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 OWL SWD OPERATING, LLC FOR AUTHORIZATION TO INJECT, LEA COUNTY, NEW MEXICO. CASE NO. 15723

REPORTER'S TRANSCRIPT OF PROCEEDINGS

SPECIAL EXAMINER HEARING

Friday, August 4, 2017

Volume 3

Santa Fe, New Mexico

BEFORE: WILLIAM V. JONES, CHIEF EXAMINER
SCOTT DAWSON, TECHNICAL EXAMINER
GABRIEL WADE, LEGAL EXAMINER

This matter came on for hearing before the New Mexico Oil Conservation Division, William V. Jones, Chief Examiner, Scott Dawson, Technical Examiner, and Gabriel Wade, Legal Examiner, on Friday, August 4, 2017, 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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INDEX

EXHIBITS OFFERED AND ADMITTED

(9:36 a.m.)

EXAMINER JONES: Let's go back on the record then. This is August the 4th, 2017, and we're continuing with Case Number 15723. I believe we're ready for the State Land Office's case.

MS. MOSS: Thank you.

ANCHOR HOLM,

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

DIRECT EXAMINATION

BY MS. MOSS:

Q. Good morning.

A. Good morning.

Q. Would you state your name for the record?

A. My name is Anchor Holm.

Q. And where do you work, Mr. Holm?

A. I work at the State Land Office, and I live at 6167 Cottontail Road, Northeast, Rio Rancho, New Mexico 87144.

Q. And what do you do at the State Land Office?

A. I'm their geoscientist-petroleum engineering specialist.

Q. Would you look at what is marked in our exhibits as Number 9?

A. Number 9? Yes.

Q. Can you identify that for me?

A. This is my most recent curriculum vitae.

MS. MOSS: It's okay if I admit these at the end of his testimony? Can I admit them in bulk, or would you like them one at a time?

EXAMINER WADE: No, at the end of the testimony. You can ask each -- you're talking about the whole set of exhibits?

MS. MOSS: Yes.

EXAMINER WADE: Yes.

Q. (BY MS. MOSS) And have you testified before the OCD before?

A. Yes, I have.

Q. And when you testified before, were you found to be an expert?

A. Yes. I was found to be an expert petroleum engineer, as well as a groundwater engineer.

MS. MOSS: At this time I'd like to qualify him as an expert, Mr. Holm.

EXAMINER JONES: Any objection?

MR. BROOKS: None.

MR. NEWELL: I don't think so.

MR. MOELLENBERG: No objection.

EXAMINER JONES: Okay. Say again how you are qualifying him?

MS. MOSS: As an expert petroleum engineer and groundwater --

EXAMINER JONES: Groundwater hydrologist?

MS. MOSS: Yes.

EXAMINER JONES: He is so qualified.

MS. MOSS: Thank you.

Q. (BY MS. MOSS) Mr. Holm, would you look at what's marked as Exhibit 1 in the notebook we have?

A. Exhibit 1 is the Resource Map Number 4 prepared by Dr. Hiss back in 1975. It's entitled "Chloride-Ion Concentration in Ground Water in Permian Guadalupian Rocks, Southeast New Mexico and West Texas."

Q. And what did you find in this exhibit that you used to prepare for your conclusions today?

A. Well, when I looked at this, this has got the chloride ions, recognizing that if you double the chloride ions, it'll be somewhere close to 10,000 milligrams per liter total dissolved solids. He does have an isopleth on here that's listed as a 5. If you look in the vicinity of Hobbs, just to the west of Hobbs, there is a 5, and to the south of Hobbs, there is a 5. Those represent 5,000 milligrams per liter chloride ions. That's well back of the reef.

The reef is this dark gray area. It's where the reef rock is located.

But if you follow the -- or isopleth from south of Hobbs, it goes down beneath Eunice and heads down and enters the state of Texas just as it enters the back of the Capitan Reef rock, SP 5,000. Everything to the left or west of that line, until you get to the front of the Capitan Reef where the other 5 line comes down, that's supposed to generally protect the water.

Another thing that comes across here from the hydrology of the situation is, in the Carlsbad area, you have the Pecos River flowing from north to south into the vicinity of what's listed on this map as Lake McMillan. On the east side of Lake McMillan is where the Yates Formation type section is where it outcrops. At that point, the Yates -- just immediately to the east of Lake McMillan, the Yates has a chloride concentration of 440 milligrams per liter. So that shows that that area has been flushed, and any salts that were in that area have been dissolved. We're talking very good quality water at that point.

MR. BROOKS: Where is this on the map, Mr. Holm?

THE WITNESS: Immediately to the northwest of Hobbs -- or excuse me -- of Carlsbad. As you're coming south on the Pecos River, the first reservoir that you hit is Lake McMillan, and that's the older

reservoir. There are two others that have been put in the system that are younger. All three of them are above the City of Carlsbad and relative to the river, and all three have contributed to the groundwater in that area and contributing fresh water only.

You can see that the 5 isopleth, when it enters the back portion of the reef, it only goes about five, eight miles to the east, and then it comes back to near the Pecos River at the -- where the Pecos River departs the Capitan Reef rock. You go on down the Pecos River. It comes out and again crosses over the Capitan Reef. In this case the elevation of the river in that area is probably somewhere between 2- and 3,000 feet, probably closer to 2,000 feet, above sea level.

You go down to the Glass Mountains end and you can -- the horseshoe that's on here, and you can see that to the west of it, there is an i5 isopleth, and also to the east side of there, there is also another one. So this entire region has got fresh water that has flushed the original seawater out. It's flushed it out, and it's flowed out at underneath the City of Hobbs. And that's what Dr. Hiss' study demonstrated very clearly.

Q. (BY MS. MOSS) Okay. Moving to Exhibit 2.

A. Since this area of interest is just right north

of the New Mexico line with Texas, the dark gray area on Exhibit Number 2 --

Q. Would you just identify Exhibit Number 2?

A. It's the groundwater quality in the Tansill-Yates-Seven Rivers and Capitan rocks.

Q. And who prepared this?

A. I prepared this.

Q. Please go ahead.

A. I used data from Dr. Hiss. I used data from the Jalmat-Tansill-Yates-Seven Rivers Field, also from the Scarborough-Yates-Seven Rivers Field.

Q. And what is the broken black line that runs down the center of this?

A. The broken black line separates the area -- gray area to the west is the Capitan Reef rock, is underneath the surface there somewhere. To the east of that, where it is white, the Capitan Reef is not believed to exist, and I don't believe it does.

Q. Okay.

A. The pink dot is the proposed Bobcat SWD No. 1. Of interest right away as we move half mile to the north, you have a well that has chlorides, 4,824 milligrams per liter, total dissolved solids of 11,346. This is significantly less than the original seawater that was in these rocks. So this has been flushed.

And, in fact, it's nearly protectable water. It's slightly above the 10,000 level.

Q. Yes.

A. If you move further to the northwest and you encounter another well which has got 68,960 chlorides, which is more than ten times what is in the well that I just first discussed. It had 11,789 TDS also. Its north offset well, which is less than a quarter mile away, had chlorides of 182,700 and 316,728 TDS, nearly three times the well of only less than a quarter mile away. Moving straight north in that same section, we have another well that's got 18,400 chlorides and 37,753 total dissolved solids. All of those are elevated well above the well in Section 25 that I started with.

The only anomalous item is the saltwater disposal water injection well to the northwest of the highest concentration of chlorides and TDS. You move a half mile or so to the northwest of that water injection well, and you have chlorides up to 4,914, total dissolved solids of 10,570, which is right at protectable water. It clearly demonstrates that the water injection well has affected at least three of these wells negatively. In other words, they were not injecting maybe the produced water. They might have been bringing something from another section of the

Jalmat Field, but not necessarily injecting produced waters from the immediate area of that water injection well.

Moving straight north of that water injection well about a mile and a half, there is another well, with a yellow dot on it, chlorides 4,320, TDS, 9,758, protectable water in the U.S. Move east in that section, at the eastern edge, chlorides 400, total dissolved solids, 1,508. That's -- that's drinking water. So that's definitely protectable water. So you see there is quite a variety of water in that area to the north.

Looking to the south of the Bobcat No. 1, there is a well, a yellow dot, about a mile or so to the south-southeast, and it has a history of water analyses, the lowest of which is 1,877 chlorides, 5,800 total dissolved solids. So at one point in its history, it had very good water.

Then as the water started being degraded, and it went to 4,613 milligrams per liter, chlorides, 9,699 TDS, which is still protectable waters. Then it went up to 5,942 -- 5,947 chlorides, 12,048 total dissolved solids, above the protectable limit. And it also had another one that was done that was similar to that. So the history in this area, there was good water

in the area, but for some reason it changed significantly over time.

Looking in the vicinity, there is a triangle to the east of that well about a half mile, which is a water injection well. There's also another triangle to the northwest about a half mile away, and either one or both of those may have contributed to that increase.

There's none located within a mile of the south, except for the well near the Bennett Ranch, and that well, total dissolved solids was 20,174 chlorides, TDS, 5,420 total dissolved solids, which is protectable waters in the U.S. so they were injecting waters, which was probably leased waters, in the immediate vicinity, which suggests that that entire area of that section in which the Bennett Ranch headquarters is located has protectable water underneath it.

Moving further to the south of the Bennett Ranch, just a little bit to the east, chlorides are 3,443, protectable waters in the U.S. Moving to the south of that well, we have two wells. The easternmost well, it has chlorides of 2,198, 7,465 total dissolved solids, protectable waters of the States.

Moving immediately to the west of that last one, where it's a directed offset, we again have a

history of water analyses. At the top, they start off at 4,990 chlorides, 10,693 total dissolved solids, just right at the protectable water limits in that same vicinity. And over time, it degraded to 10,040 chlorides and 18,452 total dissolved solids. So this water has been affected by something over time. Since it's a producing well and there is a southeast offset water injection well, it has probably been affected by that well, but for some reason, probably due to timing, the water -- disposal well probably didn't start injecting until after -- sometime after the well to the north of the water injection well started. So it's probably something in there.

If we move to the south of the Bennett Ranch, now, about two miles, there is another yellow dot. It has a wide range of total dissolved solids and chlorides. It starts off at 251 milligrams per liter chlorides, 2.707 milligrams per liter total dissolved solids, which would be very good quality water. In fact, 250, I think, is the limit for EPA drinking water.

However, the one above it is significantly higher. And because there are two zeros after both of those, I don't know whether there is an error in what the data is, but it doesn't seem to fit anywhere along. Plus, if you multiply 23,700 times two, you don't get a

ten-fold bigger number that was doubled. So there is something wrong with that data point, but it's probably not something we should rely on.

Moving due east from that point, about -- nearly five miles, there is another well in which we've got chlorides of 5,082 milligrams per liter, total dissolved solids, 9,254. Of all the analyses in there, this one is the only one that's below the protectable water limit. However, the rest of them are fairly close. And this is located some two-and-half or more miles back of the -- so there is some very good quality water that was at that point, which is part of the reason that Dr. Hiss drew his line that didn't intersect the Capitan Reef until you got within a half mile of the state line. So that's probably one of the points he was using.

I believe that's all I have on that.

Q. And if you take the totality -- if you take the totality of the information that you've --

A. The totality of the information shows that we have a wide area along the entire length, including the back reef, where you've got protectable waters that the U.S. said it's been measured.

You also have intermittent spots of very poor water, which may or may not be naturally caused.

Likely caused by man, is what it appears.

Q. Just behind this is Exhibit 2A, and would you explain why that's included in Exhibit 2?

A. Exhibit 2A is a summary of the data that's plotted on Exhibit 2.

Q. And Exhibit 2 --

A. And it shows the source, what formations were involved. Start off moving from north to south, it's Jalmat-Tansill-Yates-Seven Rivers until you get down to the Scarborough Field.

Q. And 2B? Is that included?

A. 2B is the online data that I downloaded from OCDOnline, and it's where I located the information in that field. It includes the section, township and range. So I was able to decipher where each one of those wells was located, and I plotted it on the map, and subsequently, I had that verified. I also had a long-time page that has been in many saltwater disposal wells showing the various water qualities and various formations in the Permian Basin, and one of those is in the Scarborough-Yates-Seven Rivers. And that's the one that was the source of the 3,443 chlorides, milligrams per liter chlorides, and they emphasize the reef on that data. So I'm confident that's from the reef.

Q. Going to Exhibit 3, could you tell us what

Exhibit 3 is, please?

A. Exhibit 3 is a copy of the complete report -- I believe it's complete -- of the Texas Water Development Board issued September 29th -- September 2009. It was prepared by four professional geologists, and they're all employed at Daniel B. Stephens & Associates, I believe, except for one, Mr. Steve Finch, who was working for Shomaker -- John Shomaker & Associates. And one was working for Charles R. Williams. In fact, Charles R. Williams has his own company. That's Bar-W Groundwater Exploration.

Q. What does this exhibit show us?

A. This exhibit really has a very detailed analysis and update of what Dr. Hiss studies did back in 1975. So here we are 30 years later with more information.

And the significance in here is what they discovered. Looking at Figure 1, you can see the yellow outline of the Capitan Reef rock and the location of some mountains. Now, the reef rock and the back-reef rocks were all deposited back in Permian time generally at or near sea level flat. It was fairly horizontal. Now, you can see there are mountains involved. What has happened?

In the Guadalupe Mountains, they were up

from -- but they dip sharply down into the Permian Basin. So they've been turned up like that (indicating).

If you look at the Apache Mountains and the Davis Mountains, they've been uplifted, and everything goes again -- dips again directly into the Delaware Basin, dipping down to the northeast. You get to the Glass Mountains and you're oriented a different direction, and it's dipping down to the northwest. And this (indicating) -- there's also the reef at Cepco [sic; phonetic] goes down to the north in the subsurface.

You can see the -- this yellow -- or white lines between Ward County and Reeves County. This is where the county line has been drawn, and it was drawn along the Pecos River. So it helps you to see exactly where it crosses.

The red on this particular diagram is the Capitan Reef outcrop areas, and it only outcropped in the mountains. And where they affect the water quality of the reef is at the mountains. That's where the recharge areas are.

Moving to Figure Number 5, this figure says "Study Area Faults" of the Capitan Reef Complex. On this map, they have labeled the Border Zone Fault, which

is immediately to the west of the Capitan, and west end of the Guadalupe Mountains. And then they show the Stocks Fault, which runs along the north side of the Apache Mountains and north of the Davis Mountains. Those are the only two that are labeled. But there are a lot of light blue lines on this, which are also minor faults.

Moving to Figure Number 10, those faults are again plotted. We're not looking at the mountains anymore. We just see that we've got the faults. You see there are a lot of faults that have been drawn on here all in the areas of the mountains and the outcrops. There are none in the subsurface drawn here because these are where they were measured, and you could actually see them at the surface.

What's the orientation of those faults? Well, they generally follow the uplift trends. The faults along the west side are trending northwest-southeast, as are the ones across the Glass Mountains. So this was all broken in a similar or the same orogeny. So you've got fractures in that manner.

Also, on the -- where it says "B, B prime" for a cross section --

Q. Yes.

A. -- you've got an edge -- eastern edge of the

Capitan outcrop. Some geologists have interpreted that to be a fault with a major offset. Others haven't. So there is a disagreement on that.

Q. Before you leave that, can I ask you, with that B, B1, what is the line that that could hypothetically run?

A. D, D [sic] prime is the cross section that goes very, very close, if not exactly, through where the Maralo Sholes B well is located and the Bobcat No. 1, which is located, essentially, on the same location.

Q. So in your expertise, you can see a relationship between the red at B, B1 and the locations of the proposed saltwater disposal well?

A. That's right. They're many miles apart.

Q. I understand.

Now, is there a way in which the lower fault area, the F, F1, also suggests a fault at D1, D?

A. Neither one of them directly show that.

Q. And how is that?

A. Because there are no black lines over there, and there is nothing shown here that wasn't in the subsurface. Everything was at surface measurement.

Q. Okay. And does the parallel nature of the F, F1 and B, B1 emphasize the fact that the fault exists below the surface?

A. Well, what is parallel about them is they both cross the reef --

Q. Yes.

A. -- at right angles, so they're not exactly parallel.

Q. Sorry.

A. But both of them go directly across the reef. Whereas, B, B prime goes diagonally across the reef.

Q. Thank you.

A. It's the only one that goes diagonally.

Looking at detail on D, D prime, which is Figure Number 14, this is a figure that has been referred to several times by the experts here. I think all of us has looked at that. And it does not show any faulting on it, but it does show that the area -- Maralo Sholes B well, when you correlate it to the information that we have, it's somewhere near that, just to the right of the wellbore that is identified as ID 267. So it's not too far to the east of that. That would be where it fits in. Interestingly, that's where they show a high in the Capitan Reef Rock Complex, a structural high.

Q. Could you be more specific about how that impacts the proposed saltwater disposal well?

A. Well, the thin nature of the Artesia Group at

that point would suggestion that the top of the Capitan may be within 100 to 300 feet of the total depth of the open hole in the Maralo Sholes B No. 2.

Q. Thank you.

A. Moving to the F, F prime, which is down in the Glass Mountains --

Q. What exhibit, please?

A. -- Figure 16 --

Q. Thank you.

A. -- it runs from northwest to southeast, but it does go -- there is a transect across the reef, and you can see there are a series of faults that are measured in an outcrop. So down the Glass Mountains, we know it has been broken quite a bit. What's the significance of the faults? They're major recharge points. And, in fact, many of these faults are directly connected to cavernous porosity in that limestone.

Q. Thank you.

A. Moving off to the west in the Guadalupe Mountains --

Q. Can you tell me what figure?

A. -- Figure Number 12, cross section B, B prime, the one that crosses the reef in kind of a diagonal manner, it has similar faulting, and we know the recharge points there in Carlsbad Caverns, where they're

located. And, interestingly, Carlsbad Caverns, a detailed geology of it shows that it's not only in the Capitan Reef Formation, it's also in the Yates Formation, which says there's hyper-permeability connections in the areas of faulting.

Moving to Figure Number 17, which is "Capitan Reef Complex Top Contours, Mapped Faults, and Aquifer Extent Comparison," shows that the depth to the top of the Capitan Reef is somewhere near minus 750 feet below sea level. Ground surface out in this area is close to 3,000 feet. So that's quite a ways below ground surface.

You can also see on this map that it does not match the contours in the vicinity of the state line all the way up to Jal, that Dr. Hiss had prepared. It does not have a dome in it like what was on Dr. Hiss' map.

Q. And what is the significance of that?

A. It shows it's fairly smooth looking from the state line up north.

Q. Uh-huh.

A. But there's also a little high area, the minus 750, that they've entered on the north and south end. And I can't read what the other one is. It's too small print for me to see. But it's not quite shaped the same

way --

Q. Okay.

A. -- as Dr. Hiss'.

Figure Number 19, I find that somewhat helpful simply because they've colored the contours by a modeling system, and it shows that the lowest areas, approaching minus 1,500 feet, are the top surface, is the redder, the bolder red. And as you get higher and higher, it becomes yellow, then green and then blue at the outcrop. So you see really good where the outcrops are and how rapidly the dipping of the formations are going down to the northeast, generally, east-northeast area.

But this whole area (indicating), from Lea County down to Central Pecos County is quite low.

Q. Okay.

A. Also this suggested fault that is along the face of the Capitan Reef there in the Guadalupe Mountains, you can see that it has a trend that runs off to the northeast (indicating), and it crosses the reef where it's kind of a bolus area, a little bit wider area. And it goes from shallower down abruptly to deeper. That suggests that there might be a connection structurally between those two points. And that particular area is located immediately to the west of

the City of Eunice, where we already know Dr. Hiss has demonstrated that groundwater is moving to the north and east behind the reef. So there may be a faulting complex -- fracturing complex that's also contributing to the flushing of the groundwater by what's gone on here.

Looking down near where we are, which is just slightly above the state line, there's also an area that is high-low, and that's very near where the Maralo Sholes B is. In fact, maybe a mile or so away from that.

Q. And, again, what does that high-low suggest?

A. High-low is that there is a change. Abrupt changes are frequently associated with faulting.

Q. Thank you.

A. Figure 22 is their general current groundwater flow map. It's called "Regional Groundwater Flow." It shows that the water flows directly from the Glass Mountains north to near Winkler County and from the Guadalupe Mountains underneath the Carlsbad area and wraps around and departs the state of New Mexico at the state line, just south of Jal. That's what it is doing currently.

However, looking at Dr. Hiss' map, he shows how, in the past, before man started playing with this

aquifer, it discharged both from the Glass Mountains and the Guadalupe Mountains, discharged underneath Hobbs. But because of the intense pumping that's gone on in the Winkler County area. And that water is mostly being used for waterfloods, I believe, as well as some drinking water. So there is a lot of pumping that has gone on in that area. And that's caused by draw-down, how it's affected the flow in the aquifer.

Figure 23 is the gross isopach grid of interbedded fine sands, silt and clay within the Capitan Reef Complex. So within the reef rock itself, when you move just north of the state line, you can see that there is hardly any sand in the Capitan rock itself. But just north of where the Maralo Sholes B cross section D, D prime is, there appears to be what could be interpreted as a sandy channel heading down there that terminated. It terminated at that point.

This is from a lot of geologic analysis that was done by these well-qualified professional geologists.

Q. Thank you.

MS. MOSS: Would it be possible to take a two-minute break?

EXAMINER JONES: Yes. Five-minute break.

(Recess, 10:15 a.m. to 10:27 a.m.)

EXAMINER JONES: All right. Let's go back on the record.

Q. (BY MS. MOSS) So we're back on the record, Mr. Holm, and can you tell me what you have in front of you there?

A. I'm looking at the CEK Engineering report that was testified to earlier, looking at Tab D. This has been called both a tab or an exhibit. Tab D is a west to east --

EXAMINER WADE: Before you continue, which exhibit are you specifically referring to, what exhibit number? Does it say "State Land Office Exhibit"?

MS. MOSS: Oh. He said OWL.

MR. NEWELL: Exhibit 1, Tab D.

THE WITNESS: The second page should say "CEK Engineering."

EXAMINER JONES: Is it D, as in dog?

THE WITNESS: D, as in dog, right.

EXAMINER DAWSON: Oh, all right. I thought you said B. All right. Perfect.

THE WITNESS: Again, looking at what is called Tab D in Exhibit 1, it's titled "West to East Structural Cross-section (Jalmat Field Fluid Contacts)." It shows a series of six oil well logs that have been correlated on a -- in a structural manner. It means

that they're set on ground level at the surface and corrected to sea level.

So this is the current configuration of the rocks at each one of those wellbores. It shows where the top of Tansill, top of Yates, top of Seven Rivers occurs, but it doesn't show anything below that.

In the small map to the south or below this cross section on the left, there is a series of dots which are listed as "Yates or Seven Rivers Completions," and there is a very fine line which runs from the south up about three miles to a wellbore, then jogs to the east, which is the Maralo Sholes B No. 2 well, I believe. And then moving to the north, there's two more wells it intersects, and then it moves to the west and terminates.

Q. (BY MS. MOSS) And what's important about that line?

A. That appears to be the schematic line here, across here, but for some reason, he also has an A to A prime here, which is across this area. So I think what he has done is he's projected these wellbores to that, but I'm not sure which one -- whether -- from this detail here, he doesn't really say what that is. But what I believe he's showing us is that in the area of the Maralo Sholes B2, which is the middle well log, that

wells to the south and east of it, are all in this area where you've got an orangish-brown area that is considered to be -- I believe it's gas cap, although it's not labeled, because he does say something about original gas-oil contacts.

Q. And what does that -- how does that gas cap affect the wells?

A. Well, that says that it's -- there is a closed structure somewhere because the gas is trapped above the oil --

Q. Okay.

A. -- on original conditions [sic].

The greenish area appears to be his oil, and I'm guessing that the blue area was water, which would be kind of a typical color shading that a lot of people use.

Looking at the thickness of the Tansill-Yates-Seven Rivers, the distances between the top of the Tansill and the top of the Seven Rivers is relatively constant in all wells on this cross section. However, when you move to the left or the west of the Sholes Federal B 25 No. 5 well, it drops abruptly by the time it gets to the Burk Royalty Lindley No. 2 well.

Q. And what does that suggest?

A. That suggests that there's either been a

stratigraphic change, which usually is a pinch-out or maybe a fault. It could be either one of those. And because this occurred over a stretch of about 1,000 feet, plus or minus a little, chances are very good this is a fracture zone and it's moved down, and it has terminated the gas well.

Q. I see that.

A. Okay. And the well that's further to the west, which appears to be in the same west half or the same section, the Apollo Operating Joyner WT-Fed 2, appears to be the same elevation below the other portion of the cross section.

Q. Uh-huh.

A. So that would suggest that there is a fault underneath -- across this cross section that separated those two wells from the gas cap in the right half of this diagram.

Q. Thank you.

A. That's not very far from the Maralo Sholes B No. 2. Also, that might -- it might also explain why there is an elongate modeling -- groundwater modeling result, but I'm not sure. I don't know the details of his modeling enough to tell -- tell you. I don't know the structural change in his model.

Q. If we go to Exhibit H of the same notebook,

Applicant's exhibits --

A. H. Okay.

MS. MOSS: It looks like this, Scott.

THE WITNESS: At the top, I believe it's labeled "Oilfield Water Logistics Bobcat SWD #1 Offset SWD/Pressure Maintenance Permits Jalmat Oilfield." This is the one in which the Skelly Jal Oilfield is highlighted with pink -- with pink dots, and it's located several miles to the north-northwest of the area of interest in the southeast portion of Section 25, which is our SWD-1127, which is Maralo Sholes B No. 2, I believe. So it's several miles' distance away, but it's been discussed by CEK Engineering.

Q. (BY MS. MOSS) And was there something you wanted to add to that?

A. There is one data-quality point that was not entered. It was for the Skelly Jal Water System Number 1. We have -- I found, when I researched the OSC Web page and was looking at the water right that was developed for this field -- water field. And in that, the No. 1 had been drilled and tested, but the other wells had not been drilled at that point in time.

Q. And what was the quality of the water there?

A. That water quality -- do you want me to go to our exhibit or to the --

Q. Stay with this one, please.

A. Okay. The water quality was chlorides, 1,683 milligrams per liter; sulfates, 940 milligrams per liter; bicarbonate or HCO3, 372 milligrams per liter. H2S was present. The pH was 7, so it was a little bit alkaline, but fairly close to neutral. And specific gravity was 1.005, very close to that of fresh water. That is water without any solids in it, which would be 1.0.

Q. We're going to move to the next -- the Daniel B. Stephens & Associates report. There is a Figure 8 in there. That may be easier. It's part of Exhibit 2, I believe, in Applicant's -- it is part of Exhibit 2 in Applicant's exhibits.

A. I'm not sure which one you're on.

Q. Can you identify what this is?

A. Figure Number 8. Okay. I'll take the luxury of seeing -- is it the same or different than this (indicating)? That is not in -- wait a minute. I'm looking at the wrong report.

Q. Okay. So I'm going to hand you this and you can identify -- and take your time. It's already been admitted, but --

A. This is the one that I believe Mr. Land prepared.

Q. Uh-huh. And it tells us -- can you tell us what it tells us about the methodology that was used in this report?

A. This shows the various layers in the groundwater model and the western edge of various interfaces between the back reef formations and the Capitan Reef itself, the reef.

Q. Okay. And what is important about that?

A. The area that's very dark or black on this black-and-white copy, that is considered to be a no-flow cell, and it's actually the Capitan Reef, which has permeabilities in the range of one darcy or more.

Q. Okay.

A. In other words, three to ten times more than the back reef aquifers have.

Q. Okay. And what is the name of the methodology that is used in this report?

A. This is a model layer system, and I believe that that's -- I'm not sure what you mean by that.

Q. I think that there was a discussion about the way the data was entered in this, which you have identified but you'll have to confirm that now, as the Monte Carlo method; is that correct?

A. We use a Monte Carlo method to estimate some of his assumptions, which is a way that modelers can use

sometimes quite effectively to estimate what -- using various other parameters as to what a certain parameter should be so he reduces his error margin. So that can be done, but it's only valid if you have the geology right. And if you don't understand the geology, you can't do a modeling --

Q. Right.

A. -- because you're modeling geology and the permeability and porosities within it. So you've got to put that all together in one chunk, and it's difficult to do.

Q. I have just one more in this notebook. It's just one other exhibit that was used in the Daniel B. Stephens model, and could you describe that, please?

A. This is what's listed as his Figure Number 9. It says, "Conceptual Cross Section of Model Boundary Conditions." They established that there was no-flow boundary at the top of layer number one. And I believe as he discussed that, that was the Tansill Formation, is above layer number one in this model. And layer number two does not have any no-flow boundaries in the vicinity of the Bobcat SWD, but it does show where the proposed completion zone is. And we know that proposed completion zone is the same as the Maralo Sholes B No. 2, and that would mean that layer number two is the --

the upper part of that would be the Lower Yates. The bottom portion of that would be the Upper Seven Rivers.

Q. Okay. And is there something that you can identify on the left of that figure which seems to support the conclusions that you are trying to reach?

A. It appears that the crosshatched -- bold crosshatched area would be what is called "general head boundary cell" representing groundwater flow. It's a boundary cell, in other words, no flow.

Q. Okay.

A. The fine crosshatch in the opposite direction is general boundary cell representing horizontal ground flow. So you see there are a lot of boundaries to vertical flow, a few to horizontal flows.

Q. And how does that affect what you're looking at?

A. It would restrict the rate that the model predicts it would move -- water would move to the left. There are no restrictions to the right. Except way over on the eastern side, there is a head boundary cell, a horizontal flow -- groundwater flow. So he's arbitrarily stopped the flow to the right vertically and picked various places where the vertical flow stops, and the horizontal flow stops once you go to the -- as you go to the left.

When you go below the -- into layer three, it has both a horizontal and a vertical groundwater flow blocks [sic] boundaries. And he has shown -- below this area that's been crosshatched, he's labeled as Capitan Reef, and yet there is no evidence of those boundaries.

Q. Okay. Thank you.

A. So this is artificial. It may significantly affect his model.

Q. Okay. Now, I know there's been a lot of material that we've looked at this morning, but if you'd like to take a moment or if there is something I've forgotten that you would like to add, could you tell us at this time?

A. I don't believe so.

Q. Okay.

MS. MOSS: So if this would work, we have a number of exhibits which the expert has absorbed into what he's discussed, and that would be 4 -- in our notebook, that would be indicated as 4 through 8, and I don't intend to move to admit those. So I can leave them out of the notebook or simply ask to admit 1 through 3 and 9.

EXAMINER JONES: Are we going to need to ask questions about these or --

MS. MOSS: I haven't introduced them into

evidence.

EXAMINER JONES: So why did you put them in?

MS. MOSS: Because the expert earlier thought that they would be helpful as he went into more detail on the exhibits that we talked about. But we could go through them, but I think it is not -- I don't think it's a good use of time.

EXAMINER JONES: He chooses not to do that?

MS. MOSS: That's right.

EXAMINER JONES: It's probably better not to have them here. The court reporter doesn't --

EXAMINER WADE: They shouldn't be in the record.

MS. MOSS: So we would just pull them out, then.

MR. BROOKS: Well, Exhibit 5 is an order of the Division. I don't know if any of the others are of that character.

MS. MOSS: That's 4.

MR. BROOKS: 4?

MS. MOSS: Yeah.

MR. BROOKS: Okay. Exhibit 4 is an order of the Division. Do you consider that to have any relevance, from a precedential standpoint, that it ought

to be considered by the Examiner? Because legal precedence, they're not ordinarily admitted into evidence, but nevertheless -- you know, they're already hard to find in our order books, so if you want that to be considered, it should be before the Examiner.

MS. MOSS: Okay. Mr. Holm --

Thank you.

Q. (BY MS. MOSS) Mr. Holm, look at our State Land Office exhibits and look at Number 4.

A. Tab Number 4 is Case Number 8405, the New Mexico Oil Conservation Division, Order Number R-7935, and this order -- this order is related to the SWD-272, Lea County, New Mexico.

Q. And there were aspects of this finding which at one point I believe you thought would be helpful, perhaps specifically to the findings in number three and number four?

A. The well of interest is labeled in (2). It says "The applicant," and it's the Meador A Well No. 1, located in Unit G of Section 10, Township 25 South, 36 East, which I believe is the same township that the Maralo Sholes B No. 2 is located in. The administrative order authorized the applicant to utilize this well to dispose of produced water into the Delaware Formation. The Delaware Formation is from 5,406 to 5,426. So it

was originally permitted by OCD to go to the Delaware. I say that because -- this was set up to go to that. And it shows that that order identifies the wells to be -- to produce waters from wells to be disposed of in that well. They both specify what that is, and this is something that is frequently done by the OCD, and these are all within the few miles of the same --

Q. So those were all part of what was used in the evaluation?

A. Yes. It shows that they limit the area, but it's also a practical thing. To move water very far is not cheap.

MS. MOSS: I don't have anything further for this witness.

EXAMINER JONES: Okay. Mr. Moellenberg, do you want to follow the same procedure? Let the other questions happen first?

MR. MOELLENBERG: Yes, sir.

EXAMINER JONES: Mr. Brooks?

CROSS-EXAMINATION

BY MR. BROOKS:

Q. Good morning, Mr. Holm.

A. Good morning, sir.

Q. I think I spoke to you early this morning, but that's a formality.

A. That was before the second cup of coffee.

Q. Yes.

You obviously are extremely knowledgeable about this subject matter, correct?

A. I've been working in this ever since the 1970s in detail in the Permian Basin area.

Q. Unfortunately, one of the disadvantages of being extremely knowledgeable about any subject matter is that one doesn't know when to assume that others are following them, and that's often not the case because the others do not have the background knowledge. So if I ask you questions that seem extremely naive, please bear with me.

I want to go back to your Exhibit Number -- this is not your exhibits -- this is your exhibits (indicating), your Exhibit Number 2 -- no -- yeah -- 2. It's what you had testified specifically about.

A. That's correct.

Q. Now, I had a little trouble following which wells you were talking about some of the time. I understand the large pink dot halfway down the map on the left is the proposed well, correct?

A. That is correct.

Q. Okay. Now, you talked considerably about this -- about -- well, there was some discussion of the

well that appears to be identified as 30-025-11860 in Section 31; is that correct?

A. Yes.

Q. Okay. Now, you have four figures and -- four readings, water analyses, in that well, and I gather, from the way you explained it, that the one at the top is the most recent?

A. That appears to be what it is.

Q. And that is true of the other wells where you have multiple readings?

A. Yes, because I took these in the order that they are on the spreadsheet that I downloaded. I just took them in the order in which they were on that list.

Q. Okay. So what you see here is a -- what you pointed out in connection with 11860 was progressive deterioration of the water quality as represented by the top three lines on the graph?

A. That's correct.

Q. How do you explain the bottom line? Does that mean anything? I mean the bottom line literally. I'm not talking in terms in which that term is sometimes used.

MS. MOSS: Mr. Brooks, perhaps you could be just a little --

THE WITNESS: That would be in Section 31,

25 South --

Q. (BY MR. BROOKS) I believe it would be 31, 25 South, 37 East.

A. It is in my Exhibit 2C, which is the data -- backup data.

Q. 2C?

A. Yes. It's about in the middle of the page. There is a Federal Well No. 5, which I think has that same API number. I can't read it very well on this. And I took them in the order in which they were presented there.

Q. Well, I don't think that's particularly an important point. I'm just a little confused.

A. What this doesn't show you on this spreadsheet is that deep sample analysis.

Q. Right.

A. And that's something that I didn't have access to.

Q. This well is the closest one, I believe was the case, but a number of wells you pointed out show TDS below 10,000, correct?

A. Yes.

Q. Now, were these samples from the reef water, or were these samples from the Yates-Seven Rivers Formation?

A. One of them that I know is from the reef, for sure.

Q. I believe you mentioned that, but I do not remember which one it was.

A. It was in Section 7 of 26-37.

Q. 26-37?

A. Yeah, 26 South, 37 East.

Q. And that would be?

A. Number seven. It is the one that's to the northwest quarter, because I went to the API number to get that.

Q. 21299?

A. 21299 is the digits.

Q. Okay. And that one is from the reef?

A. That one is definitely from the reef.

Q. And you don't know for sure --

A. The other is -- the others are from whatever zones were open. And since many of these are -- were listed in the field name of Tansill-Yates-Seven Rivers or Yates-Seven Rivers, those are definitely open, and they are to be considered back reef. But they're actually above the actual rocks of the Capitan.

Q. Would this lead you to conclude that some of these samples, at least, were taken from the Yates-Seven Rivers?

A. I would say the majority have been.

Q. Okay. Now, the best water I see on here, just glancing, is from Number 09766, which is in, it looks like, Section 14 of 25-26 --

EXAMINER JONES: 36?

Q. (BY MR. BROOKS) -- 400 parts per million chloride, and 1,580 TDS -- 1,508 TDS?

A. Yes. That appears to be in Township 25 South, 36 East.

Q. Yeah.

A. Okay. And it would be -- that would be in Section 13.

Q. Oh, yes. Section 13, that's the township line.

A. Yeah. It's not in a standard location. It's a little closer to the east line.

Q. Yeah.

That has a TDS of 1,508?

A. Correct.

Q. That's pretty fresh water, isn't it?

A. That's very good-quality water. It's better than what Midland water used to be.

Q. Well, I grew up in Midland, and I didn't know that water didn't taste bad until I was about 18 years old (laughter).

But do you have any way of knowing where

that water sample is drawn from?

A. It came from the production of that well, so it came from probably the Yates-Seven Rivers.

Q. That's -- okay. You're speculating to a degree on that?

A. It's a well that's completed in that pool, so I know it's completed in at least one of those --

Q. Very well likely this was Yates-Seven Rivers?

A. That's -- that's a high probability.

Q. Now, do you believe, from looking at all these data points on the map, that at some times and in some places, the Yates-Seven Rivers has produced water significantly below 10,000 TDS?

A. This demonstrates that it has.

Q. (Indicating.)

A. It has.

Q. Okay. Now, would you say -- on the basis of your study of this area, would you say the same thing about the reef water in this area? Has it produced fresh water at some places and some times during -- produced water under 10,000 TDS at some time in some places in this general vicinity? By this general vicinity, so the record will be clear, I'm talking about within the range of several townships of the proposed disposal well?

A. Yes. There is evidence that it's produced both very high-quality water, which, in some cases, could be drinking-water quality in the Capitan Reef, as well as some that's been degraded somewhat.

Q. Can you tell us where that would be?

A. As you get closer to the reef or reef edge, by the pipeline on Dr. Hiss' map, the water quality near there sometimes becomes higher TDS. And when you move further to the east of this location, it looks like there are more and more waters that have higher total dissolved solids in the -- in the Seven Rivers, Yates and Tansill. And what that demonstrates is that the fresh water, which came from the south in this area in the Glass Mountains, flushed through the Capitan Reef into the back reef zone layers and then on further to the north. So it's -- a major portion of this has been flushed, but there are areas that may have been bypassed. And so you'd have low-quality water and high-quality water.

Q. Because it got flushed by --

A. By nature.

Q. -- by reef -- by recharge water --

A. By recharge water.

Q. -- which would be fresh?

A. Yes. And the only way that a drinking-water

quality water analysis could be there is if it was a residue of that original flushing of the Capitan rocks.

Q. And the flushed water -- the areas that would be flushed would be where the good water was, and the areas that had been bypassed would be where the low-quality waters would be?

A. More than likely, that's what it is.

Q. I always get mixed up on this, because high TDS is low quality and low TDS is high quality.

A. High TDS is low quality. In reference to drinking water, you wouldn't want to touch it.

Q. Okay. Based on your examination of the data in this area and your knowledge of the reef and the Yates-Seven Rivers in general, do you have an opinion as to whether injection that has taken place has been a factor in causing the deterioration of groundwater from the higher qualities to the lower qualities in this area?

A. Yes. I do believe that happened, especially in and around the vicinity of well 09792.

Q. 0979 -- 792, you said?

A. Yeah. I labeled it "SWD WIW."

Q. And where is that?

A. It's about a mile and a half to the northwest of the Bobcat No. 1 location. It's a white label.

Q. Okay. 09792.

A. Yes.

Q. And that's in Section 24 of 25 South, 36 East?

A. That's correct.

Q. Okay. I believe that's all I have right now. Thank you, Mr. Holm. I'm sure there is a lot more to be understood from your analysis, but I may not be smart enough to understand it. So thank you.

EXAMINER JONES: Mr. Newell, you weren't here for the particulars of the testimony, but do you have any general questions?

MR. NEWELL: I have just a couple.

EXAMINER JONES: Okay.

CROSS-EXAMINATION

BY MR. NEWELL:

Q. Looking at the same exhibit you're looking at now --

A. Exhibit Number 2?

Q. Yes, sir. Yes, sir.

-- I noticed that in the wells -- or in the locations where there are multiple readings, there is a great deal of variability.

A. Yes. That's variability probably over time, is what it appears.

Q. Sure.

And does that suggest there is an influence of something in whatever aquifers are being measured, whether it was the Capitan Reef or the Seven Rivers or Yates? There is some kind of influence that's causing that variability?

A. That's correct. It's probably something that man did.

Q. And then my only other question is -- I was looking at something during the break, and it looked like Shomaker & Associates had done some analysis of the Capitan Reef in connection with its use as a freshwater source in West Texas, and they had a comment. And I would just like you to -- I'd like to get your impressions on this comment. "It was found that previous work by Hiss and Standen and others did not include the Tessy Limestone when defining the extent of the aquifer...." And the aquifer they're referring to is the Capitan Reef Complex, which they've identified as CRCX. Did not identify -- "did not include the Tessy Limestone when defining the extent of the aquifer even though it's recognized as part of the CRCX Aquifer System."

Are there any Tessy Limestone formations associated with the Capitan Reef in the area in and around Jal that you're aware of?

MR. MOELLENBERG: I do object to the question based on the lack of any source for the quote or -- I mean, we have no idea where that's coming from, whether it has any validity.

MR. NEWELL: Okay. Well, let me just ask -- let me rephrase the question.

Q. (BY MR. NEWELL) Are there any Tessy Limestone formations associated with the Capitan Reef Complex Aquifer in this area that you study?

A. Not directly in this immediate vicinity. The Tessy has been referred to in the -- near the Glass Mountains, and it looks to be roughly equivalent to what would be the Goat Seep in the Guadalupe Mountains.

Q. Is that the source of the recharge, then, if it's coming to the south?

A. It would contribute to the recharge. Yes.

MR. NEWELL: I pass the witness.

EXAMINER JONES: Redirect? Oh, no, wait. We've got Mr. Moellenberg.

CROSS-EXAMINATION

BY MR. MOELLENBERG:

Q. Good morning, Mr. Holm.

A. Good morning.

Q. So I want to go over and make sure I'm clear on some of the sources of this information. So turning to

State Land Office Exhibit 1, there are a number of labels on this one, but I believe you indicated it is from the 1975 Hiss report; is that right?

A. That's correct. That's a copy that I purchased directly from the Bureau of Mines and Mineral Resources.

Q. But when we go to Exhibit 2 -- you've referenced it a number of places in your testimony. I think you talked about protectable groundwater, and in other places, I think you might have said protectable groundwater of the U.S. So, first of all, what is the source of your term "protectable groundwater?"

A. There are two sources. One is the New Mexico state law, I believe, passed in 1972 that said the state will protect its groundwater to 10,000 TDS or less. Subsequent to that, in the same year, the US EPA issued one for the entire United States and used the same number, 10,000 TDS.

Q. Okay. So that 1972 reference, are you thinking that's a statute passed by the legislature or perhaps a rule, or do you know?

A. I believe that's a state law passed by the legislature. Whereas, the EPA is a rule.

Q. The EPA would be a rule.

So those two sources, in your speaking to the Examiners here, that's where you're coming from when

you're talking about the term "protectable groundwater"?

A. That's correct.

Q. And I think you've also used the phrase "protectable groundwater of the U.S." Is there a distinction there that you're trying to draw or --

A. No. I'm in the habit of -- I spent a lot of time in Texas, and so I'm in the habit of saying "the U.S." because that's the rule that everybody follows in the oilfield. When I got to New Mexico, I found out about the state law, so now I refer to both.

Q. Okay. So just so your testimony is clear, when you said protectable groundwater of the U.S., were you trying to distinguish between the EPA rule that we've talked about and the state law, or were you really trying to make any distinction there?

A. No, other than to say that they're -- basically, they're the same number.

Q. Okay. So turning to your Exhibit 2, if I recall your testimony correctly -- and please correct me if I'm wrong -- I think you said there are two sources of data that you used for this. One was from Hiss, right?

A. Yes. Some of this data is actually on Hiss' map.

Q. Okay. And then the other data, I believe you

said, was from an OCD Web site or something of that sort?

A. Yes.

Q. Could you be a little more precise about what you mean?

A. Yes. I ran an online query to find out what water qualities were available in these fields within New Mexico, and I got a spreadsheet that covers the entire state, primarily in the southeast.

Q. Okay. And do you know what database you ran your query on?

A. Specifically one within the OCD.

Q. Okay. Do you know if it's a query called "Produced Water Data Search"?

A. It likely is.

MS. MOSS: If you know. Answer if you know.

MR. MOELLENBERG: Can I approach, and I'll hand these out?

EXAMINER JONES: Sure.

Q. (BY MR. MOELLENBERG) Mr. Holm, I've placed in front of you what is labeled as OWL Exhibit 11. And can you tell me if you've seen this page before, or are you familiar with it?

A. I'm familiar with some of the information at

GO-TECH. I normally don't go directly there, but a lot of the staff does.

Q. Okay. Do you -- you know, there are a number of things on here. But is this the database that you searched -- the database that this page would be in the front that you searched to come up with your data for Exhibit Number 2?

A. I'm not sure whether this is the exact database or not, but it probably was.

Q. Okay. Do you know if there is another database that might be accessible for this kind of data on the OCD system?

A. There may well be, which I believe it may or may not give you all that information.

Q. Okay. But you're not clear for sure, or you're not sure if you --

A. I asked for a query to be run on the data, and that's the spreadsheet that I got back.

Q. Okay. Did somebody else run the query?

A. Yes. It was one of my -- one of the geologists there at the State Land Office.

Q. Okay. And so you asked him to run a query. And did he identify to you the specific database that your data came from?

A. As I understand it, he said OCD.

Q. OCD.

A. But that was verbal.

Q. Okay. And what I have in front of you as Exhibit 11, that's also a database within the OCD system; is that right?

A. I believe it's connected to it. Yes.

Q. Okay. Under this heading, kind of the upper middle of the page, under "Produced Water Data Search," could you read that paragraph for me?

A. "Data in the New Mexico Produced Water Quality Database...was updated in 2016 for the first time in many years. Data should be used for general information purposes only. The uncertainties in the data collection procedures, analysis quality and specific sample sources make it unsuitable as a basis for any significant business or policy decision. Data was gathered from many sources and about 5,400 distinct wells in New Mexico are presented. More data exists for most samples than is provided by the results screen; the downloadable spreadsheet contains more information including field, formation, sample source (where available), and latitude/longitude."

MS. MOSS: I'm going to object to any more questioning along this line because we can get you a witness and bring them in who went to the sources that

were given to this witness. And that would be the best way for you to ask these questions, which I don't object at all. But this witness has already said that he doesn't even know for sure whether this was used.

MR. MOELLENBERG: And, again, the issue here is there seems to be uncertainty about exactly what database was used. I think the witness has said he probably used this database --

MS. MOSS: Yeah.

MR. MOELLENBERG: -- but he doesn't know. And if he used this database, you know, it sounds, from the description that we've just read, like there are some uncertainties here regarding the source of the data and what it represents.

MS. MOSS: I think you're more than entitled to have this information, and I think it's been absolutely clear that this is not the witness to give that information.

EXAMINER WADE: Well, I think he testified that he thinks this is where the information came from, and the Hearing Examiners can weigh the sufficiency of the evidence.

MS. MOSS: But we would still need the other witness to come in in any case.

EXAMINER WADE: I don't think so.

Go ahead.

MR. MOELLENBERG: Fair enough.

Q. (BY MR. MOELLENBERG) So, Mr. Holm --

MR. MOELLENBERG: Yeah. I would like to move to admit Exhibit 11.

EXAMINER JONES: No objection?

MS. MOSS: I don't have an objection.

MR. BROOKS: No objection.

MR. NEWELL: I didn't get a copy, so --

MR. MOELLENBERG: Oh, I apologize.

MR. NEWELL: -- so I haven't had an opportunity to review the exhibit.

I don't know that it's been identified by anybody -- I mean, has it been authenticated? I mean, I have no objection. But I don't know that there's been sufficient authentication, certainly not established through this witness who says he doesn't even know about the source of the information or that he's ever even looked at this particular Web page. So that would be my -- the basis for my objection. There is no authentication of this Web page subject sufficient to allow this in.

EXAMINER WADE: So you are objecting?

MR. NEWELL: I will object, yeah.

EXAMINER WADE: Mr. Holm, you did testify

that you think this is basically a source of the information that you used; is that correct?

THE WITNESS: I believe it's probably at least linked to the same thing I did or had done for me, so I think we're probably working off the same information. It's a probability.

EXAMINER WADE: I think that's enough information to allow the exhibit in.

EXAMINER JONES: Exhibit 11 is entered now.

(OWL SWD Operating, LLC Exhibit Number 11 is offered and admitted into evidence.)

Q. (BY MR. MOELLENBERG) So, Mr. Holm, turning back to your Exhibit 2 -- and, again, we've talked about some of the sources of the data on this exhibit being from Hiss and some being from a -- a printout of the database that was apparently provided to you. Is there anything we can use on Exhibit 2 to identify which of this information is from Hiss?

A. I did not separately identify that.

Q. Okay.

A. I did provide the map that Mr. Hiss has his well spots on that.

Q. Right.

So someone could compare the two, perhaps, and identify --

A. I believe so.

Q. But certainly some of -- some of this data comes from this other -- this other printout. And to try to sort this out, is all of the data from your other printout of the database is what's listed on Exhibit 2A, or is this something else?

A. Exhibit Number 2A is all the data that's shown on this map and its sources or the spreadsheet or the online query, plus one other data point where it specified the reef.

Q. Okay. And I would note, down at the bottom of this list, it does say, "OCD Online query for Produced Water Quality in SENM." Do you see that?"

A. That's correct.

Q. Could that perhaps be another indication that this data comes from the produced-water database that we were talking about with respect to Exhibit 11?

MR. NEWELL: Objection. Calls for speculation. He even used the word "perhaps" in his question.

MR. BROOKS: The current objection of the witness -- I would not have an objection to the witness answering if he knows, but if he doesn't know, he should not speculate.

EXAMINER WADE: Mr. Holm, do you know the

answer?

THE WITNESS: Would you restate your question, please?

Q. (BY MR. MOELLENBERG) Yeah. So let me go back to --

MR. MOELLENBERG: Actually, let me ask the court reporter to read it back, if you would.

(The court reporter read back the question on page 59, lines 15 through 17.)

THE WITNESS: There is a possibility they are connected.

Q. (BY MR. MOELLENBERG) Now, also on your Exhibit 2A, just below the line I just read, do you see a statement that says, "Water Sample Analyses submitted to OCD in C-108 SWD Applications"?

A. Yes.

Q. Are you familiar with C-108 SWD applications?

A. Yes, sir.

Q. And are those normally applications to drill a well?

A. They're normally applications to either drill a new well or saltwater disposal purposes or to recomplete an existing well.

Q. Okay. So if the data -- so just to come back to that, so some of these applications would be for a

proposed new well for saltwater disposal? I think that's what you said, right?

A. Yes. Some of them are.

Q. And if that is the case and the application is submitted before the well is drilled, would it be reasonable to assume that the water-quality data did not come from that particular well, but came from some other location?

MR. NEWELL: Objection. Calls for speculation.

MR. BROOKS: Yes. I concur on that objection.

EXAMINER WADE: Well, I think, again, do you know the answer to that question?

THE WITNESS: I know that the standard procedure for a C-108 application, the OCD requires produced-water information about the water that you plan to inject into the well, as well as offsetting freshwater wells, their water quality, so that they know the quality and the ion makeup of all the waters involved. And that's what -- typically, this particular page has been included in many SWD applications.

Q. (BY MR. MOELLENBERG) So I think what you just told us is that -- and this would be consistent with my understanding, that a C-108 application has a

requirement to provide some water-quality data, right?

A. That's correct.

Q. But if the application is for a well that hasn't been drilled yet, that water-quality data would necessarily have to come from somewhere else, right?

A. That's correct.

Q. So given that you've testified that some of these data locations are for wells that apparently have not been drilled at the time that the C-108 had been submitted with the water-quality data, some of this data could be from wells other than the ones that you've identified on Exhibit Number 2; is that correct?

MR. NEWELL: Objection. Calls for speculation. Unless he has the basic knowledge to have this information that some third party filled out, I don't know how he can answer that. They could have made it up out of whole cloth. I mean, anything is possible.

EXAMINER WADE: This is going to the veracity of the information he used, so I'll allow the question.

Go ahead.

MS. MOSS: I know it's a little informal, but if I can call a rebuttal witness for this, then I don't really care what he asks because I can get in what actually happened --

MR. NEWELL: Right.

MS. MOSS: -- if that's what we need. I mean, he can answer the question whether something is possible through dinner.

EXAMINER WADE: The Examiners can weigh the sufficiency of that answer.

EXAMINER JONES: I think it is important. I would like to know where all this data came from. And I'm ready to break for lunch.

MS. MOSS: Okay. Rather than speculating, it makes so much sense to me. Maybe I'm on a different line here.

EXAMINER WADE: Yeah. I'm not having a different witness to answer that particular question.

MS. MOSS: No. It's the whole line that needs to be addressed by the person that brought him the information, and that person can come in quick, fast and accurate.

MR. MOELLENBERG: So if we can get an answer to this question, which I think you've allowed, and then I probably have one more before we break for lunch.

EXAMINER WADE: As far as this line of questioning, is that going to be your last question?

MR. MOELLENBERG: Yeah, I believe so.

MS. MOSS: Then I don't need -- if that's your last question on this line.

MR. MOELLENBERG: I have one more other than the one that's pending.

MS. MOSS: And then you'll have one more and one more after he answers.

EXAMINER WADE: The Hearing Examiners understand what the issue is that's trying to be drawn out. They can weigh the sufficiency of that evidence. So let's go ahead and ask two more questions and then break for lunch.

EXAMINER JONES: Yes.

MR. MOELLENBERG: So can the court reporter re-read the question that I asked that we were just discussing the objections to?

(The court reporter read the last question.)

THE WITNESS: My answer is the data that's presented on Exhibit Number 2 is site-specific to specific wells by API number on the summary sheet and on the spreadsheet, and they came from the Jalmat Oilfield from either production in the Tansill-Yates or Seven Rivers or a combination thereof or the Scarborough Field completed in the Yates-Seven Rivers Formation or a combination of those two wells. So that's -- we're very

limited because each one is a separate data point, separate location, and the timing of it is irrelevant to the Bobcat No. 1 other than obviously they were drilled prior to the Bobcat No. 1.

When you go back to the sheet that shows the Scarborough-Seven Rivers-Yates-Reef analysis, that's one that's specific to the section, township, range as where it was taken, and this is dated -- quite frequently was on Dr. Hiss'. But I didn't examine each one of those to verify whether it was on Dr. Hiss' map or not. But it gives everybody a general idea of what is the water quality in various named formations that might be used to dispose into the proposed saltwater disposal well whether it's to be drilled or recompleted.

Q. (BY MR. MOELLENBERG) So, Mr. Holm, in preparing your Exhibit 2 -- and, again, I'm talking about the front page here -- did you simply transfer the data from the database that was printed out for you, or did you go back and check the original data source for that -- for that printout to verify that the water actually came from the well that you've labeled here?

A. I didn't do it on every well. I did not go back and check the individual well record. Some of them, I did, and I found no discrepancy based upon the information that I could download in the well file on

OCD's Web site.

Q. Can you identify which ones you went back and checked?

A. I don't recall which ones they were.

Q. Okay.

EXAMINER JONES: Okay. Let's break for lunch. Come back at 1:00.

(Recess, 11:33 a.m. to 1:03 p.m.)

EXAMINER JONES: Let's go back on the record this afternoon and continue with Mr. Moellenberg's questioning.

MR. MOELLENBERG: Thank you, Mr. Hearing Officer -- Examiner -- get my --

EXAMINER JONES: Whatever. I'm not taking any offense, believe me.

(Laughter.)

Q. (BY MR. MOELLENBERG) Mr. Holm, I have a couple of additional questions on your Exhibit 2, and I'm looking at the legend in particular on the right-hand side. And there are some teardrop-shaped symbols there on the right-hand side that appear to depict certain types of the water wells. Do you see those?

A. Yes, they are.

Q. And I see just a few of those on this map. Does this map give any indication of the depth of those

wells or the formations that they're withdrawing water from?

A. No, it does not. But this is something that the Oil, Gas & Minerals Division is now responsible for, looking at both freshwater wells and saltwater wells, and so we've added that as part of our normal legends.

Q. Okay.

A. And they are platted according to the lat/long.

Q. Lat/long. But there is no indication whether they're in shallow aquifers or what particular formations they're withdrawing from?

A. Not that I've referenced, no.

Q. Okay. And I do see there is a little bit of a qualifying legend at the bottom of this exhibit as well. The State Land Office assumes no responsibility -- do you see that?

A. Yes. That's a standard paragraph that's on every one of these, required by the Commissioner.

Q. Right.

You may have talked about this earlier, but let me get a little clearer idea of what is meant to be depicted by this black-dashed line. Is that a feature of the Capitan Reef, or is that something else?

A. It's the back reef terminus of the Capitan Reef rocks that is permeable between the two -- the

formations in the white area, and those -- that are in the gray area, which is Capitan.

Q. Okay. So if I've understood correctly, the cross sections that have been presented by various witnesses, the Capitan Reef Formation isn't just a straight, vertical line. It actually sort of slopes, and I think it's from west to east, going from top to bottom, if that makes sense. Do you recall that, or do you understand what I'm saying?

A. Yes. The typical cross section shows a pinch-out of the Capitan Reef on both ends of the cross section that goes directly across the reef.

Q. Uh-huh.

A. That's typically how it's demonstrated.

Q. Okay.

A. And usually that's a geological picture of the change in the type of rock that's on one side or the other.

Q. Okay. And tell me if this doesn't make sense. But this dotted line, then, is that depicting an area toward the upper elevations of the Capitan Reef or the lower elevations of the Capitan Reef?

A. It was picked by numerous researchers, but Dr. Hiss started the first one that we're looking at. And that's generally about where the end of the reef is

depicted on the cross sections, plus or minus a little bit.

Q. Plus or minus a little bit.

A. Yeah.

Q. And, again, I'm trying to get this in a -- sort of lining up with the idea that there isn't just a straight, vertical up-and-down boundary in the Capitan Reef, and I'm trying to get a sense of whether this line may be -- is it toward the top, which I think would kind of slope -- would be sort of the easternmost boundary of the reef, as I understand it, towards the bottom -- actually, I've got that backwards.

A. I was just going to say that's in reverse.

Q. The top of the westernmost boundary or the westernmost point --

A. That's right, because the reef itself -- the Goat Seep is beneath the reef, but it's contiguous to it and probably -- probably doesn't exist. It started first building probably near this dashed line (indicating) and started building up, as you move up on the structure, to where there is no Yates, there is no Tansill, necessarily, at the western edge of the reef rock.

Q. Okay. I might ask some questions of my witnesses on that to see if they understand what that's

depicting, but that's that.

As to the Seven Rivers Formation in the area of the map that's shown on your Exhibit 2, would you agree that most of that formation is oil and gas producing?

A. The upper portions of it would be considered -- they are all oil and gas producers, but they also produce water, and that's because the oil and gas floats on top of the water.

Q. So they produce water, but let me ask you this. Is it produced water in connection with oil and gas production?

A. Yes.

Q. Okay. And similarly, the Yates Formation throughout the area of the map in Exhibit 2, is that an oil and gas producing formation?

A. That's correct.

Q. Okay.

A. It's all part of the Jalmat Field.

Q. Okay. Mr. Holm, that's all I have. Thank you very much.

A. Thank you.

EXAMINER WADE: Redirect?

EXAMINER JONES: Redirect? And don't forget your exhibits.

MS. MOSS: Forget my exhibits?
MR. BROOKS: I know she moved them. I don't remember --
EXAMINER JONES: Do you want to move them again?
MS. MOSS: I'll move them again. But could I ask a couple of questions?
EXAMINER JONES: Yes, just don't forget.
MS. MOSS: One has to do with these last few questions, and I'd like to clarify something, but I may be wrong.

REDIRECT EXAMINATION

BY MS. MOSS:

Q. If the question is about the vertical nature of your dotted line, isn't that shown in the bottom right-hand corner --

A. It's, again, shown on a --

Q. -- in red?

A. -- different scale, but the red is the outline of this map.

Q. Right. So the vertical --

A. It's not -- they're not related -- it's not related to geology. It's related to the surface.

Q. Well, isn't the reason why this appears vertical is because it's only a small portion of the

reef?

A. It's the projected-up-to-the-surface, about 3,000 feet up to the surface. It's eastern edge in this area of the Capitan Reef.

Q. Okay. Now, I just need to do a little rehabilitation.

During lunch, did you go to the State Land Office?

A. Yes, I did.

Q. And while you were at the State Land Office, did you speak with to Niranjan Khalsa?

A. Yes.

Q. And who is Niranjan?

A. Niranjan is a geologist. She's actually my supervisor. Let's see. Her formal title, I believe, is Petroleum Engineer Specialist Supervisor for the State Land Office.

Q. And through speaking to her, was your recollection refreshed such that you remembered that you created the data that you used in creating Exhibit Number 2?

A. Yes. And she showed me how I did it. I said, Oh, yeah, I remember that.

Q. Now, we actually have emails, if it were necessary, but --

A. That was, by the way, over a year ago that I got that information.

Q. I forget things from yesterday, so that is --

A. I feel pretty good that I remember where I got it.

Q. So did she point you to the "About GO-TECH" Web site?

A. Yes. OCD has a button on it that says "Go to GO-TECH."

Q. Yes.

A. And that's what I've been directed to do apparently, which I don't remember exact details. But then I asked, Well, how did I get from there?

Q. Okay.

A. The next step was I clicked on that, and then it came up with a page where you could select what you wanted to look, and it said, "Select water data, produced water data," if I remember correctly. And then I click that. Then it asks you where and what. Well, there's a series of things you can ask for. I believe that we -- the way I looked at is I queried all formations in southeast New Mexico.

Q. And on that site, does it tell you where the information comes from?

A. When I click on the -- and, again, this is

already in the GO-TECH site.

Q. Right.

A. I click on the next page, and it has a paragraph that tells you that all the oil and gas production data has been provided by OCD to GO-TECH.

Q. Okay. That's all. Thank you very much.

MS. MOSS: I don't think I have any other questions.

EXAMINER WADE: Do you want to go ahead and move your exhibits again?

MS. MOSS: Yes. So what I'd like to do is move to have Exhibits 1 through 5 -- through 4 and Exhibit 9 --

EXAMINER WADE: Entered?

MS. MOSS: -- entered.

EXAMINER WADE: And the notebook you'll give the court reporter, you'll remove the --

MS. MOSS: Yes.

EXAMINER WADE: So is there any objection to 1 through 4 and 9 being entered?

MR. BROOKS: No objection.

MR. MOELLENBERG: No objections.

MR. NEWELL: I don't think so.

EXAMINER JONES: Exhibits 1 through 4 and Exhibit 9 from State Land Office are admitted.

(NM State Land Office Exhibit Numbers 1 through 4 and 9 are offered and admitted into evidence.)

MS. MOSS: Thank you for reminding me.

EXAMINER JONES: Mr. Wade, do you have any questions?

EXAMINER WADE: I do not have any questions.

EXAMINER DAWSON: I do have a few questions.

CROSS-EXAMINATION

BY EXAMINER DAWSON:

Q. Good afternoon, Mr. Holm.

On the -- on your map, Exhibit Number 2 --

A. Yes, sir.

Q. -- where the proposed location saltwater disposal well is --

A. Yes, sir.

Q. -- do you feel if that well was moved over two miles east, maybe two-and-a-half -- two, two-and-a-half miles east of there, due east -- do you feel that there would be a possibility of -- disposal waters were injected into the well in that location two miles east, do you think they would have the ability to intersect the Capitan Reef?

A. Well, the data, all except for one -- there are three wells that are two-and-a-half to three miles to the east or north or southeast that would have water that is of lower water quality than that that's protected under the freshwater definition. So yes, you could.

Q. Even though it's beyond the boundary as depicted on the Hiss boundary there? Even though it's east of the dashed line?

A. The Hiss boundary would be going more up the section line. Let's see. If you're in Township 27 South, 37 East, if you went to Section --

Q. You mean 25? Sorry.

A. It would be the east side of Section 32, the north-south line in there. It's about in that area, is where the Hiss line is.

Q. Okay. You spoke about a fault that could be possibly west of the proposed location?

A. It appears to be north and west of the location in the same section.

Q. In Section 25?

A. That's correct.

Q. 25 South, 36 East?

A. Correct.

Q. And do you feel that maybe if produced water

entered that fault, that it could be a conduit to the Capitan Aquifer? It could maybe travel down that fault towards the Capitan Aquifer?

A. Yes. We don't know how far vertically extensive it is other than it crosses the Tansill, Yates and Seven Rivers Formations. We haven't looked any deeper than that. It may go all the way down to the base of the Capitan, which would make, I think, good sense, but I didn't examine any data to show that.

Q. Okay. In looking at your map on Exhibit 2, do you have the different colors for the lower, moderate, higher --

A. Yes, sir.

Q. -- saltwater injection and their different colors? Would you -- in looking at this map, it looks like -- just briefly looking at it, that the water quality south of the proposed well may be a little bit less TDS in chlorides than to the north of the proposed well?

A. That's correct. The ones with the highest chlorides are in pink, and they're all north and northeast from the proposed site.

Q. And so when you look at the triangles where the saltwater disposal wells are, you feel that maybe the higher chlorides and TDS are in association with those

produced -- the saltwater --

A. If it's the typical distribution of concentrations away from a point source and it declines geometrically, it's very high near the injection well and it's been injecting for a long time, it's displaced all of the formation water. But then as you get further and further away, you get more of a mix that goes down geometrically to background.

Q. Okay. You were talking about down there -- I don't remember what exhibit it was. You were talking about down in the Winkler County --

A. Winkler County? Yes.

Q. -- a depression down there where they had -- they had produced a lot of water from the Capitan?

A. Yes. On the 2009 report of the Texas Water Development Board, their water indicates that that's where the current low is now as compared to what it was before man started pumping large volumes from the Capitan.

Q. So say if Jal started pumping from the Capitan in that area, nearby the proposed saltwater well, would you -- would you feel that that could maybe create some kind of cone of depression, where there was produced water that was going through the Capitan Reef, that it would concentrate the neck on the depression?

A. Yes. It would move toward the better-quality wells that may be would be usable water in the future.

Q. Okay. That's all the questions I have. Thank you very much.

CROSS-EXAMINATION

BY EXAMINER JONES:

Q. Mr. Holm, what's your understanding of why the State Land Office made an entry in this case?

A. My understanding is that we would like to protect the environment and to protect the resources beneath the state lands. And these fluid resources, basically the aquifers like the Capitan, can move. Typically, they don't move very fast, but they can move in response to production and injection, and we don't want extremely poor quality water being -- migrating underneath state lands. And we are -- 770 feet south of the Bobcat No. 1 is where state lands exist.

Q. So is the State Land Office looking at the water as a resource for --

A. Yes. We have easements for both fresh water and saltwater, and we have several of them that we've issued relative to both mining companies and oil and gas companies for extraction of the brackish water of the Capitan Reef, which is not produced water. It's a brackish water that exists naturally.

Q. Is this water you're looking at as a resource from the Artesia Group or from the Capitan Reef or from the Capitan Aquifer or what?

A. The source of the flushing is the Capitan, but it extends all the way in the back reef, from the Yates down to the San Andres. In fact, the San Andres, the East Hobbs Unit, water has got 5,000 chlorides, and that's just before it goes into Texas.

Q. There was another reason mentioned in the Division's application for -- as a respondent [sic] in this case as a possible waste of the oil and gas in the Langlie Mattix and Jalmat Pools in this area. Does the State Land Office have a concern about that?

A. Yes, we do. We don't want any waste to occur on, especially on state trust minerals where we're the owner. But if you're taking the same water that is produced locally and injecting it, you're generally re-injecting the same quality water. But when you start drawing in formations from considerably further away, you have an entirely different spectrum of ions, especially various concentrations. It may be 10 to 100 times more concentrated than what is naturally in the Seven Rivers-Yates. So injecting there is recycling the same waters. So the resource itself is not degraded. When it's degraded is when you bring in exterior

saltwater stick [sic].

Q. Are you worried about a loss of -- loss of oil and gas saturation due to saltwater disposal wells set up instead of a pattern of waterflooding wells set up?

A. Yes, because it's not specifically designed to increase recovery. It's designed to get rid of water at low pressures.

Q. But you heard Mr. Kronkosky's testimony about the pressure in the -- in the reservoir here being so low that it would be really difficult to -- well, we're going to question him some more.

But on the potential for waterflooding -- you're a petroleum engineer, as well as a hydrologist.

A. Yes, sir.

Q. So you do have a concern that there might be some recoverable oil in this reservoir still?

A. Clearly, there still is because there's still -- when they put a well back on for test that's been shut in for a number of years, in some cases, it makes oil, as well as water. So there is still residual oil that is -- when you shut down a well that's had a cone of depression, then gradually that cone comes back up pressure-wise. But during that entire time, it's gathering more oil. If you start pumping again, it'll produce it. It may not last very long before it waters

out. And by watering out, that doesn't mean it stopped making oil. It means stopped making an economic amount of oil.

Q. Okay. Most of these lands out here appear to be leased. And the state lands -- there were notices sent to the lessees of the state minerals, and those people have not objected to this application. What do you think about that?

A. I think that this is mostly --

MS. MOSS: Object. Calls for speculation. It's beyond his capacity.

Go ahead.

Q. (BY EXAMINER JONES) Go ahead.

A. I think their interest is in the deeper formations. That's because they think that -- probably other recoverable reserves out here in excess of 50 percent have been recovered of what was originally in place. They would rather go down somewhere where they can start off with primary production and produce that first before they start spending money on any of these wells. Plus, these are oil wells -- old oil wells, and if you start to put in something like they have around Hobbs, where you've got CO2 injection, there are a lot of wells they'd have to re-plug. So there are a lot of dollars that are keeping the big companies away from

this.

Q. Right.

A. And the little guy is -- the smaller companies are generally not -- don't have the capital to invest in larger projects. But that's a generalization.

Q. Okay. Yeah. Obviously, we can't speculate as to why the oil companies did or did not make appearances in this case. Sometimes they're lurking in the back of the room, but --

(Laughter.)

A. She's shaking her head "no, she's not lurking."

Q. When this water swept -- this fresher water is swept, does it sweep certain ions through? In other words, does it end up with a higher ratio of chlorides to TDS than in waters that haven't been swept, or do you know? Have you looked at that?

A. Well, you have your waterflood naturally, but you're doing it with very fresh water. In Marathon -- or the Glass Mountains, it starts out as rainwater, so the TDS is probably less than 50. But as it goes through the formation, anything that's soluble will be picked up.

Q. Okay.

A. Most of the Capitan Reef, the soluble portion of it has been taken out by this groundwater. And

that's the reason, as you go north and east from Eunice out into Hobbs, the TDS tends to climb slightly. It's more and more mixing of formation water.

Q. Okay. Water that's produced from oil and gas operations, is that considered protectable water?

A. If the total dissolved solids are less than 10,000 milligram per liter, they are, whether it's got H2S or not.

Q. Okay. That's a legal question anyway.

A. Well, the H2S is just another --

Q. It would be nice if the attorneys could give me an answer to that.

MR. BROOKS: That will be covered.

EXAMINER JONES: Okay. Sounds good.

MR. BROOKS: I was going to ask that earlier in the proceeding.

Q. (BY EXAMINER JONES) I used to work with geologists that looked for hydrodynamic traps, especially up in Montana. So is this -- was this Langlie Mattix a hydrodynamic type trap, or was it a strat trap?

A. It very easily could be because I only saw -- I've seen -- and what was presented in this case -- one oil and gas contact and one oil-water contact, both of which they drew as a horizontal line generally going

east-west across the reef. What does it look like in the north-south, in the direction of flow north or south? You may see we've actually got a tilted water table, and that could and does occur. It definitely occurs in the Yates Formation between the McMillan -- Lake McMillan and Carlsbad, because that has got a tilted trap in there.

Q. Okay. So what we're looking at here, it seems to me we're looking at permitting a replacement well for an existing well. So --

A. Yeah. They're not very far apart.

Q. They're not very far apart.

A. Less than 100 feet.

Q. So is it true that the State Land Office -- we're going to talk about the existing well in another case. But it's hard to imagine both wells being so close together in operation. So, in effect, the State Land Office seems to be objecting to injection of the original well; is that correct?

A. I believe there is a high potential that we now have high TDS water beneath state land 700 feet or so to the south.

Q. Okay. You've been coached by your attorney here, so --

(Laughter.)

MS. MOSS: Either I didn't do my job or I did too much.

THE WITNESS: No. That's a fact.

Q. (BY EXAMINER JONES) Mr. Kronkosky and also Mr. Blandford has talked about the small likelihood of waters that are put back in here ever migrating into the reef, and they talked about the Lower Seven Rivers being a dolomite -- low-permeability dolomite. Do you agree with that?

A. Dolomites can be extremely high permeability or low, but they almost always are close to -- if you were to put a bucket of water on top of a dry piece of dolomite, it will go along the top until it finds a crack and goes down. And that's typically what happens here. So yes, there is communication. It may not be directly in that wellbore, but it may be nearby, especially if there is evidence of faults or fracture zones nearby.

Q. Okay. When I envision the Capitan Reef, I just envision a massive limestone that might have vugs or caverns going through it for porosity, but no porosity besides the caverns; is that correct? Or is it more of -- does it have some native porosity and permeability?

A. Well, you have both matrix porosity and

permeability in the reef, in coral reef in particular, and usually those are connected -- have interconnected pathways for the fluids to flow through it. And the rainwater then would come in there, and water is probably the best natural solvent in the world. If you put water on something for a long time, pretty soon it dissolves part of it. And that's what has happened here.

Q. Okay. But in the reef, is the ratio of vertical to horizontal permeability about one to one?

A. One to one -- seldom is it even ten to one.

Q. Okay. In the Artesia Group, what would be the ratio of vertical to horizontal permeability?

A. I've only looked at that in one area, and that was over near the reservoir I referred to northwest of Carlsbad, Lake McMillan. And in that, the high permeability was very high. And the OSE, when they did a study on it, they found the same thing I did, and they felt that it was clearly -- it was infiltrating at the end of, actually, the Lower Yates and showing up in the Capitan Reef. It just went right straight to it. So that's high permeability all the way from the bottom of the Yates to the top of Capitan.

Q. But isn't it true that you have to have a head difference to make migration happen? As a hydrologist,

you probably are more aware of that than most people, but --

A. Yeah. The head difference in that particular example was the water level of Lake Brantley and the water level above the Pecos River in Carlsbad. So it was slightly less than the topographic change. So it didn't take much head loss to get there. It was almost like going through the river, which doesn't take much head loss.

Q. Okay. But injection of 100,000 or more TDS waters into this Artesia Group, is that going to create enough head to mobilize waters back into the reef anytime soon, or would it in our lifetime, or would it 1,000 years from now or what?

A. It may be down the road. It may be very shortly. I don't believe there are any monitor wells in the Capitan right next to this well, the Sholes B No. 2, so we don't -- we don't know what the vertical permeability is at that site.

Q. So there is very little control for logs drilled through these -- this area to actually look at the porosity permeability; is that correct?

A. Yes. There is very little control.

Plus, quite frequently, the gamma ray neutron, as well as the porosity logs will show that you

have pretty much a low gamma ray count, and you also have in and out porosity streaks from vertically all the way to the base of the Capitan, starting up at the Tansill. Once you get below the Tansill, it really starts to change. And then into the -- into the Seven Rivers, it changes a little bit more, permeability. But below that, I don't think -- I didn't see -- on the one log I looked at that was nearby, I didn't see any real shale breaks, which is usually what I look for for permeability -- vertical permeability breaks. I didn't see any from the Seven Rivers down -- down to the base of the Capitan, and that well was drilled beyond the Capitan.

Q. And you looked for those through the gamma ray or the resistivity log or both?

A. On the shale, I'll normally look on the gamma ray first, and then I have to verify that with the porosity, because shales have very high porosity, very low permeability.

Q. Okay. Thank you very much.

EXAMINER DAWSON: I have another question for you.

RECROSS EXAMINATION

BY EXAMINER DAWSON:

Q. On that line, Mr. Holm, the well that you're

talking about that you reviewed, is that the one north of there, the Fulfer well? Is that the one that -- is that 30-025-09812?

A. Offhand, I don't remember exactly which one it was.

Q. Was that a Devonian well?

A. I want to say yes, it went down to the Devonian and tested. But I look at a lot of Devonian wells, so I don't remember for sure.

Q. So do you recall how far away that well was in your review?

A. I think it was within two miles.

Q. Within two miles.

When you were looking at that well log, could you pick the top of the Capitan on that well log?

A. You had a very hard time picking it. You had to correlate it to something where somebody else had picked it. If they've picked it, then I'll rely on that because he's looked at, actually, the cuttings or at least should have. And they may have even cored it, but usually it's just the cutting. And the geologist on site, when they're drilling the well, he usually picks the tops.

Q. Do you recall in your observation of that well log as to an idea of the vertical separation between the

injection zone and the top of the Capitan, about how many feet that was?

A. It was around 300 feet.

Q. 300 feet.

So that would be pretty close to what you would expect in the proposed saltwater location, correct?

A. Yes. At that practitioner site of the various logs and data I looked at in this region, which is beyond two miles, I saw it could be as little as 107 feet from the top of the Seven Rivers Formation to the Capitan -- top of the Capitan to as much as nearly 400 feet. So that's the range that occurs in this area. But I didn't have site-specific information.

Q. Okay. And in your observation of the Hiss cross section versus the INTERA cross section, in your mind, which of those cross sections is more accurate, the Hiss or the INTERA?

A. I think they might even be the same one.

Q. Well, I'm talking about the -- I'm kind of referring to the peak of the Capitan. It looks like it's a little different on both cross sections.

A. Yes, but they still show a second peak to the east, as I recall.

Q. Uh-huh. That's the peak I was concerned about,

the one to the east.

A. Yeah. Both of them showed that. However, I'm not exactly sure which one's right or whether they're both wrong. And that's because when I look at the top of Capitan maps by Hiss and the top of Capitan maps by Daniel B. Stephens & Associates for the 2009 study, they don't agree. They say there is no hump. They say it's a gradual slope up. So I'm not sure.

Q. So the hump you're referring to, you think that's maybe an anticlinal feature in there? Is that why the oil and gas fields are there, in your mind?

A. It may be. I don't know the cause of it. I'd be speculating on it.

Q. Okay. And do you think that -- that hump or anticline or whatever it is, do you think that might be -- the Capitan may be higher due to that hump?

MS. MOSS: Objection. Asked and answered.

THE WITNESS: Well, the thickness that I saw of the Tansill-Yates-Seven Rivers' picks was constant across the area. And usually when there is an existing hump, when it's deposited, you see something missing, and they start pinching out against it. This doesn't show that in the data that I've seen and presented here.

Q. (BY EXAMINER DAWSON) So you wouldn't anticipate

that that blip, hump, whatever you want to call it would be up into the proposed disposal zone?

A. It may get closer to the proposed disposal zone, but there would no vertical barrier to trap oil and gas underneath it. I'm not aware of any oil and gas in this area that's produced out of the top of the Capitan.

Q. Okay. That's all the questions I have. Thank you.

EXAMINER JONES: Anything else on this witness?

We've tortured him enough, so thank you very much.

Is that it for the State Land Office's case?

MS. MOSS: Yes, it is.

EXAMINER JONES: As far as closing or arguments -- oh, you want to do rebuttal witnesses. Let's do that.

MR. BROOKS: Mr. Examiner, in light of some things that came up during Mr. Holm's testimony, we also would want to have -- we also want to put on a rebuttal witness.

EXAMINER JONES: Okay. We will start with the Applicant's rebuttal witness. And let's have a

five-minute break.

(Recess, 1:42 p.m. to 1:54 p.m.)

MR. MOELLENBERG: OWL calls Mr. Neil Blandford as a rebuttal expert -- or a rebuttal witness with respect to the testimony presented by Mr. Goetze and then Mr. Holm.

THOMAS NEIL BLANDFORD,

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

DIRECT EXAMINATION

BY MR. MOELLENBERG:

Q. Mr. Blandford, you previously testified and have been sworn in this case; is that right?

A. Yes.

Q. Okay. Do you have a set of the Division's exhibits in this case available to you there?

A. Yes, I do.

Q. Would you turn to OCD or the Division's Exhibit Number 3? During Mr. Goetze's testimony, I believe he used some of the information in these exhibits to describe his view of the geology in the area and contrasted that a little bit with some of his conclusions based on that information with the information presented in your model. Do you recall that?

A. Yes.

Q. And I think that his testimony was that despite what's presented in your model, there is a degree of flexibility to interpret the geology and that there still could be migration of injected fluids to the north. Do you recall that?

A. That's what I understood. Yes.

Q. Okay. And do you have a response to that?

A. My only response to that is to evaluate issues like that is why we constructed the model in the first place. And I can have an opinion based on what I see in the figures on what might happen, and, you know, Mr. Goetze can do the same thing and have his opinion. But that's why we did the model, to try to quantify some of those potential processes, taking into account the concerns that he raised, which was the slope on top of the Capitan and the density of the injected fluid and how it relates with that slope.

Q. Moving to Division Exhibit 4, that exhibit presents a few graphs that I believe are intended to depict rises in water levels in the Capitan Reef Aquifer. Is that your understanding?

A. Yes.

Q. Did you consider this data in your evaluations and analysis?

A. We did. And specifically in the modeling that we did, the graph on the right is -- lower right, there is a hydrograph, water levels through time for the Southwest Jal USGS monitor well, and the current water level, there is about 2,610. If you look on the upper inset figure, it gives you the elevations as opposed to just the depth of water. And that's where we came up with our Capitan Reef hydraulic heads that we used in one simulation.

The other simulation we used the historical low from the mid-'70s, which is about 2,109, I think is what I computed, about 500 feet lower, and we did a sensitivity run with that. The idea is, in the future, if the production from the Capitan increases, as it probably will because there are a lot of permits out there for industrial use, what would happen if that head was reduced.

So that's where I got the two values for the Capitan hydraulic heads that we applied.

Q. Is there anything else that you would like to comment on with respect to the Division's Exhibit 4?

A. The one other thing that I would comment on is these graphs -- you know, on all the monitor wells out here, but these two in particular, if you look at the starting date, it's from the late 1960s. That's when

the wells were converted to monitor wells by the USGS.

But the starting hydraulic head, water levels in these wells prior to pumping of the Capitan Reef for oil and gas waterfloods and things like that, would have been much higher than it is today. So if you project out the starting head back to the 1930s or '40s or whatever, that head would be much higher than what we're observing today. So these graphs make it look like there's been recharge above an early water level, but, in reality, you've only come back up maybe half of the drawdown that occurred because of the way the graphs are when the data started. And so I think that's important to point out.

And the major point being, in my view, is that this recovery in water levels that we're seeing can occur just because pumping in the Capitan Reef Aquifer stopped in the mid-'70s and that cone of depression that was formed is going to fill in, and as it fills in, water levels rise. And I think that's what we're seeing in these graphs.

Q. I'd like you now to move to Division Exhibit 12. And my understanding is that this exhibit is a portion of the thesis by Mr. Hiss. Is that your understanding?

A. I believe so. I'm still getting there.

Yes. That's correct.

Q. And do you have any particular responses to some of the -- particularly some of the boxed information that Mr. Goetze highlighted, or would you like to present that through a slightly different exhibit?

A. I have an exhibit that I highlighted of the same pages regarding the Hendrick Field. And, you know, Mr. Goetze pointed to the Hendrick Field as an example of where the Artesia Group units are well connected with the Capitan Aquifer and in Texas below the state line, and I don't disagree with that. I call that out in my own report on page 8. And it was very well established. There is good connection in that area. But that's a very different type area than what we're dealing with at Jal. Hiss discusses this in great detail.

Q. So, Mr. Blandford, I'm going to show you what's been marked as OWL Exhibit 12.

A. Yes. And so the first page here, Hiss talks about the large amount of produced water.

Q. Just before we start that, is that -- is this exhibit also a part of Mr. -- or probably Dr. Hiss' thesis?

A. It is.

Q. And is it a portion of the same thing that is

Division Exhibit 12, or is it something different?

A. It's a portion of the same thing. You can tell by the page numbers and everything else.

Q. Okay. Very good. Go ahead.

A. So all I want to point out is with regard to the Hendrick Field, with the oil production, there was a very large amount of water production as well. And that's the way it's been historically. So the last sentence on page 330, they're getting to -- you know, 99 percent of the fluid produced was water and 1 percent was oil, and they had very high ratios of water to oil. So in this field, the Capitan Aquifer is well connected with the Artesia Group, and to pump the hydrocarbons, you are essentially pumping Artesia Group water that is well connected to Capitan Reef water. We have no dispute about that.

But what I want to point out is that's not been the history in the Jalmat Field. The water production in the Jalmat Field has been very low, as testified to by Mr. Kronkosky. So it's different around Jal than it is in the Hendrick Field.

Q. In his discussion regarding Exhibit 12, do you recall Mr. Goetze presenting some of his views regarding the possibility of local communication between the Seven Rivers Formation and the Capitan Reef Aquifer?

A. Yes.

Q. Okay. Have you prepared an exhibit to help with your response to Mr. Goetze's testimony in that regard?

A. Yes, I have.

Q. I'm talking about this one (indicating).

A. Yes.

Q. Okay. Hold on. Let's get those marked.

And while we're getting these handed out, can you also identify another paper by Mr. Hiss that might be of use in your response to Mr. Goetze's testimony?

A. Yes. There's a Hiss 1980 publication that we also have copies of.

Q. So the first exhibit I've just handed out, which has been marked as Exhibit 13, would you describe that exhibit?

A. So this is a cross section that I presented in my direct testimony, but I've added a cross-section location with some -- with nearby well locations that we've been discussing on the bottom: The Maralo Sholes well, the monitor well location for the Southwest Jal Unit 1, and the EOG Resources well. And I've kind of drawn interpolations of those onto Section D, D prime.

And the second thing I've added is the

hydrograph, the observed water levels at the Southwest Jal monitoring well that we were just discussing.

Q. So I take it that you have prepared this exhibit yourself?

A. Yes.

Q. So would you tell the Examiners how this exhibit helps you respond to Mr. Goetze's testimony?

A. So with regard to communication potential -- hydraulic communication between the Capitan Reef and the Artesia Group, I draw your attention -- we have the Maralo Sholes B No. 2 well on the right with the injection interval shown. That's a very small green dash there right around sea level in the Artesia Group as we know. As we move to the left or the west, we get to the Southwest Jal Unit No. 1, and the green lines at the bottom of that well is the perforated interval of that observation well, so clearly in the Capitan Reef.

And then what I'm trying to illustrate, by going to the hydrograph on the upper left, is that even back in the '70s, when the Capitan Reef water level was at its lowest, we had, you know, well over 2,000 feet of hydraulic head in the Capitan Reef Aquifer, and at the injection interval, as we know from the Maralo Sholes, we have very low water levels. So the Artesia Group is encompassed, as we know, on the bottom by the Capitan

Reef Complex laterally to the west, and it's confined on the top by the -- by the Salado Formation. And so all around this volume of Artesia Group, we have more than 2,000 feet of hydraulic head, which, over a period of the 50, 60 years, has not found its way into the injection interval.

You can view this as a very long-term, large-scale injection test, if you want to, with the injection pressure being the greater-than-2,000 feet of Capitan Reef Aquifer head, and we're not seeing a response in the Maralo Sholes B No. 2. And not only that, for the -- the head hasn't -- in the Capitan Reef, has not been constant. As you can see from the hydrograph on the upper left, it's been going up a total of near 500 feet since the mid-1970s. And even with the head increasing through time, we're still not seeing a response in the injection interval of, you know, where the Bobcat well would go.

So it's hard to imagine more clear data indicating the lack of hydraulic connection. If there were faults or facies changes or unplugged boreholes, anything that's going to allow the seepage of water, it's going to come in with 2,000-plus feet of hydraulic head difference.

Q. And if you could turn to the paper that has

been marked as Exhibit 15, and, again, could you tell us who is the author of this paper?

A. This also is Dr. William Hiss.

Q. And it looks like this is a published paper. Can you tell any more about the state of this publication or -- well, I guess I'll just ask you. Is this the kind of paper that experts in your profession would rely on in evaluating these types of cases?

A. Yes. It comes from the New Mexico Geological Society guide book, the Thirty-First Field Conference. These are peer-reviewed publications.

Q. Okay. And would you tell the Examiners how this paper would be helpful in evaluating the potential for communication between the Capitan Reef Aquifer and the injection interval for the proposed well?

A. Okay. I'm not going to go through all the detail of this paper. Of course, it talks about the predevelopment and post-development hydraulic head in the Capitan Reef Aquifer. But the one figure I'd like to draw your attention to is on page 292. It's Figure A3 of this publication. And in this figure is Dr. Hiss' map, if you will, of post-development hydraulic head in the Capitan Reef Aquifer. And there are several industrial well fields along the section of aquifer that we've been discussing. The largest one is south of the

border in Texas. And you might see this big contour that loops around in a half circle that has 2400. That's kind of the center of maximum pumping during the '60s and the '70s.

But what I'd like to draw your attention to is there is a note that's kind of written top to bottom and it's centered around Jal. It's off to the side. And it parallels the New Mexico-Texas state line. And what the note says is, "The potential [sic] metric surface is extremely low over oilfields on the Central Basin Platform wherever the hydraulic communication of the oil reservoir with the Capitan Aquifer is poor."

And this is exactly what we're seeing in the Jal area. We see an extremely low potential metric surface near sea level when the hydraulic head in the Capitan aquifer is about 2,500 feet or 2,450 feet at this period of time near Jal. So this is another line of evidence in addition to what we've observed at the Maralo Sholes well with regards to fluid levels of what the conceptual model, if you will, around the Jal, extremely low hydraulic head. So those oil-depleted oil and gas fields and the connectivity between the Artesia Group and the Capitan Aquifer, as Mr. Hiss said, are poor, and I would say extremely poor or extremely small.

Q. Mr. Blandford, do you have any other comments

that relate to Mr. Goetze's testimony regarding the Division Exhibit Number 12?

A. I don't believe -- that was the one with the hydrographs, right?

Q. That was the Hiss paper.

A. The Hiss paper. No.

There was also some brief discussion by Hiss about the Artesia Group and the Capitan north of Jal. He really doesn't provide -- Dr. Hiss doesn't provide the data for that, so it's hard to evaluate, but it could be there's more connectivity up there. Either way, going north, you have miles to the north. Going south, you're miles to the south. And we have the picture that we do around Jal that I've been demonstrating with the extreme differences in hydraulic head.

Q. So, Mr. Blandford, I'd like you now to turn to Division Exhibit 13. And I take it you were here for Mr. Goetze's testimony regarding Exhibit 13?

A. Yes.

Q. And what's your understanding of what this exhibit is intended to depict?

A. Mr. Goetze took some outlines of our -- for our model scenario one, the simulated extent of injected water at 20 years, at two different concentration

intervals and represented that with the yellow and the white line on this figure.

Q. Okay. Have you prepared an exhibit to respond to Division Exhibit 13?

A. Yes, I did.

Q. And I believe it's been marked as Exhibit 15. Do you have that in front of you?

A. Yes.

Q. Did you prepare this exhibit?

A. I did.

Q. And would you describe it for us, please?

A. This exhibit is designed to show the same thing that Mr. Goetze showed, except for our second model run. So there's the Bobcat well location in the middle, the green triangle one-half-mile area of review. And then the purplish line outside of that is the extent of simulated migration of injection water at 20 years.

For our second scenario -- and that was the scenario where we did not apply the higher Capitan Aquifer hydraulic heads. And so this actually probably is a little bit -- it probably is a better representation of what you would expect in the first run, because in our first scenario that Mr. Goetze used, the head is increasing because of inflow from the Capitan Reef Aquifer. And we know that's not happening.

So the reason you get movement off to the west and the north is because of the influx of Capitan Reef water, which is not occurring in reality.

So if you're going to look at where might you expect the effects to be, I think the second scenario is probably a better scenario to look at the injection zone. It's probably closer to what would happen in reality for that injection zone.

Q. Just so we explain this a little bit further -- and I think it's on the legend -- the green circle is the half-mile radius from the well that's the area of review?

A. That's correct.

Q. And the purple line, then, depicts the simulated prediction of the extent of influence on TDS concentrations of the injected fluids; is that right?

A. Yes, in model layer two, which is the injection zone. So you have the greatest extent in model layer two.

Q. Is there any other aspect of either Division Exhibit 13 or OWL Exhibit 15 that you'd like to discuss with the Examiners?

A. No.

Q. Do you recall during Mr. Goetze's testimony a question and answer relating to rising water levels in

the Capitan Reef in the vicinity of the project and recharge?

A. Yes.

Q. Do you have a view regarding the extent of recharge to the Capitan Reef in the Jal area?

A. In the Jal area, there is no recharge to the Capitan Reef, in my opinion, other than the groundwater within the Capitan Reef Aquifer itself flowing inward. And so there is no source of recharge from above or the sides in the Jal area.

Q. And with the head differential that you've talked about, would it be possible to get direct recharge coming into the Capitan Reef from the Jal area?

A. No. The flow would be out of the Capitan Reef Aquifer, not into it.

Q. I think there may have been a question somewhere along the line about the source of water that is used or proposed to be used in a lake or pond in the City of Jal. Do you recall that?

A. Yes, I do.

Q. Do you have an understanding of what the proposed source of water is?

A. The source of water for the lake on the southern end of Jal is Santa Rosa wells. There are two appropriations they've put in for. I talked about nine

wells that were new. There is an existing four or five wells that also had appropriations for the Santa Rosa Aquifer. I don't know if they've been drilled or not. I asked Mr. Newell, and he didn't know either. That was several years ago that they put those applications in.

Q. Okay. There's been a fair amount of discussion of -- I guess I would describe it as the thickness of the Artesia Group in the vicinity of the injection zone, or perhaps it's from the bottom of the injection zone to the top of Capitan Reef. Do you recall that?

A. Yes.

Q. Have you prepared a cross section to help describe your views on that topic?

A. I did not prepare a cross section, but I did a calculation. I was asked by the Hearing Examiners about that number. And I looked at the base of the injection interval at the Bobcat well, which would be the same as the Maralo Sholes, and to the top of the Capitan Reef, as we modeled it, it would be 450 feet. And if the contour that I discussed in Hiss were not changed, if you just took his map, it would be 275 feet. I think our value is closer to reality, as I've explained, but those would be the two numbers, 450 or 275.

Q. Is there any additional information you might consider collecting or trying to --

Well, let me ask first: Is your view of that based on your review of all of the existing available literature and information regarding that topic?

A. Yes.

There was one point nearby from, you know, our study which was the Standen, et al. study that I have in the figure. I posted it in the figure. And that was one of the sources of information I used to kind of take that high. I don't really think it's there. But I couldn't find anything right on that high point to look at a well log or anything like that. So as far as I, know there's nothing available.

Q. Given the information you have on the head differential, how much importance would you place on the variable of the views of what that thickness might be?

A. I mean, I think it's certainly something to look at, but as you already understand, I'm sure, I keep going back to the head differential 2,000-plus feet and no effect in the injection zone. And that head differential applies everywhere below the Artesia Group for miles. So we're not seeing it at the injection zone, at the Maralo Sholes, regardless of what the thickness is below that to Capitan. And if there were any feature a half mile away, a quarter mile, two miles,

water is not coming up through that feature in any significant amount. And so I really think that just the basic observed data is -- is extremely compelling, in my view, anyway.

Q. Have you heard any testimony in this case that would dispute or call into question the values you've talked about as to the head differential?

A. No. I don't think anybody's disputed that. We're using the same data in that regard.

Q. Okay. I'm going to hand you a booklet which has the State Land Office exhibits in it.

Well, before I go there, is there anything else from Mr. Goetze's testimony that you would comment on that we haven't already discussed?

A. No.

Q. Okay. So with respect to Mr. Holm's testimony and the State Land Office exhibits, would you first turn to State Land Office Exhibit 1? What's your understanding of what that exhibit is?

A. This is a reproduction of one of the Hiss -- William Hiss' publications.

Q. And had you seen this information prior to the hearing or in preparation for this hearing?

A. Yes.

Q. Had you considered that information as part of

your work this case?

A. Yes.

Q. Is there anything of particular note on this exhibit that relates to your work on this case?

A. No. I think I covered in detail my opinions on the Capitan Reef water quality in my direct testimony and exhibits.

Q. Okay. Let me then ask you to turn to State Land Office Exhibit 2, which is in evidence here. Have you previously seen this exhibit and some of the information in here in preparation for this hearing?

A. I certainly saw some of the information. I believe Mr. Kronkosky dealt with this in much more detail than I did.

Q. Okay. Is there anything in this exhibit that shows information that was of particular response to your work on this case?

A. Not other than I assumed water quality of about 20,000 TDS for the Artesia Group for the initial water that was there, and I think that's a reasonable number for our modeling.

Q. And was that based, at least in part, on Mr. Kronkosky's analysis of the water-quality data?

A. Yes, and his summaries of that data.

Q. Is there anything in this exhibit that gives

you pause about anything that you have presented yourself during this hearing?

A. No.

Q. So let me ask you to turn to State Land Office Exhibit 3.

A. Yes.

Q. And what is your understanding of this exhibit?

A. This is the report that I have referenced as Standen, et al., 2009. This is a regional study that my company completed for the Texas Water Development Board.

Q. Okay. So you, yourself, referenced this report and had reviewed it in connection with your work in this case?

A. Yes.

Q. Okay. Let me just ask you in general if there is anything in this report that, you know, you haven't considered in your work or that you would find as giving you pause regarding anything you've presented in this case?

A. No. There's not. When I was putting my model together, I did consider using what we had in this study, but when I looked in the Jal area at the contouring of the units, I believe that overall what Dr. Hiss had in his study was better in that particular area. And a lot of the -- you know, this was a regional

study, 22,000 square miles, and the contouring -- the way it was done, it was just automated contours using a geographic information system.

And when going from a regional study to either a subregional or a local study, some of those contours can change by a fair amount if you're looking at the interpretation of a geologist or a hydrogeologist.

And, for example, one of the things that Dr. Hiss had in his maps that do not show in the contouring here were these canyons that he talks about that lead to this steep slope at places and to the north of the Bobcat well on the top of Capitan Reef. And because that was of particular concern for the Division, I wanted to have that steep slope in the model as opposed to a more flattened slope, if I had used the information coming out of here (indicating). And so that's why -- that's why I used the Hiss work instead of this work.

In addition, I would note that the -- a lot of the emphasis in this study was on the portion of the Capitan Reef in Texas because it was for the Texas Water Development Board, and so more detail was put into the Texas portions of the reef than the portions of the reef in New Mexico.

Q. So, Mr. Blandford, would you turn to Figure 10 of this report? Do you recall Mr. Holm talking about some faulting as shown in this figure?

A. Yes, I do.

Q. So I don't know how much work or review you've done with faulting as it relates to this case or particularly locally, but -- so if you'd rather or if it makes more sense to have Mr. Kronkosky address it, just let me know. But do you have any response to Mr. Holm's testimony with respect to this exhibit, particularly about a suggestion that there might be faulting close to the Maralo Sholes B well?

A. I have not seen faulting in the Capitan Reef marked on geologic maps or cross sections in the vicinity of Jal that we're talking about. I know Mr. Kronkosky has some additional testimony possibly on deep faulting that he's aware of and, you know, below this whole section that we're discussing.

But, again -- and I know I'll be a broken record -- I go back to fault or no faults. If the faults are conduits for fluid flow, the water will flow with 2,000 feet of head difference, and we don't observe that. So if there are faults, they're not permeable. That would be my opinion.

Q. Okay. I take it you've described this report

as kind of a regional evaluation. Is that of particular interest to your work at a more localized level, or could you tell us how you might consider this kind of report in connection with the type of work you've done for this case?

A. Well, this type of report, I would do exactly what I did. If you're interested in a local area, you have to review what's in this type of study with what you know from the local data. And we've done that many times with other regional studies, you know, groundwater modeling studies, for example.

We've modeled the entire southern High Plains of Texas, 30,000 square miles. But when we follow up on that study and we want to help the City of Lubbock, for example, figure out their water resources, you see what that regional picture looks like at the local area, and you make the adjustments that you have to make to account for the local data. That's a very common procedure. We do it all the time. And more often than not, you will find differences, sometimes significant differences, at the local level that you don't pick up in a regional study.

Q. Would you turn to Figure 14 of this report and tell us if there's anything on this figure that you'd like to respond to Mr. Holm's testimony in any way other

than you already have?

A. The only thing I would mention on this figure, when I was comparing this cross section to what are listed as different formation intervals at the Bobcat well, it appeared that this cross section lines up pretty good. So that was another reason that I used the original Hiss information. And, again, on the prior exhibit that we handed out, this is the cross section that I have plotted the wells on with their -- with their open intervals, including the injection zone in rebuttal Exhibit Number 13. This is the same -- the exact same cross section unaltered.

Q. Okay. I think -- at least I have in my notes and it may be perhaps with this figure or another that Mr. Holm made a comment about the thickness of the Artesia Group in the vicinity of the Bobcat well and suggested that it might be within 100 to 300 feet of thickness. Is that your understanding of his testimony? And, if so, would you agree with that?

A. That is my understanding of his testimony. I would say I haven't seen any cross section or geologic data where you could derive a 100-foot separation. I think that's much too small.

You can look on this section here and look at the scale, and it looks like the separation from the

bottom of the injection zone to the reef would be, you know, maybe 400 feet, 500 feet. It could be measured out. And that's kind of in the range of the numbers that I've already mentioned that I calculated, 450 to 275.

Q. Anything else you'd like to comment on with respect to Figure 14?

A. No.

Q. Would you turn to Figure 16 of the report that you have in front of you?

A. Okay.

Q. Is there anything you see there or recall from Mr. Holm's testimony that you'd like to comment on?

A. No, other than -- I mean, this is -- as Mr. Holm's said, this is in the Glass Mountains south of Fort Stockton, so I don't really see that it has any relevance to our area.

Q. My notes may be off here, but I have an indication that Mr. Holm then went to Figure 12, and I think he was talking about something close to Carlsbad Caverns here. Does that make sense, based on this figure?

A. I don't see the connection. I might have missed it.

Q. Okay. Let's move to Figure 17. And if you

have that there, I have some references in my notes to Mr. Holm talking about the depth to the top of the Capitan Reef Aquifer being about 750 feet below sea level and such. Do you have any response to Mr. Holm's testimony regarding this figure?

A. Well, this is straight out of our report, and this is -- like I said, this was just contoured with a computer program based on data points. And it's missing -- particularly in some of these more detailed areas that Hiss mapped out, these canyon features and things like that, they're not replicated in this figure because the computer doesn't know that there is an interpretation of a canyon over there, for example. And so if these were drawn by hand, they would look closer to what Dr. Hiss had.

Q. Would you move to Figure 19? And is there anything you would recall about Mr. Holm's testimony on this figure or anything else of particular note from this figure as it relates to your prior testimony?

A. No. It's difficult to get much detail from this figure due to the color scale.

Q. How about Figure 22? Would you turn to that, please?

A. Yes.

Q. I think there was some discussion by Mr. Holm

about pumping in Winkler County, Texas as opposed to also waterfloods, and then also some reference to possible drinking-water use from the Capitan Reef Aquifer in this area. Do you recall that?

A. I do.

Q. Do you have any comments on Mr. Holm's testimony with respect to this area?

A. Yes. There was no -- just like from Lea County, New Mexico, in Winkler and Ward Counties, Texas, there was never any municipal or drinking-water use from the Capitan Reef Aquifer. By the time you start -- the Glass Mountains for water quality is very good, but you start to, you know, go subsurface very quickly around Fort Stockton. And this recharge water, by the time it gets into Ward County and Winkler County, this is not fresh drinking water. It's already picked up a lot of salts. The water quality's very bad.

And I mentioned in my direct testimony, the Colorado River Municipal Water District, which has a large well field in Ward County, in the Pecos Alluvium, they're not interested in using the Capitan Reef water at all because it's already very poor quality. Odessa looked in that area. They weren't interested either. So it's high salinity by the time you get to that point, and then you still have to go whatever it is, 30, 40

miles, to get up to the Jal area.

Q. Do you recall Mr. Holm talking about Figure -- Figure 8 from your report that is Exhibit 2 in this case?

A. Yes.

Q. And I believe he made some comments regarding the no-flow cells that you show in this model and the black depicting that and raising some questions about that. Do you recall that?

A. I do.

Q. How would you respond to Mr. Holm's testimony regarding this figure?

A. The black cells, they are no-flow cells. They are Capitan Reef, and the they're no-flow because we're not simulating the Capitan Reef. We're simulating the Artesia Group, but we have exchange of water with the Capitan Reef. So if we wanted to simulate the flow of water north-south from, you know, all these other things that went in the past, we would have that Capitan Reef cells as active cells.

But what we want to simulate is the potential exchange of water, and that is simulated. It's not like we have this Capitan Reef as no flow, and there could be no flow to it. You have flow to it out the boundary condition, and then our model stops at the

boundary. So the fact that these are no-flow cells is not -- you know, it's kind of meaningless in the context that Mr. Holm was putting it forward, as if we were discounting exchange of water between the two geologic units. That's not what we're doing.

Q. Is there any other thing that you recall from Mr. Holm's testimony on your Figure 8 that you'd like to point out to the Examiners?

A. No.

Q. Let me ask you to turn to Figure 9 of that same report we were just talking about. And if I recall correctly, Mr. Holm talked a little bit about some of the same kinds of issues as depicted in this figure. Do you recall that?

A. That's correct.

Q. And in response to Mr. Holm's testimony, can you provide the Examiners with a little further explanation of what's going on here, particularly on the boundary conditions of your model?

A. That's correct. So where there are these blue cells in the figure, you can have leakage of water vertically in the model according to the boundary condition, and where there are the red cells, you can have exchange of water horizontally according to the boundary condition.

But water flows freely through these colored cells. So, for example, in model layer one, as you go to the left, you get six cells that are colored blue before you get to the one that's colored red. We're not inhibiting the flow of water in the horizontal direction. All this means is that as water is flowing through those cells, if it does, it can have exchange with the Capitan Reef vertically, and then when it gets to the end, all the way to the left, it can have exchange with the Capitan Reef horizontally.

So we're not -- these colored cells do not inhibit the flow of water at all. They just control the exchange of water between what's in the Artesia Group and what's in the Capitan Reef in accordance with the simulated hydraulic head in the Artesia Group and the prescribed head in the Capitan Reef. And so we're not initially constraining the flow of water in this model. If water got to that point, it would flow out if the Capitan Reef head was lower than what it is at the injection interval.

Q. So I think that if my notes are correct, Mr. Holm said that under this figure and your depiction, that the model, as I have it, arbitrarily stopped flow to the right. Would you agree or disagree with that?

A. No. It's the same condition on the right -- if

water got to the right, conceptually it would flow out into additional Artesia Group sediments. Now, in reality, when we do the simulations, the water doesn't get near to these boundary conditions, so we're not having that issue. But if it did go that far, it would flow out of the model domain.

Q. Is there anything else you can recall regarding Mr. Holm's testimony with respect to this figure that you'd like to comment on?

A. No.

Q. Is there anything else that you can recall from Mr. Holm's testimony that you would like to address at this time?

A. No. I can't think of anything else.

Q. Okay. Thank you.

MR. MOELLENBERG: I pass the witness.

MR. BROOKS: Do you want to take another break?

EXAMINER JONES: Sure.

(Recess, 2:47 p.m. to 2:57 p.m.)

EXAMINER JONES: Okay. We're ready.

MR. BROOKS: I'm on for cross-examination of Mr. Blandford, right?

EXAMINER JONES: Yeah.

CROSS-EXAMINATION

BY MR. BROOKS:

Q. Mr. Blandford, I'm going to be brief.

There was some testimony by Mr. Kronkosky about recharge, and you testified about recharge. Now, I want to get the context clear. When you said there was no recharge of the Capitan Aquifer in this area, I'm thinking that what you probably meant was there's no -- there's no recharge from rainwater coming down in the Jal area. Is that what you meant?

A. The first part of what I meant and the second part of what I meant in the Jal area is there is not flow of water from the Artesia Group to the Capitan aquifer.

Q. Okay. Okay. You were not saying that recharge flow was not coming into the Capitan Aquifer from the sides? I believe you said that; did you not? There was no recharge except what was coming in from -- through the -- through the Capitan Aquifer itself?

A. Correct, which would be a north-south direction --

Q. Yeah.

A. -- within the aquifer itself.

Q. And besides, if we said there was recharge through the aquifer, we would have to assume there was

rain in Jal, and that doesn't seem likely.

(Laughter.)

MR. NEWELL: It rained there yesterday, and there was standing water.

MR. BROOKS: Well, maybe I'm rebutted.

MR. NEWELL: No. It's just that time of the year, you know.

Q. (BY MR. BROOKS) But you testified that you think that the rising water level of the -- of the Capitan Reef Aquifer that's been shown on the tables on OCD Exhibit 4 is related to recharge?

A. I believe it's -- it's due to the cessation of groundwater pumping. So when you pump, you're going to draw the potential metric surface down. When you turn the pumps off, you're going to have a natural rebound effect, which comes from water within the aquifer itself, continues to flow towards where the pumping had occurred. It doesn't stop because that's a low in the potential metric surface. And because water keeps flowing within the aquifer, that's how you begin to fill up that cone of depression, and that's why water levels are going up, in my opinion.

Q. Well, Anchor Holm testified that when recharge water comes into the area, it tends to flush out pollution. Do you agree with that?

A. It becomes -- fresh water near the recharge areas, we're talking way down in the Glass Mountains, for example, will become more saline as it goes deeper into the aquifer and flows to the north because this aquifer is surrounded by low-permeability geologic units that are essentially salts. So it picks up a lot of salt as it flows, but it starts doing that way down in Texas. Long before it ever gets to Jal, it'll become, you know, high TDS water.

Q. Well, as it picks up salt from the aquifer, then it's -- it's going to flush out the area where it picks up the salt to some extent; is it not? That seems to be what Mr. Holm's testified.

A. Fresh water can dissolve more salt than salty water. Okay?

Q. Right.

A. You eventually get to a point where the water is so salty that it can't really dissolve much more rock and become a higher TDS. So it's a progressive process from the mountain recharge areas until you get to the deep portion of the aquifer that we're in.

Q. Well, doesn't the anecdotal evidence that has been introduced indicate that much of the area in the vicinity we're talking about, in southern New Mexico, the TDS levels in the aquifer are considerably below the

saturation point?

A. A number of them are. And so what we've seen in the Capitan is about 13,000 -- a little bit over 13,000 milligrams per liter, that EOG well we talked about.

Q. And that's well below the saturation point?

A. I believe it would be. Yes.

And there are other wells that are much higher than that, some over 100,000 TDS.

Q. Okay. So you can't rule out the possibility that water sweeping through there could pull out more salt?

A. No. I would not rule out that possibility.

Q. Sweep it away?

A. I would not rule out that possibility. That's correct.

Q. Now, the other thing I was going to -- oh, yeah, I remember now. I didn't put it on my note sheet, and that's always a bad thing.

It occurred to me when I was -- and I hadn't thought about it before, but it occurred to me when I was talking about this. The testimony yesterday said it was very good at this. The Artesia Group in this area is very good or some people think it's a very good place to dispose of produced water. Do you

remember that testimony?

A. Yes.

Q. If that's true and people are going to want to dispose of a lot of produced water in that area, we might want to be -- figure out who really has the correct ideas about this. And in my opinion, the Division has the authority to require some -- to put some conditions on the permit, and one condition that we might put would have to do with some monitoring.

Based on your modeling work, can you tell us where you might be disposed -- if you wanted -- if this permit were granted -- and I'm pessimistic at this point. If this permit were granted, to verify your theory concerning the movement of this water, where would you want to place monitoring wells, if any?

A. We always have the monitoring at the wellhead.

Q. Right.

A. Offset monitor wells, there could be options with existing wells that are out there.

Q. I was thinking of that. Yes.

A. And I don't have an exact location, but if you're -- to me, if you're in the range, quarter mile, half a mile, something like that, if you can tie -- observe changes in pressure to a specific well, then that tells you a lot about the injection interval

between those two wells. So I don't think I can give much more detail than that right now, but those are the kinds of distances and potential opportunities that come to mind.

Q. Well, because there is a question about westward versus eastward movement. Would you have any interest in knowing what was going on west of this well if it were put on production -- put on injection?

A. I believe movement is going to be predominantly radial from the well.

Q. Okay. And that was what you testified to in rebuttal of Mr. Goetze's Exhibit 13?

A. That's correct.

Q. Okay. And if, in fact, it were moving in a preferential direction, to determine that, you would have to have a monitor on both sides, right?

A. Correct, either both sides or, you know, northeast, you know, a 90-degree type thing.

Q. Right. Right.

Thank you.

MR. BROOKS: I believe that's all my questions.

EXAMINER JONES: Ms. Moss?

CROSS-EXAMINATION

BY MS. MOSS:

Q. One thing I want to make clear, you've spoken about protectable waters, I think, on your direct and now in terms of municipal use; is that correct?

A. I don't think I used the term "protectable waters," but I have spoken about municipal use.

Q. And your model was for 20 years?

A. It was for a 40-year period total.

Q. In New Mexico, protectable water is to be evaluated on foreseeable -- reasonable foreseeable use. Are you familiar with that term?

A. I am.

Q. Okay. And do you know how long that is generally defined as being?

A. To my knowledge, there is no time period associated with that that I could -- that I could quote.

Q. Would you be surprised if I told you that on the Energy, Minerals and Natural Resources Web site, it says the general time period is 200 years or longer?

A. I've never heard of that. I was involved in an extensive hearing before the Water Quality Control Commission where time frames of prediction were discussed, and nobody was talking about 200 years.

Q. That answers my question.

EXAMINER JONES: Mr. Newell?

MR. NEWELL: Yes. Thank you.

CROSS-EXAMINATION

BY MR. NEWELL:

Q. We talked a lot about your model and stuff like that. You would agree with me that your model is only as good as -- only as valid as the inputs that are involved in the model, correct?

A. Yes, sir.

Q. Any model, right?

A. Yes.

Q. Okay. You talked about OCD Exhibit Number 4. And would you pull that out, please?

A. Okay.

Q. This exhibit has graphs on it, correct?

A. It does.

Q. Okay. And these graphs depict the water level and reflect a general increase in that water level, correct?

A. It does on these hydrographs, yes, since the mid-1970s.

Q. Okay. So as you understand it -- I understand your testimony. You're saying that the increased water levels are a result of the stopping of production or the stopping of producing or removing water from these

formations and the zone of depression filling in, correct?

A. Yes, specifically the Capitan Reef Aquifer.

Q. Okay. And as you understand it, when did the pumping of the aquifer water stop?

A. The vast majority of it stopped about the mid-1970s.

Q. Okay. And, as we sit here today, based on these graphs, the water level is continuing to increase, correct?

A. Yes.

Q. Okay. So is it your testimony that the cones of depression haven't filled in for almost 40 years?

A. Yes, it is.

Q. Okay. How much water was removed from those wells? What's the volume of water?

A. I haven't calculated the total volume of water. There is quite a bit of information in the Hiss report. Some volumes aren't well documented, but total pumping, I believe, per year had exceeded 40,000 acre-feet a year, if you start adding up the different well fields in the Capitan Reef. So I forget how many years that was for, but you're talking about a lot of water that was removed from the aquifer from whatever, the '60s into the mid-1970s.

Q. I understand a cone of depression is just that. It's a cone that's around the circumference of a well and that it reflects the water being drawn out of that well, correct?

A. It does in an unbounded aquifer, but this aquifer, the Capitan Reef, it is -- it's bounded on the sides by, essentially, impermeable sediments. So it's not going to be a round cone. The cone of depression is going to hit the sides of the aquifer relatively quickly, and then it's going to expand north and south. And that's what happened in this case.

Q. Okay. To really verify whether your theory about the zones of depression being the cause of the increased water level are true or not, you kind of need to know the volumetrics of the cones that you're looking at in terms of the amount of water that was removed from each well, correct?

A. Yes. I've done a computation to that.

Q. Okay. So I thought you just testified you didn't look at the amount of water that was removed in terms of identifying the volumetrics associated with these cones of depression?

A. I didn't add up the cumulative volumes year after year after year after year so I could give you one number for a cumulative volume, but I did look at the

pumping rate on an annual basis for a prescribed period of time.

Q. Okay. Based on the models that you did or the studies that you did and given the fact that the cones of depression are continuing to fill in, if you will, then how long will it be until those cones of depression are fully filled so that you reach that equilibrium point where there is no longer water flowing in those cones of depression?

A. I didn't run the model out that far. I ran it to current day, essentially starting back in the '50s to current day so I could see if these rises appeared reasonable, that they were filling up a cone of depression up till now. I didn't run it out a number -- whatever it would take till it stops filling up.

And, number two, in all likelihood, it will never fill up to the original level prior to pumping because I don't believe the recharge is sufficient for that to occur.

Q. Okay. Now, would you look at your Exhibit 14?

A. If you could remind me which --

Q. That's the Hiss article, "Movement of Ground Water in Permian Guadalupian Aquifer Systems, Southeastern New Mexico and Western Texas."

A. Okay.

Q. All right. Would you turn to -- it's not marked as such, but if you look, it's page 292. I think there is a mark on 291, and I think you talked about this on rebuttal direct.

A. Yes.

Q. Okay. So -- and as I -- well, would you agree with me that on this particular diagram and the legend that's associated with this particular diagram, Hiss uses the term "relatively poor" in certain areas or "relatively good" in describing other areas. Do you see that?

A. Yes.

Q. What is he referring -- relative to what?

A. It's relative, as I understand it, his judgment of -- if you're observing a hydraulic head in the -- what do you call it -- the Artesia Group, what he calls the shelf bottom aquifers, versus the Capitan, if you have a relatively good hydraulic connection, then the heads will be very similar to one another. And if you have a measurement in one unit or the other, you can assume you know the head reasonably well for both. If you have a poor connection, that's not true.

Q. Okay. So is he saying relative -- when he talks about relatively poor, is that relative to other areas of the Capitan Aquifer that are relatively good?

Is that how you would interpret that?

A. I don't know if he had in his mind specifically relative to other portions of the aquifer or just in the general context of there is a good hydraulic connection or a poor hydraulic connection. I can't tell you which.

Q. Now, relatively poor is different than what you're testifying to, because your testimony is that it's not relatively poor. It's -- it's almost nonexistent when it comes to communications between the two aquifers; isn't that true?

A. In the Jal area, that's correct. And I don't know what -- you know, talking about these types of terms, relatively poor, what that meant exactly to Dr. Hiss, I certainly can't, you know, tell you what was in his mind.

Q. Okay. He did not say it's nonexistent, did he? He did not identify any area where communication was nonexistent, did he?

A. He said the potential metric surface is extremely low over oilfields on the Central Basin Platform wherever the hydraulic communication -- the oil reservoir with the Capitan Aquifer is poor. I mean, those were -- those were his words.

Q. Relatively poor?

A. No. He just said poor.

Q. Well, okay.

A. He did just say poor. That's the quote.

Q. Okay. What are you looking at?

A. I'm looking at this note that is aligned with the Texas state line.

Q. Would you tell me the page?

A. Same page we were talking about.

Q. Okay.

A. There is a note on the map that's oriented kind of top to bottom, north-south, and I'm reading that note on the map. It's near the New Mexico-Texas state line.

Q. When we look over on the legend where he has -- would you agree with me that the legend reflects certain areas that are identified by lines and, if you will, almost like arrowheads or whatever you want to call them, triangles, as part of that? Do you agree with that?

A. He identifies those lines on the legend. Yes.

Q. Okay. And the lines that appear on the north side and the south side of Jal, how are they reflected in the legend?

A. He has those as triangles. He says: The head measure at the Capitan Aquifer and shelf aquifer system with hydraulic communication between the two aquifers is relatively good, for the open triangles. And I see some

dark triangles as well, and I'm not seeing his -- I'm not seeing an explanation of those on the Capitan Reef contours. And he has no contours with triangles in the Jal area.

Q. So that suggests he did not review that area, correct?

A. No. I think he reviewed it. I think he reviewed it, and he wrote this note on the map that says exactly what I just read.

Q. Okay. So let's look at Winkler County right below Lea County. Is that part of the Central Basin Platform?

A. It's on the edge of it. Yes.

Q. Okay. And there is one area measured in there that's kind of like a semicircle, correct?

A. That's correct.

Q. And it has two open triangles and a closed darkened triangle, correct?

A. Yes.

Q. Okay. So that certainly suggests that in that area, the communication is relatively good, correct?

A. Yes. That's the area of the Hendrick Field that we, you know, discussed at length earlier, where it's been well shown that there is a good hydraulic connection, because when they pumped that field, they

pumped almost all water and much less oil.

Q. Okay. So now let's look at -- I believe it's your Exhibit 15.

A. Okay.

Q. Does this exhibit take into account the nearly 37 million barrels of water that have already been injected into the formations from the Maralo Sholes B No. 2 well?

A. It does, because my understanding of that water is it may have been injected, but it's all taken back out after it was injected, for the most part. And Mr. Kronkosky has an exhibit in that regard and can speak to that further.

Q. Okay. Can you tell me -- I don't recall the testimony where it was -- where that 34 -- or 37 million barrels of water was removed. Can you tell me where that evidence is?

A. As I recall that would be under Mr. Kronkosky's Exhibit F.

Q. And that's the history of production graph; is that correct?

A. Well, he has a number of things on this graph, but the two things that I was considering was the produced water line and the injected water line, which tend to, you know, mimic one another once you get to a

point where the data is available for both.

Q. Okay. So you acknowledge the produced water line from the produced wells and the injected water line has a relationship to each other?

A. I believe so, yes. Mr. Kronkosky can speak to that in detail. I'm not the oil and gas person, but that's what I get from his exhibit.

Q. All right. So let me finally ask you this: Do you believe there is any, like, review bias or any type of bias that Mr. Goetze brings to this proceeding as you rebut his testimony?

A. I'm not aware of any bias by Mr. Goetze.

Q. Okay. Same for Mr. Holm. Any input bias or anything that either of these two state employees have in the outcome of this proceeding?

A. I don't think there is any bias on the part of Mr. Holm. I have a hard time understanding why, you know, the State Land Office has the concerns that it does in this area because I've testified extensively, in talking about the Artesia Group, that that's not going to be a source of water ever for anyone regardless of the quality. There's not enough permeability. There's not enough thickness of the zones that do have higher permeability, and I doubt it's even physically possible to extract water from those zones regardless of quality.

So -- but bias, no.

Q. In 100 years, where is Jal going to get their water?

A. I do not know. I assume they could still be pumping Santa Rosa wells. If, for some reason, Santa Rosa is not working out, the next aquifer down is the Rustler. And if Jal ever wants to go to the Capitan, it would be exceptionally expensive, but they could pump Capitan, I suppose.

Q. And, finally, I'm going to talk about potential bias here. Let's just throw the 800-pound gorilla or elephant out in the room. You're being compensated to provide testimony here today, correct?

A. That's correct, but I'm really not going to risk my professional rep- -- you know, my career, so to speak. I represent many clients, and the only reason we get hired is because we can do the science. If I'm viewed as biased because somebody's paying me, then I wouldn't have much of a career left. So I'm really not going to do that for anyone.

Q. Okay. So let me make sure, then, that I understand. And I was out for part of this, but I believe it was Exhibit 3 that was presented by the State Land Office. Was that a report that had been done by your firm?

A. Yes, it is.

Q. All right. And as I understand it now, you've clarified various things that are reflected in that document as not being completely accurate. For example, because it doesn't take into account canyons or this or that, and you've identified, like, for example, certain issues Hiss being the better source of information, correct?

A. I did, yes.

Q. Okay. In that case, didn't your firm have the same desire to get it accurate as you should have here?

A. We were attempting to get it accurate at the scale of this study, which was being done for the Texas Water Development Board. So the purpose of this study was to develop a geologic framework for the Capitan Reef Aquifer primarily in Texas, but we also went into New Mexico, and within the confines of what we were able to do with the budget of the study and time, we did, you know, the best job that we could. But we're not -- you know, we didn't have the time to sit down and hand contour 22,000 square miles of data, so it was done another way.

Q. Now, certainly, if we look beginning on page 50 of that report, we can identify four different studies of Hiss that were utilized. And at the bottom of page

51, we can identify that there was NMOCD database information used. And then if we go to the Database Development that's reflected on Appendix A, we again see New Mexico Oil Conservation Division Web site information was used, and New Mexico State Engineer Technical Report information was used. Will you agree with that?

A. Yes. I don't see where you're reading from, but I believe that is correct. Yes.

Q. Okay. Now, this New Mexico Oil Conservation Division Web site information, was this the same information that was at issue or brought out in, I believe -- what was the GO-TECH Web site exhibit? Was that 11?

A. Yeah.

Q. Was this the same information that was -- that Mr. Holm was criticized for using in Exhibit Number 11?

A. It's not. That exhibit didn't exist when we did this study.

Q. Okay. But do you know whether this site -- this Web site included that material that you looked at in 2009?

A. It was not.

Q. It was not.

So you're saying that the NMOCD information

in 2009 is superior to the information that was used by Mr. Holm?

A. This exhibit that you're holding, my understanding, is a produced water database. The OCD information that's referenced in this report, the Standen 2009, is -- in all likelihood, I believe it's well logs and things like that. It's other pieces of information that are available on the OCD Web site. It's not related to this Web site you're talking about at all.

Q. Now, you understand that the New Mexico Oil Conservation Division has a voluntary compliance regimen, so whatever information that's inputted into the system most likely comes from voluntary compliance disclosure by producers involved in the industry, correct?

A. Well, the data that we were using are things like well logs, but you don't have to take the producers' word for what's going on with the well log. You can download the well log and look at what it shows.

Q. Do you know what information they utilized for that report?

EXAMINER JONES: Mr. Newell, we're going to have to keep moving here.

EXAMINER WADE: I think we can weigh the

credibility of the --

MR. NEWELL: Fair enough. Then I'll pass the witness.

EXAMINER JONES: Anything else for this witness?

You guys want to ask any questions?

EXAMINER WADE: I have no questions.

EXAMINER DAWSON: No questions.

EXAMINER JONES: I have no questions either.

Thank you very much.

MR. MOELLENBERG: Then OWL calls Chad Kronkosky.

CHAD E. KRONKOSKY,

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

DIRECT EXAMINATION

BY MR. MOELLENBERG:

Q. Good afternoon, Mr. Kronkosky. You've been -- you testified previously in this proceeding and have been sworn; is that correct?

A. Yes, sir.

Q. And you understand that you're here this afternoon to testify in rebuttal to the testimony presented by Mr. Goetze, for the OCD, and Mr. Holm, for

the State Land Office?

A. Yes, sir.

Q. Okay. So I'd like to go through Mr. Goetze's exhibits and talk about some of his testimony on those exhibits. And do you have anything to comment on with respect to Exhibits 1 and 2?

A. With regards to Exhibit 1, no comments. With regards to Exhibit 2, no comments.

Q. So let's move to Division Exhibit 3. And in that regard, in connection with Exhibit 3, do you recall Mr. Goetze discussing the potential, based on interpretation of the geologic data, for preferential flow of injected fluids from the proposed well to the north?

A. I do remember his testimony.

Q. You've looked at the geology of the area of the proposed injection well very closely, haven't you?

A. We've looked at it quite extensively. To give you an understanding, we have downloaded every well in the nine-township area and put that data into IHS Petra, which is a geological interpretation software. We have downloaded all of the state logs in the immediate area that are on your-all's Web site, on the Division's Web site. Furthermore, we have utilized public data vendors to supplement missing data for well logs that were not

available on the Division's Website, which there were quite a few. And we have put together our own personal geological interpretation, and I think that it's established through the exhibits that exist in our report. But to be frank, we've looked at this quite extensively.

Q. Is there any particular information presented in Division Exhibit 3 that you haven't considered or taken into account in your evaluation?

A. We've looked at Exhibit 3. We're well aware of the Hiss data. With regards to the -- I believe it's the high that numerous people have referenced. We would just point out that in Hiss' data, there are no control points that he identified at least in his map, and we've reviewed, I guess, what is to be interpreted as his submarine canyons, and we have not been able to replicate that in our geological interpretation.

Q. So I take it, then, that you are not in agreement with Mr. Goetze's interpretation of some of the geologic features in the area and his opinions regarding preferential flow to the north?

A. Yes, sir.

Q. Would you care to elaborate any more on that, or is that something you've addressed adequately in your direct testimony?

A. I think we've addressed it in the direct testimony, with regards to the head that we have observed in the literature, and in Mr. Blandford's testimony as well.

Q. Okay. Let's move -- is there anything else you'd like to comment on with respect to Exhibit 3?

A. No, sir.

Q. Then let's move to Division Exhibit 4. Is there any information presented in Exhibit 4 that you didn't consider or address in your examination of the site?

A. No. We've reviewed this data extensively and have taken it into consideration, in our opinion.

Q. Is there anything in particular you'd like to comment on?

A. We just second Mr. Blandford's opinion that the head rebound that we observed can be explained just due to the cessation of pumping.

In our report, there is a subsection that discusses a very simple -- but it's a void [sic] metric calculation. And it is simple in nature in the calculation, but I believe it should suffice as evidence that this could be caused just due to cessation of production.

MR. NEWELL: Object to the answer. "Could

be caused" doesn't rise to a reasonable scientific probability. So his testimony is opinion testimony. And I think, under law, it should be to a reasonable probability, and "it could be" doesn't rise to a reasonable probability.

EXAMINER JONES: Mr. Moellenberg, what would you say to that?

MR. MOELLENBERG: I would say that I think you-all are in a good position to assess the answer in light of everything else you've heard here and decide how you want to take the information.

THE WITNESS: It's a volumetric estimate, so --

EXAMINER JONES: Okay.

Q. (BY MR. MOELLENBERG) Mr. Kronkosky, is there anything else you'd comment on with respect to Exhibit 4?

A. No, sir.

Q. So let's move to Division Exhibit 5. And with respect to that exhibit, can you recall testimony by Mr. Goetze as it relates to some of the data, particularly for the produced water presented on this figure?

A. Yes, sir. I do remember his testimony.

Q. Okay. And in that regard, have you recently

taken a look at the OCD records regarding the volumes of produced water for the Sholes B 25 Well No. 1?

A. Yes, sir. I reviewed that data this week.

Q. Okay. And does your review of the current data agree with what's presented? I believe it would be with the blue lines on Exhibit 5.

A. The data as presented in Exhibit 16 is in nonagreement with the State's Exhibit 5 for the peak and water production in -- at the end of 2016.

Q. Okay. And if I recall correctly, Mr. Goetze acknowledged that there had been some corrected data reported, but he has no reason to or, really, information to be able to assess whether the originally reported data or the corrected data is correct; is that right?

A. That's my understanding.

Q. Okay. Do you have any information from your knowledge of the situation that would help the Examiners assess whether the originally reported data or the corrected reported data is correct?

A. Several months ago -- I can't remember the exact date -- in preparation for this hearing, I did a site evaluation. I observed the well in question and observed that it is a flowing gas well and that it is not connected to electricity and has not been connected

to electricity in some time. The spike in production that took place in the 2015 area would require flow rates of 3,000 barrels of water a day. In order to produce fluids at that rate, it would require some sort of artificial lift mechanism, most likely a submersible pump. We could discern no, I guess, knowledge or observations that a submersible pump had been in that well in probably quite some time, at least into the '90s. There is no electricity out there on that well.

Q. To your knowledge, is there any other explanation from where the originally reported produced water volume numbers may have come from?

A. I would speculate, but I would say the high rates may have been a reporting error. Maybe a decimal place was corrected, but I'd be speculating on the report. But physically, the well in question, at least during my observation, was not capable of producing 3,000 barrels of water a day.

Q. So based on your understanding of the capability of that well to generate produced water, is it your view that the originally reported numbers or the corrected numbers are most likely correct?

A. The corrected numbers in 2016, 2017 are correct. The current 2015 are incorrect.

Q. Is there any other comments you would have

regarding Division Exhibit 5 or Mr. Goetze's testimony about that exhibit?

A. Not at this time.

Q. So let's turn to Division Exhibit 7, which is some information relating to the New Mexico [sic] B 31 well. Do you see that?

A. Yes, sir.

Q. If I recall correctly, the discussion with Mr. Goetze related to whether there is a potential need to inspect the plugging of this well. Do you recall that?

A. I do recall.

Q. Do you have any comments or concerns in that regard?

A. Nothing aside from the fact that it's my understanding that the State doesn't have any information on that wellbore and that the regulatory engineers relied upon trusted third-party providers to prepare this exhibit.

Q. Okay. Let me have you turn to Division Exhibit 8. And I think Mr. Goetze's testimony related that to the same issue of the adequacy of the plugging of -- of the M.F. Sholes B 30 number well -- M.F. Sholes B 30 No. 1 well. Do you recall that?

A. Yes, sir.

Q. Do you have any comments in that regard or any concerns that this type of sinkhole development might be a risk at this well, given your understanding of the geology in the area?

A. While I haven't reviewed this paper in great detail and given it a tremendous amount of thought, I am aware of sinkhole development that's taken place in the Permian Basin. I would just like to point out that I believe that the paper has to do with waterfloods and injecting fresh water, which fresh water may leach salts. Whereas, it has been established that the Maralo Sholes B is injecting fluids of 140,000 TDS, which the solubility of salts in that fluid is extremely low. So that's about the only comment I make on that.

Q. In the interest of time, I'm going to skip Exhibit 9. Let's go to Exhibit 10 briefly. Exhibit 10 appears to be an order of the Division. Do you recall that?

A. Yes, sir.

Q. And this was related to an application for a saltwater disposal well; is that right?

A. Yes, sir.

Q. And is it your understanding that this application proposed an injection interval that would have included part of the Capitan Reef Aquifer?

A. Yes, sir.

Q. And your understanding is this application was denied based on this order?

A. Yes, sir.

Q. Let's take a quick look at Division Exhibit 11, which is the March 15th report by Mr. Goetze. As I recall, your written report and much of your direct testimony was centered on a response to some of the points that Mr. Goetze made in this report; is that right?

A. It is.

Q. Do you have anything else to add regarding this exhibit or Mr. Goetze's testimony in relation to this exhibit that would be helpful to the Examiners?

A. I believe that we attempted to address Mr. Goetze's letter in our June 1st letter as best we could.

Q. Okay. So really nothing to add on that?

A. No.

Q. So let's turn to Division Exhibit 12. Mr. Blandford, on rebuttal, addressed this to a fair degree. Do you have a particular comment on this exhibit or Mr. Goetze's testimony on this exhibit?

A. I would just like to point out his, I guess, highlighting on page 34 of this report. Specifically,

he talks about -- Hiss talks about the Eugene Coates 3 well, and I believe it's on Exhibit -- and then on page 301 as well. The Eugene Coates well is actually located very near or in the Jalmat Field and is, I think, completed in the Seven Rivers, and the Federal Davidson well is an observation well completed in the Capitan Reef. Hiss made the distinction that the two were -- the two hydrographs of these two wells were related to one another. I haven't reviewed the hydrographs. I don't know that. I'd be speculating. But because they are completed in different formations and we know for a fact that the Skelly Jal water supply was producing out of the Seven Rivers, it's more likely that the Federal Davidson observation well's decline was related to the Skelly Jal water production, and the Eugene Coates decline or fluid level observation was related to the production that was taking place in the Jalmat Field at that time. Again, I would be speculating because I have not reviewed the hydrographs.

MR. MOELLENBERG: Do we need to pause for a moment?

EXAMINER JONES: Mr. Holm needs to leave. Is there a need for Mr. Holm?

MR. MOELLENBERG: I don't believe so, not from our end anyway.

EXAMINER JONES: Okay.

EXAMINER DAWSON: Go ahead.

(Mr. Holm exits the room, 3:49 p.m.)

Q. (BY MR. MOELLENBERG) Anything else you'd like to say about Division Exhibit 12?

A. Not at this time.

Q. If you would turn to Division Exhibit 13, and in this regard, I believe that Mr. Goetze and also Mr. Holm had some comments relating to potential impact of the proposed injection on correlative rights and the possibility of waste. Do you recall that?

A. I do.

Q. And you, as a reservoir engineer, have looked at that issue in connection with preparation of your reports for this case; is that right?

A. I have.

Q. Now, recognizing that none of the operators or lessees who have been notified so far have appeared and raised any issues but now we have a new round of notice coming -- and perhaps we'll have to revisit this issue depending on what happens -- could you, in response to the testimony that's been given in this case up to now, give the Examiner your view about the potential for impacts on correlative rights?

A. I don't believe that they exist. I believe

that the injection that OWL would do in the Bobcat well would be beneficial to adjacent and existing oil and gas mineral owners, and it would only serve to recover more hydrocarbons that would not otherwise be recovered without the additional injection.

Q. And why is that your opinion?

A. If we look at Exhibit -- I believe it's F -- or Tab F and our report and we review the production, the injection that took place, which started in the late 1960s, in Section 24 and in Section 25, there were several water -- several saltwater disposal permits, and those are also identified in our exhibit. I believe it's Tab H. There are numerous saltwater disposal permits that have been approved in this same section, Section 25 and Section 24, and those are identified in blue in Tab H. And we've identified the orders and the case numbers and the dates of the approvals.

What we observed in the production history since the 1970s is that the water was recycled in this project area. There was no new makeup water put into the area. That probably would have had to come from fresh water, which is extremely scarce in this area. There is not a whole lot of water to be put into this field. And for a secondary recovery project to work in a very depleted field, additional waters would need to

be put in place, and a substantial amount of water would have to be put in place before we would even see secondary response.

And we can observe that in Exhibit F. We observe that in 1994, the review of the production, Southwest Royalties tried to instill a waterflood pressure maintenance project, and that's the spike in oil production that you see in '93. And the spike in water production and injection, because injection data only exists from 1994 to today's date, we observed that the water production and the injection was essentially the same. So they recycled the water, and no new water was put into the system. So the reservoir pressure remained depleted. This was no additional mass put into the system to increase the reservoir pressure. That's why the reservoir pressure to this date is extremely low in this area.

Q. And as it relates to, I guess, the related topic of waste, could you describe your views on whether the proposed injection would waste resources?

A. I believed it would be beneficial. We would recover additional hydrocarbons.

I guess the only other comment I'd like to make is we reviewed the injection data in 1994, in the mid-'90s, for the two wells north of the proposed well,

and I believe those are identified in Exhibit F. I've got the orders. But there are two injection wells that are due north of the proposed well. Those would be R-5196 and R-3488. When we reviewed the injection data on those wells, they were injecting 20,000 barrels a day in 1994. So there is precedent, in this same section, of high-volume injection under vacuum.

Q. And, Mr. Kronkosky, does the answer you just gave and the discussion you just gave relate to some of the questions Mr. Newell has raised about consideration of historic injection of higher volumes in the area?

A. I believe it should address his questions regarding that.

Q. So let's move -- and I think I can do this fairly quickly. Let's move to Mr. Holm's exhibits. Do you have any -- do you have any comments or anything to add regarding Mr. Holm's or the State Land Office Exhibit 1 and the testimony that's been given to that?

A. Nothing that -- we reviewed this document a long time ago, and we're well aware of it.

Q. Okay. Let me ask you, then, to move to State Land Office Exhibit 2. And we've had a fair amount of discussion on that, the sources of the data and so forth. I take it you haven't attempted to try to reconcile all of -- all of this data that's presented in

here, have you?

A. We have not tried to reconcile it. We've merely provided our client and, through our client, the State a statistical review of Hiss' 1975 USGS work. It's a database that he prepared. We have scanned copies of that data in this area. And I believe that some of this data may be obtained from that, but I would be speculating.

Q. Okay. In that same regard, although you haven't done a comprehensive review, has any of the data that's presented on State Land Office Exhibit 2 caused you to raise a question and take a look at it in more detail?

A. It has.

Q. And could you identify which particular data point or points that you have taken a look at?

A. I believe that Mr. Holm has made the testimony and the comments that the chlorides in Section -- I believe it is -- 24 -- and those are for API Number 30-025-09789 -- total dissolved solids of 316,000, thereabouts, and the well due south, 30-025-09788, total dissolved solids of 117,000, 118,000. I believe his testimony was that the saltwater disposal well 30-025-09792 was responsible for the degradation of waters in that section. We have evidence to the

contrary.

Q. And what is that evidence?

A. In Hiss' 1975 USGS publication -- and that is in Exhibit -- I believe it is Tab M -- I'm sorry -- Tab L, and we'll have to go back through it. But if you flip through the scanned images of that report to page -- and it's toward the very back -- it would on his report, page 241 and page 241A.

Q. Sorry to interrupt you, but what is the source of this report?

A. The source of this report is Hiss' 1975 -- let me read the title of it. It is "Water Quality Data From Oil and Gas Wells In Part of the Permian Basin, Southeastern New Mexico and Western Texas," the "USGS Open-file Report 1975-579," and it was prepared in coordination with the New Mexico State Engineer's Office. We have scanned -- we have requested this document from the Library of Congress in Washington, D.C. and have made a scanned copy of this entire data set. I don't know if the State has a copy of this, but it is an extremely rare document. And it includes water quality all across the United States -- I mean through the Permian Basin with a tremendous amount of detail.

With regard to the two specific wells with the high total dissolved concentration, on page 241 --

and you'll see a number called "Sequence Number," "SQNO," and it goes from 1 to 53 -- I believe if you look at Sequence Numbers 31 and 32, you'll observe that the chloride concentration that is in Hiss' report is 69,000 and 180, which matches the numbers provided on the State Land Office's map for those two wells in question, and the total dissolved solids also match. Now, they do not match exactly because this database was prepared in 1975, and they rounded significant digits at that time. But suffice it to say that is the same data samples that the State Land Office is reporting.

What was interesting to note is on page 241, Sequence Numbers 31 and 32, the date of sample collection, in Sequence 31, it's 6/20/1959, and Sequence 32, it's 9/15/1959. The saltwater disposal well that is an adjacent well was not approved for disposal until 1968, so in ten years after the sampling took place. So it is not possible that this well injected fluids to cause those samples to be degraded to that point.

Q. Are you finished on that point, Mr. Kronkosky?

A. The only other point that I would make regarding this and some of the data that the State Land Office had made regarding water is that most of these wells never produced water initially. Almost all of them were water-free completions. The water that is

being reported, I have no clue where it's coming from, but almost all of these wells produced very little water. Especially as we move further and further to the west and we get up into the gas cap by the Maralo Sholes, there should be no water being produced or that is producible in the reservoir at that high elevation structurally. It would be at irreducible water saturation. So they may have done these reports to look for some minor amounts of scale, tendencies on raw pumping these wells, but there should be no water that was productive in these wells because it is so high above the oil-water contact.

Q. So are you concluded with your comments as they relate to the State Land Office exhibits?

A. Yes, sir.

Q. I know that Mr. Blandford discussed State Land Office Exhibit 3 in a fair amount of detail, but are there any comments you would like to make with respect to State Land Office Exhibit 3 or Mr. Holm's testimony about that exhibit?

A. Nothing besides the fact that I have reviewed the document. I second that. I believe there was testimony on faulting from this document. I think we need to put the record straight on that.

Q. Yeah. So let's talk about that a little bit.

So Mr. Holm talked quite a bit about faulting as it related to some of the information on State Land Office Exhibit 3; is that right?

A. Yes, sir.

Q. Have you looked at the potential or possibility for faulting within -- or faults to be located within the area of the proposed injection well?

A. We have reviewed, quite frankly, at least 300 well logs in the immediate area, and we see no evidence of faulting in the shallow Permian reservoirs. There is -- I don't know if there is any literature that would substantiate substantial faulting through the Permian section. And all of the faulting took place in the Permian Basin and the major mountain-building took place in the Permian time, and then there was a Wolfcamp erosional feature that took place out here on the Central Basin Platform, and carbonates flew up from that.

But there is no evidence there is -- I think the comment was made regarding Tab D. I believe Mr. Holm made the comment that the draping structure that we see in this cross section is related to a shallow fault. That is patently incorrect. It is due to drape across deep-seated faults in the Pennsylvanian and Devonian section. There are numerous faults in this

area. Lots of normal faulting and reverse faulting took place. That is why there is Devonian production up on the Central Basin Platform in this area. There are probably 3- or 4,000 faults in the extremely deep reservoirs, but there is drain across this fault just due to natural compression in the Basin.

Q. So based on your view, do you have any concern at all that faults might exist in the vicinity of the proposed injection well that could result in transport of injection fluids differently than you and Mr. Blandford have assessed?

A. Not in the Artesia and Capitan Reef portions of this reservoir.

Q. Mr. Holm also gave some testimony about a couple of your exhibits, and I believe the first one was Tab D. Do you recall that?

A. You might have to refresh my recollection.

Q. Do you have Tab D there?

A. I believe it's the cross section.

Q. Okay. I have some fairly extensive notes on that. Give me just a second --

A. Sure.

Q. -- to see.

So it appears that he had a comment on what this figure shows based on the colors concerning the gas

cap, a closed structure related to the gas cap, a blue area that he identified as water and so forth. Do you recall whether Mr. Holm accurately testified regarding what you have depicted on this exhibit?

A. That is correct. The blue color is the water that is below the oil-water contact. The green is the oil window, and the red or pink color is the gas and the gas cap.

Q. Okay. Now, I believe Mr. Holm suggested that there was a possible stratigraphic change. I think he described as a pinch-out. This is -- as you're moving across the diagram to the left -- this may not make sense. Starting with the Sholes 25 well and it says, "Drops abruptly at the...." And I have the initials B-R-L No. 2. I think that stands for a well. I think the point was that he's suggesting there is evidence of some stratigraphic change and the possibility of a fault here. Would you agree with that, or what would be your interpretation of this information?

A. I would disagree. This is just, as I said, just drape across a very deep-seated fault that does not make connection up into the Permian Basin -- the Permian strata. You can clearly see that the reservoirs do not thicken appreciably across this area. It's essentially pancake flat.

When these reservoirs were laid down, the reservoirs do pinch-out laterally to the east approximately -- in the Seven Rivers and Yates approximately eight miles to the east. They then further pinch out as they lap up onto the shelf edge, shelf margin approximately six miles to the west, the sands do this. The sands pinch out.

Q. Anything else to add on that point?

A. The only other thing I maybe would like to add is that we observed a drill-stem test in this well on the left, which is the Skelly Joyner -- or I guess it's now the Apollo Operating Joyner WT-Federal 2. We observed a drill-stem test, and we have noted that in our report in the text. And that is noted on page -- page 9 of our text at the top. And what we would specifically like to point out is that they did a drill-stem test in 1995, and production had been producing out here since the late 1920s. They drill-stem tested the productive sands, and they recorded bottom-hole pressures in 1955 of 95 psi. They then tested reservoirs deeper in the section into the oil-water contacts of 1,400 psi, the original reservoir pressure. That confirms that there is no vertical migration of fluids at least over that 35 years period of time. And we observed that today. So it's a test

further confirming no vertical migration of fluids in these reservoirs.

Q. And would that then address Mr. Holm's contention that there might be some evidence around that Apollo Joyner well that suggests a fault line that separates these wells from the gas cap?

A. No. The reservoirs that were drill-stem tested had never been produced in the area. That's why they were at original reservoir pressure.

Q. Okay. There was some discussion about the possibility of fracturing in formations consisting of dolomite. Have you seen any evidence of such fracturing in your review?

A. In this particular area, we don't see evidence of fracturing. We observed the resistivity logs, and what we observed is extremely tight dolomites. We don't observe any fracturing.

Q. Mr. Kronkosky, is there anything else you recall from Mr. Holm's testimony that I may have missed and that you wish to comment on, or Mr. Goetze's, for that matter?

A. I believe Mr. Holm's made a comment that he reviewed a well log that had the marking of Capitan Reef on it that he did not prepare. As the Division is well aware, operators typically write on well logs, and then

sometimes they use the type logs.

But we have utilized not only our own interpretation, but we've utilized GRS, a data vendor that provides well tops all across the Permian Basin. I believe they provide well tops for 100,000 wells, and they had dozens of geologists on staff that prepared this work. We not only reviewed their tops, but we made our own tops. And we would observe and pick the Capitan Reef in the Maralo Sholes well approximately 700 feet beneath the injected interval. That would be the proximity of the reef. And we can identify this in Exhibit D again.

EXAMINER JONES: D?

THE WITNESS: I believe it's D. And if we get the Fulfer Oil & Cattle Sholes A 8, this well, I believe, is on strike and due north approximately one mile to the north, so it's a very good representation depositionally because the sediments came from the east and west. But this is a good representation of what a deep Maralo Sholes well log would look like.

And what we observe is, at the very bottom of this well log, there is an increase in porosity and an increase in dolomites and very clean -- or cleaning of the gamma ray, which signifies cleaner carbonate. And I know it's difficult to read, and I believe we're

going to get the Division larger copies of this. But each one of those numbers in the middle of the well log is 100 feet. And from the injected interval, if I count them right, it's approximately 7- to 800 feet below the proposed injected interval, is where we observe porous, clean carbonates, which may be considered Capitan Reef reservoirs. The carbonates above them are extremely tight dolomites, which would be considered clean, and basal Seven Rivers, but they are very tight and nonporous and permeable.

Q. (BY MR. MOELLENBERG) Mr. Kronkosky, I'm handing out some additional papers, because we don't have enough. But can you confirm that what I'm handing out here are simply larger, more readable printouts of the exhibits that are in your report that is OWL's Exhibit 1?

A. They are.

Q. And I'm not intending to identify these as new exhibits or anything. I think the ones for the record are fine, but these ones are easier to read.

Mr. Kronkosky, does that conclude your rebuttal testimony, or do you have anything to add?

A. I would like to add one quick comment.

Q. Okay.

A. In Tab D, which is the -- we were talking about

the Fulfer Oil & Cattle Sholes A 8 and my testimony regarding the Capitan would be approximately 700 feet deeper in this section than the proposed interval. That is also shown in Exhibit -- or Tab A, at the top right, where Harris and Saller make a geologic cross section of the Federal Davidson and the number of wells going on in the shelf margin. The proposed well is actually further to the east of the Davidson Federal, so it is right of that well. And what we observe is that there is approximately 7- to 800 feet of shelf dolomites that are tight, and then we would get potentially into the Capitan Reef, and it would be very thin at our proposed location. I just wanted to get that in the record.

Q. Okay. Anything else to add for the record at this point?

A. Not at this time.

MR. MOELLENBERG: I pass the witness.

EXAMINER JONES: Mr. Brooks?

MR. BROOKS: Thank you.

CROSS-EXAMINATION

BY MR. BROOKS:

Q. I wanted to ask you about your testimony that injection of water into this formation would be beneficial. And you referred us to the oil wells or the hydrocarbon wells in the vicinity, and you referred us

to -- was that your Exhibit F?

A. Exhibit F has the production history of the project area.

Q. Now, you said that waterflooding was begun in 1973 or '4 in this field?

A. There were two saltwater disposal wells that were approved in 1968 in, I believe, Sections 25 and 24 of this township.

Q. 1968 is not even shown on this graph. It only goes back to 1970, right?

A. Digital data exists to 1970.

Q. Yeah.

And you begin -- the curve that you have marked "Injected Water" begins with 1994, right?

A. That is correct.

Q. Now, do you make any distinction on this curve between injected water from saltwater disposal and injected water from -- from secondary recovery efforts?

A. It is just injected water that was injected into the approved injection wells in this section.

Q. Yeah. I thought you said they began secondary recovery efforts about 1993, '94. Is that what you stated?

A. Southwest Royalties, in 1939, 1994, attempted to do either a pressure maintenance or some kind of

secondary recovery project. They installed a few submersible pumps in some offset wells and had limited success with some of them. They pumped off pretty rapidly due to the low pressure and low deliverability on some of the pumps on the wells.

Q. Yeah. There is a spike in both oil and gas production in 1993 and a smaller spike in 1994. Would that be attributable, possibly, to this secondary recovery effort?

A. Yes, sir. I believe the oil production went from approximately 40 barrels a day previously to approximately 3- or 400 barrels a day.

Q. Right.

But this was a specific secondary recovery project, was it not, a project designed to achieve an increase in production?

A. I don't know if they made a filing at the time. I don't recall anything in the record of them making a specific permitting process to start a pressure maintenance or secondary recovery project other than the fact they took over the operation of those wells.

Q. So you didn't locate any data that this actually was a secondary recovery process?

A. I can only look at the production history and make assumptions and based upon my experience and in

doing this for ten-plus years and analyzing oil and gas assets all over the Permian Basin, especially waterfloods, that this looks like a secondary recovery project attempt.

Q. Okay. The fact that a secondary recovery effort produced some increase in production would not -- or pressure maintenance effort would not necessarily mean that any injection into the formation would be beneficial to the wells, would it?

A. I believe this confirms that injection into this reservoir would increase the recovery of hydrocarbons in this area. The reason why it was not extremely successful was because they recycled the water. There was no new water injected into this reservoir to make up. That's a term we use in waterflooding.

Q. Yes, I understand.

A. So a substantial amount of water would have to be injected -- I believe I made a simple calculation -- and it would be well in excess of 70- to 80 million barrels of water.

Q. So on what do you base this -- is this spike in production shown here the only thing on which you base your conclusion that injected water would be beneficial to the hydrocarbon wells in the vicinity?

A. No. There are numerous waterfloods in the Jalmat and Langlie Mattix all along the trim. This is a field and reservoirs that are very susceptible to secondary recovery methods.

Q. Have you done any analysis of the fact of randomly injected water into this formation? This is just the fact you have an injection well in one location. What does it -- if it's not a part of a deliberately planned effort, what effect might it have one way or the other?

A. It would -- it would increase the reservoir pressure and would be a source of the makeup fluids and would thereby allow offset operators the ability to recover additional hydrocarbons.

Q. Okay. Thank you.

Just one other question I believe I have. In SLO Exhibit Number 2 that you spoke about and you testified at length about your opinions as to the affect or lack thereof of Well Number 09792. Do you have any explanation of why the wells in the north part of Section 25 -- of Township 25, 36 East -- well, it's not the north part. It's the middle part. There are huge discrepancies between looking at -- well, looking right above the ones you testified about, there are wells showing TDS reports of 9,751 and 1,508, and then just

below those, there are 10,570 and 3,753. And then below that, there's this one, 09789, about which you testified that's 316,728. Do you have any explanation of why there is that huge difference in less than a mile there?

A. The only evidence that I can provide is what is in Hiss' 1975 scans that I've provided. And while I've not correlated this data in its entirety to the State Land Office exhibits, I have reviewed it to some degree and have made some findings. Those samples re in this report -- or in this data set. In this data set, there is also mention that there are numerous errors in this data set. This is not a 100 percent accurate data set. The 1,500 TDS, it is the lowest sample that I have seen, and it could very well be a fat finger recording error.

Q. But you don't have any specific evidence that --

A. No, I do not.

Q. -- those reports are made in error?

A. Aside from the fact that a tremendous amount of them do exist in this scanned copy.

Q. Thank you.

MR. BROOKS: That concludes my examination of this witness.

EXAMINER JONES: Ms. Moss?

MS. MOSS: I have no questions.

EXAMINER JONES: Mr. Newell?

CROSS-EXAMINATION

BY MR. NEWELL:

Q. I want you to look at your Exhibit 16 and SLO Exhibit 5. I believe your 16 was used to --

A. Is this our 16?

MR. MOELLENBERG: Yeah.

THE WITNESS: Okay. This is the updated production data?

Q. (BY MR. NEWELL) Yeah. I believe you said it's correct?

A. As of this week, I reviewed it, and the water production in the months of 2016, 2017 have been corrected.

Q. Who is the operator?

A. I'm going to butcher the name. I believe it's Fulfer Oil & Gas or Fulfer Oil & Ranch.

Q. Okay. So look at the second entry there for 2016. I believe that's February of 2016, correct?

A. Yes, sir.

Q. Okay. And we show a 2-barrel production of oil, correct?

A. Correct.

Q. 43 mcf of gas, correct?

A. Correct.

Q. And 7,500 barrels of water produced, correct?

A. Yes, sir.

Q. Okay. Now, nowhere else -- no other months depicted on your Exhibit 16 is there more than, let's say, 900 barrels of water produced, correct?

A. That's correct.

Q. In some months, there are zero barrels of water, correct?

A. Correct.

Q. All right. And do you have anything to explain the variability of the water that is produced or reflected in Exhibit Number 16?

A. That, again, could be an incorrect reporting error that the operator made. If I did my math correct, that would correlate -- the 7,500 barrels in that month would correlate to approximately 250 barrels of water a day. My observations of that well showed that the wellhead pressure was something a lot less than 20 psi, probably has a tough time even getting into the gas line in that area. It's not capable of producing 250 barrels water a day. There is no artificial lift mechanisms on this well.

Q. So you testified -- I believe the record will reflect it -- that this information is accurate on Exhibit Number 16. Are you saying it's not accurate

now, that it's equally suspect as you find State Land Office Exhibit Number 5 to be?

MR. MOELLENBERG: Objection. Misstates testimony. I don't think he ever testified that that exhibit was accurate, just that it was corrected data as taken from OCD's database.

EXAMINER WADE: So explain what your understanding is of --

THE WITNESS: My understanding is that this data is correct in Mr. Fulfer's opinion. Engineers rely upon publicly available data that are provided to public regulatory agencies. We may have to utilize that information, much like Mr. Goetze, as being corrected [sic], does get corrected quite regularly, as Mr. Goetze testified. Therefore, we continuously have to update our production databases to reflect the corrections.

Q. (BY MR. NEWELL) So if we're looking either at State Land Office Exhibit Number 5 or Applicant's Exhibit Number 16, it's pretty clear, based on your observations, that there are numbers that are reflected there that appear to be physically impossible, thereby rendering this information inaccurate, correct?

MR. BROOKS: Point of correction. Now, you referred to the State Land Office Exhibit Number 5, and I believe the State Land Office did not offer Exhibit

Number 5. Are you speaking of OCD Exhibit 5?

MR. NEWELL: Yeah. It's OCD Exhibit 5. And I apologize, for the record, Mr. Brooks.

THE WITNESS: I guess, can you restate the question one more time?

Q. (BY MR. NEWELL) Sure. You say -- in your rebuttal, you basically said OCD Exhibit Number 5 is not accurate because they come back in and provided corrected information, correct?

A. It's not accurate in the fact that they have not updated the plot to reflect today's current data on their database, just as it is correct that I have not updated my Tab F to reflect that data as well. Our exhibit was prepared prior to June. That data was not available at that time.

Q. Okay. So -- but since then, the information has supposedly been corrected, and that's reflected on Exhibit Number 16, correct?

A. That is correct.

Q. Okay. And what you just testified to is we know, at least in February of 2016, that that information is incorrect because that is physically impossible, based on your observations, correct?

A. I believe so.

Q. Okay. All right. Now, I believe you were

talking about -- and I believe this is right this time -- State Land Office Exhibit Number 2.

A. Are you talking about the map with the chloride and total dissolved concentrations plotted on it?

Q. Right. I believe that's the one where you talked about Hiss' numbers and the -- the relationship between Hiss' numbers and the time that the disposal well is reflected, correct?

A. That is correct.

Q. So I believe you also indicated that when these wells were initially brought on line, that they didn't produce any water, and that's one of the ways you distinguish it from the field to the south. It's the subject of a lot of the literature that we've discussed, right?

A. I believe in regards to the Hendrick well, yes. That field produced -- produces a substantial amount of water initially.

Q. And this field didn't produce water, correct?

A. In this particular area around Jal, the wells that are above the oil-water contact in any meaningful depths did not produce appreciable amounts of water.

Q. And to make sure I understand what you said, you do not have an explanation of where this water, that's now reflected in this material, has come from?

A. I don't believe Dr. Hiss has a complete understanding of where all this water data came from. He just took the data that was available and put it in a database and made it available for the public.

Q. My question is then: Do you have an explanation of where this water came from, because I believe you said that there shouldn't be any water in there?

A. I would be speculating, but from my experience in oil and gas operations, the reason why operators take water samples to begin with, throughout time, is to look for scaling tendencies of the produced water, because these wells were on artificial lift, and scale and a pump will stop it from pumping. They took the samples to give to chemical vendors, potentially, so that they could develop a chemical treatment program to reduce the scale. This could be minor amounts of water, but that minor amount of water could be missed, can produce scale. This is water -- these wells produced 3 or 4 barrels of water a day. They did not produce appreciable amounts of water.

Q. Okay. So my question is this -- and by the way, my dad -- I grew up with Alco Chemical as a kid. My dad worked for Alco Chemical. Exactly what he did -- he probably did this very same field down there.

But be that as it may, you have no explanation, as we sit here today, why Hiss or anyone else is finding water over in these formations, correct?

A. By finding water, what do you mean? In appreciable amounts or just a water sample?

Q. Well, I don't know. I mean, I believe -- do you know whether the water out there that's reflected in your testimony about Well Numbers 09789 and 09788 -- do you know how much water was pulled when they came up with those samples?

A. No. I have no data to respond to that, and I believe Dr. Hiss would not have that data as well.

Q. Did you go in and attempt to see any production data that would reflect water from those two wells?

A. That production data is reflected in Tab F of our report. Those wells would be in that data set.

Q. And then when I look at this Exhibit Number 2, one of the things that jumps out at me is even in these wells where we have multiple readings, there is a great deal of variability. Would you agree with that?

A. Yes, sir.

Q. So there is a lot we don't know about the geology, communication and source and flows of the water in this area, do we?

A. Yes, sir. And I would just like to point out

that this type of work is the subject of my Ph.D. dissertation. Spatial statistics is an extremely complex area. There is no spatial trend in this data. If there were spatial trends in this data, we would need to account for them when we do our statistics. Since there are no spatial trends in this data, averages or centroids in the statistics, medians in this case, are perfectly acceptable statistics to describe this water utilizing this information.

Q. Okay. Let's look at the Well Number 11860, which is just to the south and slightly to the east of the proposed well. Do you see that?

A. 11860, yes, sir.

Q. And it looks like, going from top to bottom, the reading are most recent to most distant. The readings were 120,048, 9,699, 5,800 and 11,899. You're the one doing the Ph.D. Could you explain to me how -- how we get those fluctuations?

A. That data is represented in the Hiss report. I'd have to find it. It may take me a second. But in the interest of time, I believe, from my recollection, they were on separate dates. But I could find that information. But it is in our report, and the State or the Division could find that information, or I could help correct the record, unless you want me to look for

it right now.

EXAMINER JONES: No, not right now.

Q. (BY MR. NEWELL) To follow up, what do you mean by -- when you say -- I assume that most of these recordings were recorded on different dates, if they have different amounts. Wouldn't that be true?

A. It could be. They could be recorded on the same day. It could be two samples that were on the same day. But I would have to go look at the data that is provided in Hiss to give you the dates that those samples were from and maybe even the different formations that they may have come from. The formations are also provided in this data set as well and the depths.

MR. NEWELL: Pass the witness.

EXAMINER WADE: I have no questions.

EXAMINER DAWSON: I think the questions I have have all been covered.

CROSS-EXAMINATION

BY EXAMINER JONES:

Q. Just quickly, this 70- to 80 million barrels of water to achieve fill-up, what geologic area were you talking about there?

A. It was the immediate project area, so it would be within approximately 1,500 acres, something like

that. It was an area that --

Q. Was it within the half-mile area of review?

A. Well, the half-mile area of review would be more acreage than that. It would be the area outside of the half-mile area of review. So it's taking into account the sections identified in Tab F. At the top, I believe we identified the actual sections and half sections of the project area, and I think there is a yellow outline of the project area in one of our exhibits.

Q. Okay. So that volume divided by the acres gives you a barrels-per-acre cost. Could a person use that to expand and say this is the amount you would need if you put additional disposal wells into -- to eventually achieve fill-up for injection wells, for that matter, if a person wanted to waterflood this thing?

A. I believe that once the water gets to a number approaching that level or, you know, potentially, because there is water that moves around, we would start to see the reservoir at that point in time start to pressure up, and the rates in the resI- -- in the injection wells would go down drastically at that point in time. But until the gas cap [sic] is completely collapsed due to pressure, which would require the reservoir pressure be increased to 14 psi or above,

because that's the saturation pressure, it would take quite a long time and quite a large volume of water to do that.

Q. Okay. So did you -- I forgot whether you told us, and it may have been in Mr. Goetze's report. Did you do a falloff on that Maralo Sholes well?

A. No. There was no falloff test to perform. There were two production surveys. They ran a bottom-hole pressure on the production log. But the opportunity to do a falloff test was not available at that time. I believe there were constraints due to operational constraints.

Q. Okay. That would have told you the radius of influence?

A. Yeah. It was proposed, but I believe due to operational constraints, we were not allowed to do it at that point in time.

Q. Okay. The Hiss data, is it -- is it part of your studies to put those data like that into distributions and see if it's logged normal or can be predicted --

A. It is, sir.

Q. -- in any way.

A. Yes. That data was -- and you can see it in the spreadsheet that was provided. It is extremely

lognormal, but the median of the data is 15,000-plus or 15 parts TDS.

Q. So a geometric mean or peak or a --

A. A P50 would be --

Q. -- Swanson's being 50 or whatever it would be --

A. A good representation of the data.

Q. Okay. Better than a --

A. Than an average.

Q. -- than an average?

A. I think the average is approximately 15,000 -- or 50,000 TDS, and I believe the P50 is approximately 15,000.

Q. Yeah.

Okay. So lognormal -- extremely lognormal means you've got a bunch of -- you've got some high numbers that really skew it off to the right?

A. That is correct. And even the low numbers, though are not freshwater samples. They're, you know, 8,500 parts per million. So the water is extremely poor. I believe an accurate representation would be that well over 75 percent of this water is well above 10,000 TDS, at least in this data set.

Q. Okay. I have no more question.

MR. MOELLENBERG: Mr. Hearing Examiner, I

think we're finished. And unless something comes up with the questions that Mr. Brooks has to do, I would just say -- I know that there were questions raised about monitoring, and Mr. Brooks asked some questions about that. You know, given that there is going to be a continuance here for a while, we'd certainly welcome an opportunity to talk about that with the Division or come back and talk about it with the Examiners on the record after we see whether --

EXAMINER JONES: Whether anybody else crops up?

MR. MOELLENBERG: Yes.

EXAMINER JONES: Yeah. We're looking at August 31st.

But, meanwhile, if you're willing to let -- let Mr. Goetze come back on, if Mr. Brooks wants him --

MR. BROOKS: Yeah. There is one area we want to talk about. In the interest of time, I'm going to keep it as minimal as possible.

EXAMINER JONES: Five-minute break.

(Recess, 4:47 p.m. to 4:54 p.m.)

PHILLIP R. GOETZE,

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

DIRECT EXAMINATION

BY MR. BROOKS:

Q. Mr. Goetze, I encouraged you to quickly offer your resume when you started your testimony, but I wanted to ask you your duties with the OCD.

A. My duties include being technical reviewer of applications for authority to inject.

Q. That was exactly what I was going to ask. In that capacity, do you use the GO-TECH site?

A. The GO-TECH site was developed with the PRRC with the concept of compiling a clearinghouse of information that comes in for both the operators, as well as from public sources so that it could be used for a variety of purposes. In such cases, it has been used in applications for C-108s as a basis for both produced water, as well as formation waters.

Q. And -- excuse me. Let me collect my thoughts here.

Oh. Is the OCD's data coming in from the C-115s where the operators report -- report injection into wells, is that funneled into the GO-TECH site?

A. Not only C-115s, but results from hearing order applications, as well as any type of sampling which is done is forwarded to New Mexico Tech.

Q. To your knowledge, does the -- does the OCD

consider the GO-TECH site to be an authoritative site in the use of permitting saltwater disposal wells?

A. Yes, sir. It has been endorsed by Director Fesmire, Director Bailey and, currently, Dr. Catanach.

Q. Do you have any hesitation in using the GO-TECH site as a practical reference?

A. It is an accepted database which we use.

Q. Now, this Exhibit 11 that was introduced by OWL contains statements which OWL read into the record, and I won't read them into the record again. But would your understanding of that be consistent with the idea that this is the kind of disclaimer that you find in a lot of records, where they want to say: You've got this information that we're giving you, but we don't want you coming back at us about it?

A. That would be the endorsement that I understand.

Q. And with that said, isn't it very similar to what someone read into the record about one of the State Land Office exhibits?

A. That is correct.

Q. Now, Mr. Goetze, is there anything else that you would like to say responsive to the -- to the rebuttal testimony we've heard from OWL's exhibits and from OWL's witnesses?

A. Well, the only thing I would like to bring attention to is that with the submittal of Exhibit 15, which shows a preference for the model layer two at 20 years, projecting that onto the information that I have available, between the figure I had using the relocated -- or the area which was influenced by the Capitan and opposed to this, doing a cursory review of it, I estimate there are an additional 47 wells outside of the one-half area of review that have currently -- that currently have been reviewed under the C-108.

Q. Now, is that a result of moving the projected area of influence to the west compared to your Exhibit Number 13?

A. That is correct, sir.

Q. Okay. Are there not a number of additional producing wells in the area close to this well to the west?

A. It would indicate that in Section 25, the wells that are in the northwest quadrant are now within an area of influence.

Q. And those additional 47 wells -- the rest of those 47 wells would be -- would be plugged-and-abandoned wells?

A. The majority of them would be plugged-and-abandoned wells.

Q. Which would require consideration of whether or not they were properly plugged?

A. Yes, sir.

Q. And the presence of additional producing wells would require consideration of whether they would be influenced?

A. Yes, sir.

Q. Thank you.

MR. BROOKS: Pass the witness.

MS. MOSS: I have no questions.

MR. NEWELL: At the risk of shocking everybody, I don't have any questions.

(Laughter.)

CROSS-EXAMINATION

BY MR. MOELLENBERG:

Q. A couple of the questions, Mr. Goetze, regarding the database and the GO-TECH site. When data is added to that site, is it added just straight from whatever comes in on the particular report, whether it's a C-108 or a C-115 or anything else?

A. It is a clearinghouse, so the protocol is that that information coming in would be accepted as submitted.

Q. So it's taken as face value, and there is no effort to validate the data or validate that it is what

it says it is or anything like that?

A. That's the way we operate in the Division.

Q. Okay. I think that's all I have.

BY EXAMINER JONES: Okay. I don't know we've admitted your exhibits.

MR. MOELLENBERG: Oh, okay. So thank you for that.

So I move Exhibits -- what are we at -- 11, 12, 13, 14, 15 and 16.

EXAMINER JONES: So Exhibits 12, 13, 14, 15 and 16 --

MR. MOELLENBERG: And 11, I think, as well.

EXAMINER JONES: I thought we did 11 earlier. I'm pretty sure we did.

MR. MOELLENBERG: It won't hurt to do it twice.

EXAMINER JONES: Any objection?

MS. MOSS: No objection.

MR. BROOKS: No objection.

MR. NEWELL: No objection.

EXAMINER JONES: 11 through 16, as stated, are admitted.

(OWL SWD Operating, LLC Exhibit Numbers 11 through 16 are offered and admitted into evidence.)

MR. BROOKS: The Division closes.

EXAMINER JONES: Gabe, can you ask for maybe a written --

EXAMINER WADE: Yeah. It had been discussed informally and put on the record that parties would have the opportunity to file legal briefs, memorandum, I believe. I think we could also take proposed conclusions of fact and law.

MR. BROOKS: And would this include written closing statements, because I don't think anybody wants to stay around for that?

EXAMINER WADE: And closing statements, though I think we'll glean that information from the proposed conclusions of fact and law.

MR. BROOKS: Exactly.

EXAMINER WADE: The easiest thing would probably be to give a two-week window for those briefs to be filed and a two-week response, something to that effect.

MR. NEWELL: Can that be triggered off of when we receive the transcript?

EXAMINER WADE: Do we have an idea when we might receive the transcript?

(Discussion off the record with the court reporter.)

EXAMINER WADE: So we'll say legal briefs -- does anybody want to throw out a date that briefs -- initial briefs would be due?

MR. BROOKS: I guess I would like to have at least until a week from Tuesday, and I don't remember what date that is.

EXAMINER WADE: Two weeks from today would be the 18th. If I threw that out, would that --

EXAMINER DAWSON: Tuesday is the 8th.

MR. BROOKS: Yeah, because this is -- Thursday, the 18th --

MS. MOSS: Friday is the 18th.

MR. BROOKS: Yeah. That would be acceptable.

EXAMINER WADE: Okay. So Friday, the 18th, initial legal briefs will be due. All responses are due two weeks from the 18th. That will be September 1st. So all responses are due the 1st. And then when the transcript's ready, people can submit their proposed conclusions of law and findings of fact, I suppose, whenever they have them available. I don't know that we need a date necessary.

MR. MOELLENBERG: Well, I mean, if we're going to -- you guys are going to, what, deliberate after you get those? So it would be kind of nice to

have a date to --

EXAMINER WADE: Well, assuming we're going to get the transcript the week of the 21st, but we're not sure, let's kick it out two weeks from there and say that on September 8th, findings of fact and conclusions of law would be due.

MS. MOSS: Wait. That's very close.

EXAMINER WADE: Two weeks? This is after you get the transcripts, which should be the week of the 21st.

MS. MOSS: Okay.

MR. BROOKS: Well, I thought that the court reporter indicated it might be problematic about getting the week of the 21st.

MR. MOELLENBERG: I would just suggest, if that's case, we all ask for extensions.

EXAMINER WADE: I think the court reporter said the week of the 21st, and then two weeks after we get transcripts.

MS. MOSS: I'd be so cool with that.

EXAMINER WADE: Two weeks after transcripts, findings of fact, conclusions of law.

MR. BROOKS: Well, that's the problem because that's going to be the two weeks -- from the end of the week of the 21st until the two weeks from then is

going to be the time when I'm going to be on vacation.

EXAMINER WADE: At that point, please ask for an extension, and we will look at it then.

MR. BROOKS: I will.

MR. NEWELL: And I'll go ahead and state for the record now, I would not oppose such as extension, so he doesn't have to call and ask if I oppose it.

EXAMINER WADE: Great.

We still have -- if there are no other issues in this particular case, we still have the matter of the other pending case.

EXAMINER JONES: Yeah. This case is continued to August 31st.

MR. MOELLENBERG: There is just one other issue, and that's the email on the notice. I mean, we've told them the four sections and affected parties, but I'd still appreciate an email.

EXAMINER JONES: We will.

MR. MOELLENBERG: Yeah. Appreciate that.

MS. MOSS: And the second case is extended to the 31st?

EXAMINER JONES: No. This case we're on now is continued till August 31st, which is a regular hearing date. We'll just put it on that docket date

and --

MR. BROOKS: That'll be when I will be out of town.

EXAMINER JONES: A week before that happens, you'll know if somebody else made an appearance in that case --

MS. MOSS: Got it. Thank you.

EXAMINER JONES: -- and so you'll know how to prepare. Otherwise, he'll just turn in the Notice of Affidavit, and we'll take it under advisement at that time.

MR. BROOKS: You can do that without me.

EXAMINER JONES: Yes.

EXAMINER WADE: I think so. And I feel like if people do crop up, it'll be a reset anyhow.

MR. BROOKS: I would assume so.

EXAMINER WADE: So I think we can take care of that. We won't hear it that day.

MR. BROOKS: Now, as to the second case, can we have that --

EXAMINER WADE: Can we have that case number so we know what we're referring to?

EXAMINER JONES: Yeah. It's 15753.

That's the compliance case that you are the Applicant on.

MR. BROOKS: That's the second case. And as to that case, I would have no objection to it being set for September 28th. It's a regular docket, I think. I would not really want it set the day after I come back, although I'm going to be here for the hearings that day. But I think September 28th would be -- but, of course -- well, no, we don't have -- yeah. We have hearings August the 18th, and the Division considers that case to be not a long case. We could present it on August the 18th, but I don't know what.

EXAMINER JONES: August 17th is a Thursday --

MR. BROOKS: 17th.

EXAMINER JONES: -- which is two weeks from yesterday.

MR. BROOKS: But that doesn't change what I said at all except changing the number.

MR. MOELLENBERG: So I guess speaking to that, I guess it's hard for me to predict yet whether it's a short case. I mean, I could agree, based on your application, it could be, but I could look at the intervention stuff and say it might not be.

MR. BROOKS: Well, I don't know what the State Land Office's position will be on it. Our position is simply that this well, as it's presently

constructed, does not comply with the formation protection requirements.

MR. MOELLENBERG: And if all we're talking about is the construction of the well and those issues, I would tend to agree with you that it's a relatively short case. But I think the pre-hearing statement from the State Land Office indicates something else. I don't know where that goes.

MS. MOSS: Let me just state what the big picture is for the State Land Office. We do not want to stop your client's business, but you have something that's been in violation for some time, and you continue to use it at a very high rate. Since there is a concern -- if you look at 19.15.34 of your rules, the OCD rules, within 60 days something needs to be done. So I am not sufficiently really familiar with what the violations are, and if I was, I don't know that I sufficiently would understand them to be able to say what should happen. But I think if you could contact me or let me know -- I mean, if nothing is going to be done and you're just going to continue to use it until we have a hearing and a decision --

MR. MOELLENBERG: I mean, at this point in time, there's -- there's an application that alleges violations. We will be responding to those and get a

determination of whether, in fact, they are violations, which we contest in the hearing.

MS. MOSS: So in your perspective, they're actually not violations?

MR. MOELLENBERG: That's the risk with that case. Sure. Yes. So we're talking about getting to that -- to that case. I have a witness availability for the 17th, so I don't know that I can speak to that. But I think that's the first part of the case.

MR. BROOKS: Yeah. On the record, I suggest that we reset it for September 17th as a parking place and people can make motions for continuances.

EXAMINER WADE: Do you mean August 17th?

MR. BROOKS: August 17th.

EXAMINER JONES: Mr. Newell, do you plan on participating in this case?

MR. NEWELL: Let's assume I do, unless I'm instructed otherwise. I got the impression that I would, but I haven't done anything to formally appear or anything like that, and I haven't filed anything in that other case.

EXAMINER WADE: But you will do that in future cases?

MR. NEWELL: Yeah, absolutely.

And then I might make one suggestion for

everybody to consider, and that would be adoption of these proceedings in that case to the extent that there is duplicitous testimony. It doesn't have to be repeated again, because it looks like, for example, the State Land Office's evidence is a lot of the same evidence.

MS. MOSS: Will it be the same hearing officers?

EXAMINER JONES: Not necessarily.

MS. MOSS: That would -- what?

MR. MOELLENBERG: Not if you can get out of it.

MS. MOSS: Maybe we should --

EXAMINER WADE: So let's set it for the 17th.

EXAMINER JONES: Okay. We'll set it. Right now it's set for -- does anybody remember what date it's set for in August?

MR. BROOKS: August 2nd, the day before yesterday.

EXAMINER DAWSON: It was set for the 2nd.

MR. BROOKS: Wednesday, August the 2nd.

EXAMINER JONES: Oh, yeah. Okay, we'll continue it to August the 17th, as just a beginning place.

MR. BROOKS: Okay.

EXAMINER JONES: Which is the next -- two weeks from yesterday.

EXAMINER WADE: I would just say there are some issues that have popped up in this case that are certainly issues in the other case, that some communication between OWL and the State Land Office would be appropriate, and maybe some issues could be taken care of. So --

MR. MOELLENBERG: Sure.

EXAMINER WADE: -- I encourage the parties to have discussion.

MS. MOSS: Would you at some time in that discussion be able to answer my question whether it would be the same hearing officer and you and -- how will we know?

MR. BROOKS: Well, I would think the Director might have something to say about that. It hasn't been decided definitively.

MS. MOSS: If somebody hears something, would you let me know and enlighten me, because -- in other words, if you want to use information from this hearing, I think that's a good suggestion, but I would feel more comfortable if it was before the same group as opposed to a different group.

EXAMINER WADE: Regardless, discussions that OWL and the State Land Office and the OCD would have would be with the parties that you see here regardless of who the hearing officer is.

MS. MOSS: Irrespective of who hears the case.

EXAMINER WADE: Yeah.

MS. MOSS: Okay. That's all I need to hear. Thank you for the answer.

(Case Number 15723 concludes, 5:16 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.

MARY C. HANKINS, CCR, RPR
Certified Court Reporter
New Mexico CCR No. 20
Date of CCR Expiration: 12/31/2017
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