee and federal or just all state?

A. So, in this instance our access road will encompass both state and BLM. Pipeline easements -- the current pipeline easement will involve only BLM and state. In future development I can't say that we won't cross fee, but that's our current plan.

EXAMINER LOWE: That's all the questions.

MR. JIM BRUCE: Okay. Calling Mr. Brannigan to the stand.

JAMES BRANNIGAN

(Being first duly sworn, testified as follows:)

EXAMINATION

BY MR. JIM BRUCE:

Q. Please state your name and city of residence for the record.

A. Jim Brannigan, Midland Texas.

Q. And what is your profession?

A. A petroleum geologist.

Q. And what is your relationship to Solaris in this case?

A. They hired me as a consultant to go ahead and do the geology under this location.

Q. Have you previously testified before the division as a petroleum geologist?

A. Yes, I have.

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

A. Yes, they were.

Q. And you have looked at the Devonian geology in this area, have you not?

A. As much as you can look at the Devonian geology, but yes.

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

MS. BENNETT: No objection.

EXAMINER McCLURE: No objection.

EXAMINER LOWE: He is so qualified.

Q (By Mr. Jim Bruce) Mr. Brannigan, I've marked all -- we have about ten pages of exhibits. I marked them all as Exhibit 4 and there's numbers of pages.

A. Okay.

Q. Why don't -- rather than interrupting you, let you run through what you have here?

A. Okay. I don't have the ones with the exhibits marked, so I'm not sure one, two, three what -- thank you.

Okay. The first one is just a -- your typical stratigraphic chart of both the Delaware basin and it's and the northwest shelf from the central basin platform. This is out of New Mexico tech book put together Ron Broadhead. Ron is probably the premier geologist in the state of New Mexico, no offense to anybody in this room.

But -- so this is just showing you the different stratigraphic units that we're going to be dealing with when we drill our well in -- on the Ironside. And it would be on the right-hand side where the Delaware basin stratigraphy. The Delaware basis is where our well is located.

The next page is just the -- it's a proposed -- proposal I put together. It's a prognosis for Solaris showing that the -- my estimated depths the

of where we anticipate different formations that are going to be coming in from the Rustler to the top of the -- to the tope of the Montoya. And that's based on the shell -- you see on the bottom, it says, tops below the second Bone Springs sand were picked using intervals from wells with e-logs or New Mexico Conservation Division Form 105. Then the upper section was the H well that's in that section, and No. 1 -- EBSJ.

But, again, this is -- this was -- this was based on the geology I had at the time, which I -- which is no better now than it was before. Even with the NGL well which was located in Section 6, there's no electric -- there's no electric log on that. And so -- at least with -- in the OCD files. Now, they may have it somewhere, but they haven't -- and I don't know if they turned it in or if they --

You know that -- I think -- I know for oil and gas wells oil and gas operators are mandated to run at least a gamma ray to surface. I'm not sure about salt water disposal wells. But there wasn't anything on the OCD website of the electric logs. So I wasn't able to go ahead and -- and pick any particular topics based off of NGL or Mesquites, they're top for -- on the scout ticket I believe were for -- for the Devonian was like 14,700 -- or 14,017 feet, but there's no electric logs.

So, that's just based -- and I -- and I always hate it when I -- I found a lot of oil in the state of New Mexico, and I used to -- I hate taking tops off of scout tickets because you don't know if they're correct or not. But I don't have any other information.

And on even some of the wells up in the Paduca Devonian field up to the northwest, here's one as an example, this is the Cotton Draw 64. This was a well at -- at CAOF at 92 million cubic feet of gas a day. Well, the open hole completion was from 16,492 to 16,537, but the electric log only goes to 16,218. So they probably set pipe at 16,218. And then they went ahead and drilled -- they just drilled open hole down to the Devonian is my guess. This was drilled in 1966, '65.

So what I'm telling you is that there's not a whole lot of control. They actually picked the top of the -- those of us that work southeast New Mexico -- and I wish Mike was here, because his dad was good at doing it -- but we called it -- because you don't know if you're in the Devonian or the Fusselman or the or -- or the Ordavision {SIC}. You just don't know where you're at.

We down there, the people that actually find oil and gas for the state of New Mexico, refer to

all this as pre Mississippian carbonates. Because the Fusselman -- the -- the -- if you look at it, the Fusselman is -- is -- or I mean, excuse me the Woodford is actually Devonian, but that's not -- when we refer to at the Devonian, you're referring to as decarbonates. And on most of the state forms it's the way. They'll actually break it down. Some of them -- some of them will say Fusselman and then Devonian. So my point is that there's not a lot of -- lot of lot of control to deal with. Not only for me, but for anybody working in this area.

And then the next -- the next page is -- this is just showing -- this is a --

Q. Page 3?

A. Yes, page 3. This is just a lease map. It used to be Midland Maps, I believe it's now Drilling Info which has got -- who brought them, who has now changed their name to a nondescript name that nobody can remember. But anyway, this is showing our location. And -- and -- what -- the reason I put this in is because I wanted to show all the -- these are all the locations. You can see all the horizontal wells that are going to be -- that have been permitted out there. And there's going to be lots of activity in this -- in this area.

The next page shows the -- shows the Paduca well, the NGL Paduca well in Section 6, the proximity of the Ironside well. And then to the north you can see in the southwest southwest of Section 16 is -- is a Solaris Caltrop State SUD -- SWD.

Q. And the Paduca well, that's a Devonian injection well, is it not?

A. There were -- yes, there were -- they're reporting it as Devonian, so I'm sure it is.

Q. Okay.

A. Although, there's no -- there's no electric log showing that they're actually in there. There's no electrical logs that are have logged over the Pre-Mississippian carbonates.

The next page is just a -- is just a similar thing. But this is just without the -- the Solaris well in Section 16. Looks like this might be a duplicate.

And then the other -- the other -- this I got off the OCD website. This is the --

Q. Pages 6 and 7?

A. Yes, pages 6 and 7. This is off the OCD web -- one of the OCD websites. And this is just showing that the NGL Paduca 6 SWD No. 1Y. They -- I guess they lost the first hole and they had to skid the rig. And it's

the 1Y. And they went ahead and -- showing that the amount -- if you go to page 7, you can see the amount of water that they're putting in per -- per month. It looks like they started producing or started injecting October of 2017. And -- and the latest production on this, on the website, OCD website, was -- was July of this year. And just ballpark figure, it looks like probably 25/26,000 barrels a day.

Q. And based on that, it seems look like Devonian is a good candidate for accepting salt water disposal -- disposed water.

A. Yes, it does.

Q. Yes.

And is what you the rest of your exhibit?

A. Well, the other exhibits would be -- page 8. And this is a -- this is a map that I just got. It's a -- it's a base map from Drilling Info. And this is -- I just plotted our location, and -- and it shows -- it shows the activity in the area or the future activity. Some of these are permits, some of them are actually drilled.

And then the last page, page 9, this is just -- I just put this in. This is a lease map of the townships to the west of our drilling location. And you can see there's more activity out there also.

Q. Are these primarily Bone spring and Wolfcamp wells?

A. Yes.

Q. And I believe our next witness will have information on his exhibits, we got incompatibility --

A. Right.

Q. Do you see any issues in this area which would preclude drilling of Devonian for an injection well?

A. No, I don't see any heavy faulting. Or based on the -- based on the -- some of the -- some of the work that was done by the -- by the State of New Mexico and by the -- and by some of the published publications that -- that show that -- the deeper faults, there aren't any out here. So, that shouldn't be an issue. And I don't see any karst topography in the shell that would prevent us go ahead -- the go ahead and drill.

Q. Was Exhibit 4 prepared by you or under your supervision?

A. It was prepared by me.

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

A. Yes.

MR. JIM BRUCE: Mr. Examiner, I move the admission of Exhibit 4.

MS. BENNETT: No objection.
EXAMINER LOWE: No objections?
Exhibit 4 will be accepted for this case.
(Exhibit Number 4, moved into evidence.)
MR. JIM BRUCE: And I have no further questions of the witness.
EXAMINER LOWE: Okay.
MS. BENNETT: I have one question, which is --

EXAMINATION

BY MS. BENNETT:

Q. Good morning.

A. Good morning.

Q. A moment ago you were talking about a well that was drilled in 1965 --

A. Yes.

Q. -- 1966 --

A. Right.

Q. -- at Cottonwood draw?

A. Yes. Up in -- up in Section 18 of -- of 2532.

Q. And the materials, though, that you're looking at those aren't in the exhibits anywhere, are they?

A. No.

Q. Okay. I just wanted to make sure that I wasn't missing something in the exhibits.

A. No, no. This is -- I didn't see any need to put that in, it's so far way out. What I wanted to show was the top of Devonian was. And they -- and again, it's just they -- they talk about producing, they talk about their top of the Devonian in -- on their -- on their -- the BLM forms. But when they -- when they ran the logs, they didn't go deep enough to go ahead and even -- even skim the top of it.

Q. Okay. Thank you for clarifying that for me.

A. Sure.

MS. BENNETT: Thanks.

EXAMINATION

BY MR. JIM BRUCE:

Q. There is a -- I forgot to ask a couple of questions.

Are there sealing formations or zones above and below the Devonian?

A. Yes, there are.

Q. And where are they?

A. Well, if you look at -- okay. Talking about the Devonian carbonate, the Devonian carbonate is -- there's -- there's the Woodford shell, that's -- that's a barrier that would prevent anything from getting into the -- getting into the Pennsylvania, Basin Penn. And then down below the -- down below the Devonian would be

the Silurian Fusselman Montoya and possibly the Simpson.

But we don't know, you know, we don't know what's out there. I mean, we may be looking at -- may go from Devonian right to basement, or you might go from Devonian and you might have the Fusselman Montoya Simpson Ellenburger Bliss, we don't know. There's not enough control out there.

MR. JIM BRUCE: Thank you. I have no further questions for the witness.

EXAMINER LOWE: Any questions?

EXAMINATION

BY EXAMINER McCLURE:

Q. Now, you believe the Woodford shell does exist --

A. Yes.

Q. -- as the confining layer --

A. Yes.

Q. -- upper confining layer?

A. Yes.

Q. But the top is not picked. Do we not know where the top is or what the thickness is of that?

A. The top of the Woodford?

Q. Yes. I didn't see it -- I didn't see it picked in the application anyway. Perhaps I just missed it somewhere?

A. I think it's in -- hang on a second.

Q. Because it has it listed in the layers but there's no top on it, so I wasn't sure.

A. Okay. Hang on a second.

No, I didn't -- it's not there. But -- but it's -- I mean, I don't have it listed, but it -- it is there. You can see it on the wells in the Paduca field. So, it is -- it is a confining shale that's going to go ahead and prevent any -- any fluids from going into the Pennsylvanian. In case there is any morrow production out there or a choke in the future.

Q. Yeah. I was going to say if -- of this is one that I end up reviewing, that will probably be a statement I'll need to see --

A. Okay. Okay. Well, I can get you -- hopefully there -- there's some of the -- there's three wells that produce in the Paduca field. The four wells drilled, one was a dry hole. Actually, this well I was referring to was the dry hole. And then the other three. So, the other three may have -- may have electric logs that actually show the -- electric logs might show it. So, I can -- that won't be a problem.

I could -- if we -- if you don't have it on the OCD website -- I don't know if you guys are aware, but back -- when I was president of the

New Mexico Energy Library back in the '90s, you guys transferred all of your hardcopy information to the New Mexico Energy Library down in Roswell. And we have a lot of hardcopy original information down there that you guys don't have in your files. So, you could -- you could call Patsy or Cassandra in Roswell, and they can get you more data than you guys have, unfortunately.

EXAMINER GOETZE: Well, I would also make the point that this is your application.

THE WITNESS: Sure. No, no, I'm just saying that -- no, no, I'm not saying that for me. I'm just saying for future stuff for you guys.

EXAMINER GOETZE: We have many gaps, and we realize that.

THE WITNESS: No, no, it's not -- it's not -- and I'm glad that the Energy Library can fill it in.

Q. (By Examiner McClure) : Now, I'm sorry, you did say earlier, how far is your closest -- your abandoned well, your dry hole, that you were getting your electric logs from? How far is that from this application?

A. Oh, that would be -- that's -- I don't have that. See, the electric log, they went to the Devonian, but they -- but they didn't log the bottom three or

400 feet. So, I don't know where the Devonian is. So, to get the information you'd have to go to the Paduca field or --

Q. Which is how far?

A. Oh, gosh, six miles. It's in the --

Q. North?

A. Northwest.

Q. Is it south or the east/west?

A. Kind of north by northwest.

Q. Oh, okay. So, then in theory, it's actually further away. Okay.

A. Oh, yes. It's further -- it's further away than the NGL well, and they reported topping the Devonian there.

Q. Yeah. I mean, I was trying to picture how it was related to like the reef geology. How it was -- so I knew where it was thinning.

A. Okay.

Q. I guess it should be thinning towards that -- towards this well from that distance --

A. Right.

Q. -- correct?

A. It -- there you go.

Q. Yeah. So, if you see it there, it should be existing here in theory?

A. In theory, yes.

Q. Yeah.

EXAMINER McCLURE: That was all for my questions.

THE WITNESS: Okay.

EXAMINER LOWE: Any questions? No questions?

EXAMINATION

BY EXAMINER LOWE:

Q. I got a question on your Exhibit 9. What is it supposed to reference into your exhibits here?

A. Oh, this? The -- the map?

Q. Yes.

A. That's just -- all I did on -- is the only reason I put that is because -- is because Section 32 is so -- so far west in the township, it's only a -- it's only less than a mile and a half away from -- from the edge of the township. I just wanted to show the other township that's to the west of there, and show you the activity that's going on there. That was the only -- that was the only reason I put that map in.

Q. Excuse me, I meant page 9, not Exhibit 9.

A. Oh, page -- yes. Yeah. No, that's the only reason I put that in, just to show it's more activity.

EXAMINER LOWE: Okay. That's all I have

for questions.

THE WITNESS: Okay. Thank you.

MR. JIM BRUCE: Mr. Examiner, my final witness showed up, and if he could be sworn in by the courts reporter, please.

EXAMINER LOWE: Okay. Will you please stand and be sworn in, sir?

RANDALL HICKS

(Being first duly sworn, testified as follows:)

EXAMINER LOWE: Could you please present your business card to our court reporter?

THE WITNESS: I don't use a business card. I can send it to you.

(Discussion off the record.)

EXAMINATION

BY MR. JIM BRUCE:

Q. Would please state your name for the record.

A. My name is Randall T. Hicks.

Q. And where do you reside?

A. Albuquerque, New Mexico.

Q. By profession, what are you?

A. A geologist and/or hydrogeologist.

Q. Okay. And you make your career out of being a hydrogeologist and regulatory work?

A. I do.

Q. Have you previously testified before the division?

A. Yes, I have.

Q. And were your credentials as a geologist or hydrogeologist accepted as a matter of record?

A. That is true.

Q. And did you prepare the C108 that we're here on today?

A. It was all prepared under my direction. And I, in fact, did most of it.

MR. JIM BRUCE: Mr. Examiner, I tender Mr. Hicks as an expert hydrogeologist.

MS. BENNETT: No objection.

EXAMINER LOWE: No objections? He's so qualified.

Q (By Mr. Jim Bruce) Mr. Hicks, let's run through this. In the beginning I've numbered the pages of Solaris Exhibit 1, which is the C108.

Could you look at Exhibit 4 and just give the footages, the exact location of the well?

A. I can do that. We're in Section 32 25 South 32 East, and it is 1270 feet from the south line and 175 feet from the east line.

Q. And is page 6 a C102 that is prepared for well?

A. Yes.

Q. And have you been working with Mr. Dixon with respect to permitting and obtaining the necessary state land office approvals, et cetera, on this well?

A. Not the state land office approvals. My -- my role in this was the preparation of the C108 and generation of an opinion relative to the seismicity or potential of the injection to cause seismic events.

Q. Okay. Now, running through this you got pages 7 through 12, which are a bunch of mainly land plats. Is that simply to show the location of the wells and proposed -- the proposed access roads?

A. That is true. This -- this is the entire package of the C108 that was presented to -- to me for inclusion.

Q. Moving on to page 14, the well bore sketch, could you go through that, briefly? Talk about the construction of the well bore and --

A. This is a document that you can see in the upper right-hand corner was prepared by Solaris. It was -- you can see in the title block to the left that the design was prepared by Chris Geise of Solaris, petroleum engineer. It was reviewed with respect to the geologic tops by Jim Brannigan, who you just heard from. And it was also reviewed with respect to compliance with the rules associated with injection under the OCD by Ed

Martin and myself. So, that's what the title block is talking about here, so you're aware.

Basically what we have here is we have three strings of casing and an open hole completion into the Devonian and to the base of the Fusselman.

Q. And what is the proposed injection depths, for the record?

A. The depth will be, as stated here, 17125 is the top of the injection interval, 18550 is the base of the injection interval, open hole.

Q. In your opinion, will the design and construction of this Ironside well prevent the movement of fluid between zones?

A. It complies with the rules and mandates associated with OCD publications. And I will rely upon the expertise -- I'm a geologist, not a well engineer, I will rely upon the expertise of OCD as well as the expertise of Mr. Geise that indeed compliance with the OCD rules will prevent that.

Q. What are the proposed -- could you just summarize the proposed injection operations, rate of injection, maximum average and the pressures?

A. Those are outlined on page 18 of the exhibit. And the maximum injection rate would be 40,000 -- I'm sorry, the rate is 40,000 barrels per day, that's a

volume. The average is going to be 30,000 barrels per day injection. And the pressure that is anticipated and designed had for this well is Item No. 3 on page 18, and that's a proposed maximum injection pressure of 4,081, and a average injection rate of 2,800.

Q. And Solaris would comply with the .2 PSI per foot of depth maximum --

A. That's -- that's exactly how these were.

Q. -- to the top of the injection zone?

A. To the top of injection zone? And so my answer is that is exactly how these were prepared. Those are the numbers we used.

Q. Let's move on to page 24 on the --

Could you discuss the area of review or areas of review and the various data contained in the next several pages?

A. Yes. The OCD requires two basic area of reviews. In one area of review but a radius of evaluation of two miles for all of the wells, OCD wells, oil and gas wells, within two miles of the proposed SWD. There's also a strict -- stricter or a recorded area of review as identified as one mile. And so those are -- we have three -- page 25, for example, shows three radius, half mile, one mile and two miles, to give the reader an understanding of the various tables,

notifications, et cetera, that apply to the application.

Q. Looking at this -- this page 25, you have various well types noted in the block on the lower left, one of which is other salt water injection wells.

Is there any approved or salt water injection well within one and a half miles of the Ironside State No. 1?

A. There is not.

Q. And what are Exhibits -- pages 26 and 27?

A. One of the requirements is to notify individuals with oil and gas leases and mineral ownership within one mile of the proposed SWD. This is a map that demonstrates who has said mineral leases and mineral rights within one mile. And, in fact, obviously, the whole map shows that, but the radius is identified here.

Q. And is -- that's -- page 27 goes along with that, it's just a more -- it's larger scale, I should say?

A. That's correct.

Q. Okay. And all of the leases involved in this area and the surface ownership would either -- would be state or federal; is that correct?

A. That is correct.

Q. What does page 28A show?

A. 28A is the -- the location of identified water supply wells within the map boundaries of the Ironside well. And there is one well which is identified as two data points, but it's only one well for USGS, 9141 and 9146, they're the same well. And that's within one mile of the proposed SWD. It is a real well. I visited it, and there are these water level measurements. I didn't check them, but the fact that the USGS found them, you can see it Google Earth, it's a real well.

Q. And that's a Santa Rosa and Rustler --

A. That's correct.

Q. -- well?

A. It's -- it's more than likely it's really a Santa Rosa well at this particular location and it's for stock.

Q. And what would be the depth that water is produced from?

A. It would be produced from probably -- I have the data. It is in -- buried in here somewhere. It's about -- hang on a second. I think it's about 300 feet.

Q. Okay. And then I see there's -- on this -- on page 28A there's also one other well that's almost two miles away; is that correct?

A. That's correct.

Q. Is that a shallower well or is it --

A. It's hard to say, there's no -- that was a well that came from publication, and so while -- there's just simply no data on that.

Q. Pages -- now, you prepared, and we'll get to that in a little while -- a separate letter on seismicity, didn't you?

A. I did.

Q. What are pages 28B and 28C?

A. 28B is a reproduction of a portion of a map figure within a particular publication, it is referenced in the lower left-hand corner. This particular publication has been very useful corner in identifying the degree of stress. Higher stress would create a higher propensity of a particular area to create/cause earthquakes, seismic activity. A lower stress indicates that there is a -- less of a chance to cause seismic activity that would cause damage.

There's other maps within this publication that are of interest. And this, however, shows what we need to show with respect to nearby documented published faults. And it provides an analysis based upon their work, which is quite good and quite extensive with respect to the data, on what's known as fault slip potential. And it's related to stress, other kinds of -- of data, but stress is the main issue.

And it shows that the closest, in fact, the bulk of all of the mapped faults in the Delaware basin are of a green color which provided very low fault slip potential, a very low potential for natural earthquakes to occur. The Delaware basin is a quiescent area of the United States with respect to seismic activity. And, therefore, it's like no surprise that the WIPP repository would be within an area that shows low seismic activity. So that's what 28B --

Q. So, the nearest fault over to the east is quite some distance away?

A. Eleven miles.

Q. Moving on to page 28C, I guess we're trying to show other salt waters disposal wells in this area?

A. That's true. And under -- under normal circumstances and many of our applications that we have prepared since this time, we would have the same scale of map and you'd be able to actually see some of the nearby faults. But for the Ironside the nearest fault's 11 miles away, and so it -- it is off of this particular map.

But what it does show, and what is important as far as we're concerned, and as far as the propensity of injection to enhance the probability that there would be seismic activity is the density of

injection wells into the Devonian and Fusselman, as we see here.

And the -- you may remember from about few minutes ago when I talked about some of the data that go into determining the probability that a particular fault could be -- could cause seismic activity is fluid pressure. And so when -- and keep in mind that faults, as my structural geology professor told me many, many decades ago, faults do not fall from the sky. They come -- they're caused in the basement. And so when the basement being the crystalline rock which you heard of -- Jim talk about a little while ago, the crystalline rock that underlie the sedimentary units in the Delaware basin. And.

If the fluids from injection of any kind are able to penetrate the fault planes and create a higher fluid pressure within the fault planes just to lubricate the fault and increase the potential of that particular fault to move and can create a seismic event.

And so the density of SWDs is one factor that we have used to determine whether or not the addition of the Ironside, in this case, the addition of the Ironside well and it's injection capacity would have a measurable or meaningful impact.

Q. And you see no evidence of that?

A. The -- the density is -- is described in here, and I believe it's one well for every 12 miles. I can -- I can't find that. But it's a very low density of -- of injection wells, which is existing injection wells and proposed injection wells that existed on the OCD website at the time of the application.

One SWD, it's on page 2 of this letter, one SWD proposed or existing for every 16 square miles. That is a low density.

Q. Let's move on now to page 30 and beyond that. Are these -- is this -- do these pages contain data for wells within the area of review?

A. They do. Well --

Q. Go ahead.

A. Page 30 through I think it's 35, is a listing of all of the wells from the OCD database within two miles of the SWD. So, I want to make sure that we know which area of review, so-to-speak, we're talking about here. This is a two-mile --

Q. Let's do the first one --

A. Yeah, okay.

Q. And there's quite a few wells within two miles?

A. Two hundred and nine is what my count shows.

Q. And is it fair to say that -- that other than the SWD wells, well or wells, there are no producing oil

and gas wells within that area?

A. These are -- these are, in fact, both injection wells and --

Q. Okay.

A. -- producing wells. But the producing wells are 100 percent, well above the injections on there. Not penetrating the injection zone.

And so, in fact, 209 wells, if you go back to the figure, a lot of those are -- a lot of dots are on top of one another. You can't show two -- I mean, we -- it was not possible for to us show all of these wells. And we were also showing, I believe, wells that had been drilled. Some of these wells were permitted and yet not drilled. So, that's what the 209 is here. Some of them are older and plugged and abandoned as wells. And so this -- this is -- Table 1 is from the OCD database and it was generated from the figure, Play 1.

Q. And since there -- there is no producing oil or there is no producing oil and gas well which has penetrated the Devonian within two miles, nor is there any plugged and abandoned Devonian well within two miles?

A. With respect to producing oil and gas, that's true. With respect to -- there is a SWD that Mesquite

drilled one -- you know --

Q. But i's two miles away?

A. It's -- it's either -- as we say in the application, it's either a couple of hundred feet within two miles or a couple of hundred feet outside of the two-mile zone, but it's included in the application.

And there is -- and if my memory serves me well, there are two elements here. One is a plugged and abandoned SWD, the well was skid. There was, apparently, some problems with respect to the completion. And there is another active SWD that was drilled since this -- 15, 20, 30 feet away from the plugged and abandoned well --

Q. Okay.

A. -- that has that has been drilled since we put in this application. And so there -- there is, basically two miles away, two wells that penetrate the Devonian, one's an active SWD, 30 feet away, whatever, something like that, is the plugged and abandoned SWD.

Q. Okay. Does the data show that that well was properly plugged and abandoned?

A. To our mind it -- it was.

Q. Okay. And then let's move on to page 36, what does this show?

A. Okay. This is the oil and gas wells within the

one-mile area of review. And this is the real area of review that is required by the form and the rule itself. There's 25 wells.

Q. And looks like the deepest of those wells would still be about 6500 feet above the top of the injection zone?

A. Absolutely true. And you can see that all of them and the -- sometimes you got to worry about topography, but the -- that's not all that much out there. But you can see that the lower Bone Springs wells are going to be the only ones that would be of -- they'd be the closest, and that is very distance -- very distant from the Devonian in terms of vertical depth as you pointed out.

Q. Next the couple of pages, 37 and 38, is that merely to show lease ownership in this area of the state? State and federal leases?

A. These are the -- these are part of the list that generates the affected parties that are required for notification under the OCD rules.

Q. Okay. Starting on page 39 you have produced water chemistry?

A. Yes.

Q. What is shown by this?

A. What we did here is we went into the GO-TECH

database that resides in Socorro. It's relatively extensive. And we were able to identify within a township or so the chemistry of the producing wells, the water in the producing wells. And that's what's represented here. And so high -- high sodium, very saline water. Bone Springs -- and -- and what's interesting in terms of here, and it comes into play, is most of the wells that are shown here are Bone Springs. There's some Delaware. There's -- there's one Wolfcamp, maybe two. But most of the wells here are Bone Springs, and that -- this is the -- this represents the chemistry of the water that we anticipate will be injected.

Q. Okay. It's rather saline?

A. Oh, yeah.

Q. And page 42 what does that show?

A. You may remember from Mr. Brannigan's testimony earlier that there's just not a lot of control out in this area with respect to the Devonian. And so understanding what the chemistry of the water is within the Devonian is a guess at best.

What we were able to find from the GO-TECH database are these wells that are listed here. Some of them are highlighted in yellow, because they're in the -- basically the same township. But for most of the southern Delaware basin the only place that the Devonian

is penetrated with respect to oil and gas is on the shelf to -- that is basically on the Texas New Mexico border. So, it's of questionable value with respect to identifying the chemistry of the Devonian.

However, the purpose of this is to provide the available data per the rule and per the -- the form. And from this and from somewhat practical experience in the basin we have not -- and OCD would know better than us -- we have not identified any injection problems where Bone Springs, Delaware, other higher -- waters from the higher zones have been injected into the Devonian and actually caused injection problems. We're not aware of any.

Q. So, you wouldn't anticipate any compatibility issues between the formation and injection of the water?

A. We do not anticipate that will occur, that's correct.

Q. And then you have four or five pages of well logs. What are those for, starting at page 43 and 44?

A. You asked me earlier where these -- where we're drawing water from, and I'd forgotten that we had these in here. This actually tells where the fresh water comes from. And so you can -- for example, on page 45 this is a pretty good well log, and it shows on the one -- two -- three -- four -- fifth column to the

right, water bearing, yes or no. And you can see that the uppermost water bearing unit is at 330 feet, and it's water bearing all the way down to 480 feet. And so that's the -- the zone that is producing fresh water in the general area of the SWD.

Now, I'm not telling -- I'd have to look this up a little bit -- but this is in 26 South 31 East Section 1, so it may be distant. There's not a lot of OSE, Office of State Engineer, well logs that have been -- there are online and available. And these are the two I think that I found that provide information about exactly where the water is, the fresh water, where the fresh water is.

Q. And the second well shows about the same depth, 350 feet or so?

A. That's true.

Q. Finally was a list of the parties to be notified, the mineral owners, lessees, et cetera, surface owner, was that developed by you and Solaris for purposes of giving notice of this application?

A. Its was actually developed by us. And the fact of the matter is, is that the initial notification that we p out -- confession here -- this was one of our first SWD applications, and we ended up notifying everybody, all the interested parties, within two miles. That was

a mistake our on part.

And after we did about three of these, I called people up, and I said, "This is crazy. There's so many people. This is taking us hours." So we dug into it, and we were corrected. And that was a nice thing to know.

So, indeed, this is the -- this is the list of affected parties within one mile. This is the list that we needed to comply with, so we overdid this. This is the list within one mile. This has been generated recently.

Q. And, finally, is -- page 54 simply is the notice that was published as required by the From C108?

A. That's true.

Q. Let's move on to your other exhibit, which is Exhibit 2, seismicity letters.

A. Sure.

Q. And you already discussed a lot of it.

Do you have anything to say with respect to this letter?

A. I do. This is -- this exhibit contains, as you may see in the upper left-hand corner, a date of October 14th. We updated this letter based upon some additional information and experience that we have developed since we initially generated and submitted the

Ironside.

And so one of the things I want to speak to directly is that on page 2 in the lower right-hand corner of that letter is a -- is a depth or an isopach map, a thickness map, of the underlying Simpson group. The shale and limestone and sandstone horizons that separate the injection zone of the Devonian with the underlying Ellenburger as well, and the basement.

And so one of the things that Mr. Brannigan brought up is that there's not a lot of data, which is true. But we -- we found and we identified a particular Amoco well significantly north of this in the Antelope Ridge area we also identified, on the next page on the top, a cross section which was developed by the Bureau of Economic Geology of Texas -- I'm sorry, it's from Texas, but that's where it came from. And it does show the Simpson group, it's thickness, with one well on the left-hand side being in Lea County.

And so I think that we can through -- through these well data and understanding of the dynamics of the basin formation, and pre-basin formation, one can feel relatively comfortable -- I can feel relatively comfortable that we've got, you know, about 400, 600, 700 feet of a -- of the Simpson group,

which provides in my opinion as an individual that understands fluid mechanics, an excellent barrier between the Devonian injection zone down to the Fusselman, and the basement fault areas. Again, the mapped fault -- the mapped basement fault is 11 miles away.

Q. Okay.

A. So, I wanted to bring that to everybody's attention. With respect to what Mr. Brannigan said, is there's not a lot of data, but I think we can say with a degree -- a relatively high degree of geologic and scientific certainty that we've got that barrier to -- creating high pressures in any fault zones that exist in the basement, we've got that barrier with respect to just the Simpson group, not to mention the Ellenburger also creating a barrier to high pressures being generated in basement faults.

Q. Was Exhibit 2 prepared by you?

A. 100 percent.

Q. In your opinion, is granting of this application in the interest of conservation and the prevention of waste?

A. It does.

MR. JIM BRUCE: Mr. Examiner, I move admission of Exhibits 1 and 2.

MS. BENNETT: No objection.

EXAMINER LOWE: No objections?

Exhibits 1 and 2 will be accepted for this case.

(Exhibit Number 1, moved into evidence.)

(Exhibit Number 2, moved into evidence.)

MR. JIM BRUCE: And before I turn it over for questioning I would also just -- Exhibit 5 is my affidavit of notice. I identified -- I notified the people that Mr. Hicks had notified for the original application. And Exhibit 6 is an affidavit of publication. So, I would note two green cards weren't returned, but those were sent to the addresses that are on the division's list of operators -- current operators. But, regardless, all parties were also given constructive notice by publication, so I'd move the admissions of Exhibits 5 and 6.

EXAMINER LOWE: Exhibits 5 and 6 will be accepted for this case.

(Exhibit Number 5, moved into evidence.)

(Exhibit Number 6, moved into evidence.)

MR. JIM BRUCE: And I have no further questions of this witness.

EXAMINER LOWE: Anything further?

MS. BENNETT: No objection.

EXAMINER LOWE: Thank you.

MS. BENNETT: I do have few questions for Mr. Hicks, though.

EXAMINATION

BY MS. BENNETT:

Q. Good morning, Mr. Hicks. Thanks for being here today.

I wanted to ask you a few questions. And I apologize that I might be skipping around a little bit, I took notes as you were speaking but my notes may not be in the exact same order as your presentation. I'll do my best to speak up.

So, first I wanted to talk about the well bore design, and I think what you mentioned when you were discussing the well bore design is that it was prepared by Mr. Geise; is that right?

A. That's correct.

Q. And reviewed by Mr. Brannigan and another Solaris consultant?

A. Another individual that's employed by us, Mr. Ed Martin.

Q. And I believe, though, you testified that -- and I'm just trying to clarify this, correct me if I'm wrong -- that you couldn't today, sitting here, say that the well bore design was protective of underground

sources of drinking water, that you needed to rely on Mr. Geise's expertise and the OCD's expertise for that?

A. Not for underground sources of drinking water, I can testify to that.

Q. And so --

A. That's not a problem. It was the -- the question that was brought up was potential excursion into other formations which would also be oil and gas formations with respect to the injection.

And so with respect to underground sources of drinking water, the -- the surface casing is fully deep enough with respect to the underground sources of drinking water. And so we've got surface casing, we've got circulated cement to the surface. Inside of that surface casing there will be another set of casing that is also -- these days it's circulated to the surface as well, as a matter of course. It may not be 100 percent required. But the fact of the matter is, is that every situation that I've looked at in terms of recent wells with my clients, they're circulating into the surface.

And -- and so we've got several strings of casing, several strings of cement, and -- monitored between the injection tubing and the underground sources of drinking water. So I have no compunction of saying that this -- this is going to be -- it's designed and it

will be installed in a manner that is fully protected.

Q. Okay. So, what formations were you referring to, then, when you said you couldn't testify about whether the well bore --

A. Bone Springs.

Q. -- design would protect from injection or migration into other formations?

A. Bone Springs. Delaware. It's the oil and gas formations that are being produced right now.

Q. Okay. On the -- in several places in your materials you talked about the fluid migration and reservoir pressures.

Did you conduct a reservoir pressure study or model reservoir pressures?

A. No.

Q. So, it's not in your materials because you didn't prepare one?

A. We didn't prepare one.

Q. And then I also see -- and now I'm looking at your Exhibit 2, which is your seismic letter --

A. Yes.

Q. -- opinion on seismology.

Did you prepare a fault slip probability or fault slip potential analysis using the Stanford tool?

A. Did not.

Q. And so your letter is based only on publicly available information but no modeling?

A. That's correct.

Q. And I apologize for speaking so loudly, I don't mean to sound aggressive. It's just --

A. No, I --

Q. -- trying to project.

A. Me too.

Q. Okay. On page 3 of your letter there's some quoted material, for example, about the Tulip Creek --

A. Correct.

Q. -- formation. Where -- I see where you attributed some of the quotes from, but where -- is this all from secondary sources?

A. It's all from secondary sources. It's all from the same source from which this cross section came from. It's referenced in here. It's the Bureau of Economic Geology report.

Q. Okay. Thanks for that.

So, on page 4 at the top, the very first paragraph, you conclude that the faults near the Ironside State SWD No. 1 are also most likely to exhibit a low FSP?

A. That's correct.

Q. But you didn't prepare an FSP analysis using the Stanford tool?

A. The publication that is referenced in here, and did use that. So, what we have here is a sets of mapped and relatively large basement faults that have been modeled with the Stanford tool. So, I've got one fault 11 miles to the east, and I got another fault that is you know 14, 15 miles to the west, both of which would be modeled by the best guys that are around with respect to the fault slip potential as it exists under current conditions.

And so the important thing to keep in mind here, and what -- what Solaris and everybody else needs to keep in mind, is that the -- what's going to change the fall slip potential across the basin -- and you can see it across the whole basin -- that it is a very low fault slip potential. There is absolutely no reason, other than to charge more money, to do that kind of modeling in this particular area.

And what we would suggest is that we have a -- a set of strata below the injection zone that does two things. One, we have low permeability zones that would tend to prevent wholesale excursion of injected material, injected fluids, downward and an increase of pressure downward. We also have -- and, in fact, for

these low permeability, especially the shales, you can -- in the field and in many many observations, the -- when there is a fault, the shale tends to be annealed, that is, you know, not fused but I'll use that term. It's -- it's not a great conduit. Whereas, where you have limestones or sandstones you get a breccia, a course grained zone many times where the permeability may even be greater.

And the beauty of what we have here in the Simpson zone is that if there was any kind of migration that began, it would go through the fault zone, theoretically, enter into the breccia that is associated with the more permeable material. And, in fact, those are generally not -- it's my understanding that they are not necessarily overpressured, the Ellenburger and other zones within the Simpson. And so any fluid that would come in from the injection zone would actually migrate out into the more permeable, more porous, zones. Increase the pressure there. Migrate down. So, we've got -- it's -- it's a fantastic barrier.

Q. And just to be clear my questions aren't designed to question your conclusions at all, because those conclusions are very similar to conclusions that we presented in other cases, but merely to try to understand where -- how you're showing your math --

A. Right.

Q. -- in your materials. Because I think that's the missing step for me, is I agree with the conclusions I just don't see where the support is in the materials, like a fault slip potential analysis or a reservoir engineering study. And so that's what I was trying to get at. Because I completely agree with your conclusions.

A. Yeah. I --

Q. I just don't want you to think that I'm questioning --

A. I -- I understand that. And I think that what it is in -- for me, quite frankly, it's a cost/benefit analysis, is what I did. And I felt that the data that we had, based on public information, worked on by others, in addition the lithology that we had from public information that has been -- also from well log data that was available through the public, was sufficient.

And it was not -- and the extra cost of the reservoir analysis and the fault slip potential analysis, which I would -- I would not do, you know, me personally, I just didn't feel it was commensurate with the benefit.

Q. I thank you for that.

Let's -- I had a question on page 20 of the C108. On page 20 by Roman numeral X and Roman numeral XI, there's asterisk, and I didn't see where there's any follow-up on that.

A. Yeah. I can't tell you how many times I tried to remove that asterisk without absolutely destroying the entire heading.

Q. Okay. So, it doesn't have any -- there's no meaning to that?

A. I -- I even put a call into Bill Gates, why are you doing this for, in Word?

Q. Okay. Then let's look at page 28B. And I recognize this drawing or this plate from the Snee and Zoback or CH?

A. It's K.

Q. Yeah, K.

But it looks like you've added to this another layer of data which is the --

A. Correct.

Q. -- SWD locations?

A. Correct.

Q. So, then looking at 28C, page 28C, this is the diagram that you said shows the well density for SWDs in the area?

A. Correct.

Q. And in the left -- on the left-hand side it shows all of the SWDs -- not all, but a number of SWDs. And then it says fault slip potential percentage. And --

A. Yes.

Q. -- and that's the fault slip potential percentage from Snee and Novack paper?

A. The same thing, yeah.

Q. So, it's not anything you modeled?

A. No.

Q. Okay.

A. No. It's just the -- and I believe we -- we say in the -- in the document that what we did is we took this, got rid of some of the extraneous information. We -- Stanford gave us all of the shaped files for this, so that we were able to manipulate different -- well, we weren't able to manipulate data but we were able to turn on and off certain layers, so that we were able to create a more simplified map for the inset, which is exactly the same as what's in here.

Q. So, just to be clear, you weren't actually modeling anything, you were just removing layers?

A. That's absolutely true. For clarity.

Q. Got it.

And then I think you talked about -- when

you were testifying about Exhibit 28C, you mentioned that the importance of this diagram is it shows the lack of well densities --

A. Correct.

Q. -- or the area between wells?

A. Correct.

Q. And you said that's important to understand when you add the Ironside well. So, the addition of Ironside well has no impact --

A. Correct.

Q. -- in your opinion?

And, again, I'm not disputing that conclusion, but what I was wondering is where is that shown in 28C or in your materials if there's no reservoir study?

A. It's -- it's simply a matter of the -- it's a professional opinion, that's what it is.

Q. And when I was reviewing the C108 -- and, admittedly, I was reviewing it this morning -- I didn't see anything in the materials about Solaris agreeing to seismic monitoring at the well sites.

Is that something that you know whether Solaris is proposing, to have --

A. That would be a question --

Q. -- seismic monitoring?

A. It -- that never came up in our preparation.

Q. And so it's not in the C108?

A. Correct.

Q. It's not in the application materials, as far as you know?

A. It's not there.

Q. Okay. Thank you. Let me just take a quick look at my notes here.

MS. BENNETT: All right. Those are the only questions I have. Thank you very much.

EXAMINER LOWE: Any questions, Mr. McClure?

EXAMINER McCLURE: Yeah.

EXAMINATION

BY EXAMINER McCLURE:

Q. You characterized the Ellenburger as a barrier. If I'm understanding you correctly, you're thinking more as like pressure sink. Okay. And with regards to that, that would keep the pressure from migrating down --

A. Correct.

Q. -- is your thought process?

A. That's -- that's exactly correct.

Q. Okay.

A. It's a -- it's a pressure barrier.

Q. I'm with you then.

A. Yeah.

Q. Okay. I was just making sure I was understanding what your characterization was --

A. Correct.

Q. -- in that.

Now, further question, understanding that this particular proposed well during its lifetime will likely never reach out and touch one of these faults, how much of a reservoir pressure increase do you believe it would actually take adjacent to one of these faults to actually cause something lower than a low probability of slippage?

A. That's the modeling that should be done.

Q. I gotcha. Okay.

A. With respect to that --

Q. So, we don't know, then, for sure is what you're saying?

A. Yeah.

Q. Understanding it doesn't pertain to this well?

A. It doesn't pertain to this well.

Q. Yeah.

A. But, you know, there -- the model that -- here's what I would suggest as an opinion, the modeling has been done by Snee and Zoback. It's there. That modeling has been done and generated the map of the

entire Permian basin. It's there. We called up the authors at Stanford, and they were more than generous to help us in terms of creating the level of displays and the layers and everything that was available.

Keeping in mind, that it doesn't apply to this well. But what I'm saying is, is that there is already in existence what you're asking for with respect to what is that pressure elevation that would be necessary to change the fault slip potential. It's -- it's a phone call and potentially some research funds or something. Remembering that it doesn't apply to this well.

Q. Of course. We've already established that.

A. But I'm saying it's -- that exists. It's there. And not to reach out for that would be -- I mean, in order to -- reaching out for that, that would not be a hard thing to do.

EXAMINER McCLURE: Thank you. That was all my boring questions.

EXAMINER LOWE: Mr. Goetze?

EXAMINER GOETZE: Long time no see, Mr. Hicks.

THE WITNESS: Indeed.

EXAMINER GOETZE: Yeah. I don't have any questions. Your explanations have satisfied most of my

questions. I would ask that the well completion diagram be resubmitted and include the cements so we have numbers. I do not see that in the application. And let's make sure that it's on record. Okay?

MR. JIM BRUCE: Will do.

EXAMINER GOETZE: That's all I have. Thank you.

EXAMINER LOWE: Mr. Brancard?

EXAMINATION

BY MR. BRANCARD:

Q. Just to clarify. I'm looking at -- I'm looking at page 25 and page 30 of your C108. So, you've identified one active SWD well within two miles?

A. We identified -- at the time that we wrote -- at the time we prepared this application there was one plugged and abandoned well, SWD well, and there was a permit application submitted to install a replacement SWD well within 30 or so feet of that plugged and abandoned well.

And so as of August of this year, there was an order signed by this august group of people here, indicating that they could drill that replacement well. So -- and it's active now. So, there -- today there's one active. At the time when we prepared this application it was not active, it was only proposed.

Q. Okay. So, I just want to clarify what we're talking about in the document.

A. You want to see where it is?

Q. So, we're going township below and then west to Section 6?

A. Correct.

Q. So, it's 43379?

A. Correct.

Q. Which on page 30 is identified as the Paduca 6?

A. Correct.

Q. Okay. So, there is another SWD, this township down going to the east, Section 3? 41208?

A. Section 3 -- give me that again.

Q. Section 3, Township 26.

A. Got it.

Q. R23E?

A. Yeah.

Q. All the way up the -- almost to the two-mile barrier there?

A. Yeah.

Q. 41208?

A. Yes.

Q. And just for the record, page 30 indicates that's the Pentail 3 COG SWD. And if I read correctly on page 31, the Pentail 3 is supposedly disposing into

the Cherry Canyon?

A. Correct.

Q. The Delaware mountain?

A. That -- that is true.

Q. Okay.

A. Or put it this way, that's what agrees with OCD records.

Q. That's what they're telling you.

And then there are some abandoned -- plugged and abandoned wells to the north, right? In Section 28 looks like there's two of them, 08228 and 08236?

A. Okay.

Q. I man, they don't show up on page 30 I assume because they're plugged; is that correct?

A. Yes. They wouldn't show up, that's correct. We -- we showed the active and proposed wells on the plate because that's what was important to generate the notice of affected parties. And so the -- the more exhaustive list of wells is indeed this table.

Q. And you don't know where those plugged wells, what formation, they went into?

A. We did not -- well, I mean we -- no, we did -- we do not know. We don't know.

Q. Okay.

A. We didn't do that research.

Q. So, I also looked in your report, there is no modeling done of, say, over a period of time given the maximum injection rate of any dispersion?

A. Correct. There's no modeling done. There's no reservoir molding conducted for this.

Q. Okay.

MR. BRANCARD: Thank you.

EXAMINER LOWE: I have a few questions.

EXAMINATION

BY EXAMINER LOWE:

Q. On your page 28A, on your map, you indicate the blue dots are water wells?

A. 28A? Sorry.

That -- that -- the blue dots are -- the circles are wells that are listed in the Office of the State Engineer database.

Q. And you've mentioned several times and you indicates a fresh water, do you mean that potable water or what do you mean by fresh water?

A. Potable water.

Q. Less than 10,000 -- 20,000 TDS?

A. Absolutely. These are active --

Q. Active?

A. -- wells that are used for stock. So, it's

more than likely the total dissolved solids are probably on the order of anywhere from 600 to 2,000 at worst.

Q. Okay. And on your page 36 -- well, your -- your table that you indicate one mile -- well, actually your have two-mile on page 30, you indicate two-mile wells.

Are those all wells in the area within two miles?

A. Those are all oil and gas wells within two miles.

Q. Okay. Well, the -- the table after that you indicate one mile?

A. Correct.

Q. So, does the two-mile data chart also include that one mile?

A. Correct.

Q. Okay.

A. This was for the -- these are the people that needed to be noticed. The two-mile was to satisfy the information requirement of the application.

Q. Okay.

EXAMINER LOWE: Okay. That's all the questions for now. Thank you.

MR. JIM BRUCE: Mr. Examiner, that's all we have today. We'd ask that that the matter be taken

under advisement.

MS. BENNETT: No objection.

EXAMINER LOWE: Do you have a closing statement?

MS. BENNETT: No, no closing statement. Thank you.

EXAMINER GOETZE: Okay. So, just make available to send in a PDF with the well completion diagram requested, please.

MR. JIM BRUCE: Will do.

EXAMINER LOWE: Okay. This will conclude Case Number 20812, and it will be taken under advisement. Thank you.

And that concludes the end of today's docket.

(Hearing concluded at 11:11 a.m.)

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STATE OF NEW MEXICO

COUNTY OF BERNALILLO

CERTIFICATE OF COURT REPORTER

I, BELEN A. SOTO, New Mexico Certified Court Reporter No. 106, and Registered Merit Reporter, do hereby certify that I reported the following 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 29th day of October, 2019.

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BELEN A.SOTO, CSR, RMR
Certified Court Reporter
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