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 LG&S OIL COMPANY, LLC, FOR APPROVAL OF A SALT WATER DISPOSAL WELL, EDDY COUNTY, NEW MEXICO.

ORIGINAL

CASE 15345
(Cont'd from January 7, 2016)

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

February 4, 2016

Santa Fe, New Mexico

BEFORE: PHILLIP GOETZE, CHIEF EXAMINER
WILLIAM V. JONES, EXAMINER
SCOTT DAWSON, EXAMINER
DAVID BROOKS, LEGAL EXAMINER

This matter came on for hearing before the New Mexico Oil Conservation Division, PHILLIP GOETZE, Chief Examiner, WILLIAM V. JONES, Examiner, SCOTT DAWSON, Examiner, and DAVID BROOKS, Legal Examiner, on February 4, 2016, at the New Mexico Energy, Minerals, and Natural Resources Department, Wendell Chino Building, 1220 South St. Francis Drive, Porter Hall, Room 102, Santa Fe, New Mexico.

REPORTED BY: ELLEN H. ALLANIC
NEW MEXICO CCR 100
CALIFORNIA CSR 8670
PAUL BACA COURT REPORTERS
500 Fourth Street, NW
Suite 105
Albuquerque, New Mexico 87102

A P P E A R A N C E S

For Applicant LG&S Oil Company, LLC:

Ernest L. Padilla, Esq.
Padilla Law Firm, P.A.
1512 South St. Francis Drive
Santa Fe, New Mexico 87505
(505)988-7577
padillalaw@qwestoffice.net

For Devon Energy Production Company, LP:

Michael H. Feldewert, Esq.
Holland & Hart
110 North Guadalupe
Suite 1
Santa Fe, New Mexico 87501
(505)988-4421
mfeldewert@hollandhart.com

For Devon Energy Production Company, LP:

William F. Carr, Esq.
COG Operating, LLC
1048 Paseo de Peralta
Santa Fe, New Mexico 87501
(505)780-8000
wcarr@concho.com

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(Time noted 9:30 a.m.)

EXAMINER JONES: Okay. We are back on the record this morning. I am going to turn the docket over to Examiner Phillip Goetze.

EXAMINER GOETZE: Good morning. And at this point, we will visit again now with case No. 15345, Application of LG&S Oil Company, LLC, for approval of a saltwater disposal well, Eddy County, New Mexico.

Call for appearances.

MR. PADILLA: Mr. Examiner, Ernest L. Padilla for the Applicant, LG&S Oil Company, LLC. We have three witnesses.

MR. FELDEWERT: May it please the Examiner, Michael Feldewert with the Santa Fe office of Holland and Hart appearing on behalf of Devon Energy Production Company. We have three witnesses.

MR. CARR: May it please the Examiner, William F. Carr. I am entering my appearance on behalf of COG Operating, LLC. We are appearing in support of Devon. I have no witnesses.

EXAMINER GOETZE: At this point, I ask the witnesses to stand and give your name to the court reporter and be sworn in.

MR. WOOD: Brian Wood.

MR. MAXEY: John Maxey.

MR. POWERS: Dennis Powers.
MR. SMITH: Kevin Smith.
MR. POLAND: Zach Poland.
MS. MUHLINGHAUSE: Meg Muhlinghause.
(WHEREUPON, the presenting witnesses were administered the oath.)
EXAMINER GOETZE: Please proceed.
MR. PADILLA: Mr. Examiner, we'll call our first witness, Brian Wood.
Well, first of all, as a preliminary matter, we did start with Mr. Wood. And I think the record will show that he started into his testimony and we nearly completed going through the C-108, but Mr. Feldewert objected as to his credentials to testify to part 8 and, I believe, part 12. And we do have Dr. Powers here today to testify as to the geologic contents of this portion -- of the C-108.
But if you would like, we can refresh for purpose of testimony today we will refresh -- what Mr. Wood testified to concerning the C-108 in general.
EXAMINER GOETZE: Let's proceed. Let's just touch lightly on it, if you wish to reiterate anything. We realize the objections that were stated before, we will stay away from those.

Proceed.

BRIAN WOOD

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

DIRECT EXAMINATION (resumed)

BY MR. PADILLA:

Q. Mr. Wood, would you -- I believe we qualified you as a regulatory consultant before?

A. Yes.

Q. And you prepared a C-108 in this case for the applicant?

A. Correct.

Q. Let's go -- well, generally, tell us what this application is about.

A. LG&S is trying to convert an existing oil well into a commercial saltwater disposal well. The proposed disposal zone is the Queen.

Q. And, Mr. Wood, how did you go about compiling this C-108?

A. Talking to company personnel and also accessing online records from the OCD website.

Q. Let's go to the schematic on page -- well, it is slide 1, and tell us how the well is going to be completed.

A. Basically, there will be very little work done.

The water's planned to go into the existing intervals in the Queen. And they'll put in a plastic-coated tubing, a packer following the OCD guidelines.

There looks to be very little downhole work required for this well.

Q. Now, we are talking about the Keohane B Federal No. 3 well, correct?

A. Correct.

Q. What is the disposal interval as stated in this injection well data sheet on side 2?

A. It will be from 3,280 feet to 3,570 feet. That's in the Queen.

Q. Okay. And is that well already perforated in that zone?

A. Correct.

Q. And so you are using the same perforations?

A. Correct.

Q. Let's go on to part 5 of the C-108 on page 2, and have you testify as to what is contained in that table that you have included in part 5?

A. Yes. This table lists all the leases or portions of leases that are within the one-half-mile-radius area of review. The table also shows if there's any Queen operators within that area of review.

Q. I see that all of the leases there are federal

leases; is that correct?

A. Yes. They are all BLM leases.

Q. Did you file this application with the Bureau of Land Management?

A. Yes, we filed the C-108. We have also filed the sundry notice.

Q. Did you receive any objection from the Bureau of Land Management concerning this application?

A. I have not.

Q. Okay. Let's go on to the next table on part 6. What is contained in that table?

A. This shows all the existing wellbores that are within the one-half-mile radius. Ten of eleven wellbores penetrated the Queen. Seven of the wells have been plugged and abandoned.

Q. What formation were these wells that had been plugged and abandoned producing from?

A. The Shugart; Yates; Seven Rivers; Queen, Grayburg in all instances.

Q. Are there any producing wells from the Queen in this table?

A. Yes. LG&S, the applicant, has two Queen wells, one of which is the proposed disposal well. There's a third Queen well owned by Tom Cone.

Tom Cone is no longer listed as an operator by

the OCD. Apparently, there's some financial distress there. We sent him a registered letter. It was returned. It was undeliverable.

We went to his last known address in Lovington. Could not find him. The neighbors were unaware of him. The current occupant of the building was unaware of him.

Q. So you, actually, physically, went to his last known address?

A. Yes. My employee Charles Black did.

Q. What is the proposed injection rate?

A. We are proposing a maximum of 5,000 barrels of water per day.

Q. And what kind of injection pressures?

A. We are proposing the standard gradient of 0.2 psi per foot, which, in this example, would come out to 6,966 psi.

Q. And where did you get this figure from?

A. As far as the --

Q. How did you calculate it?

A. Oh, okay. Just mathematically. We took the highest proposed perforation and multiplied that by 0.2.

Q. Based on OCD regulations?

A. Correct.

Q. All right.

Part 8, we got in trouble with your testimony here. But I just simply want to ask you where you obtained this information from.

A. The tops come from two different wells. The shallower tops came from the completion report filed by the original operator for the Keohane 3. The deeper tops came from the Devon well that's approximately 350 feet to the north.

Q. Now, that's a matter of record --

A. Yes. In essence, all these tops are on the OCD website.

Q. You made a statement in part 12 that you are not aware of any geologic or engineering data that would indicate that the Queen has some hydrologic connection with any underground sources of water.

I don't want you to testify about any geology, but where did you find information to make that statement?

A. We looked at the OCD website as far as the well records within a half-mile radius; also looked online at USGS data on nearest quaternary faults; looked at State Engineer's Office website as far as water wells or, in this case, lack of water wells within a two-mile radius.

Q. Let's go to where you can indicate to us where you made any statements concerning your search for fresh water sources.

A. We have in the application downloads from the State Engineer's Office website all water wells within a two-mile radius. The State Engineer's Office website does not show any water wells within a two-mile radius.

And I had one of my employees, Charles Black, do a field search again looking for water wells that might be there but not in the database. He did not find any.

Q. And where exactly do you have that information on Exhibit 1?

A. Exhibit H contains the downloads from the State Engineer's Office website. And then on page 6 of the text, item 11, I state, Based on a field inspection and a review of the State Engineer's records, there are no water wells within a one-mile radius.

Also, on item 8, page 5 of the text, I give a little more data where I indicate that the field inspection occurred on January 28th of last year.

Q. So let me look at Exhibit 8. You said no PODs found. What is that?

A. Those are points of division. What I have

noticed is that the State Engineer has two databases. One is called water column average depth to water, and the other is called active and inactive points of diversion.

The points of diversion could, for instance, be withdrawal from a river. It is sometimes indicative that you could have a well two miles away. Point of diversion, point of use, if you will, could be very close, which indicates there might be some water nearby. So it is kind of a double-check as far as looking for water sources.

Q. Okay. Let's look at the previous exhibit, Exhibit G and tell us what that is.

A. This is a water analysis taken from the Queen formation. The applicant is proposing to dispose into the Queen formation. And the sample is taken from a well in section 28.

Q. What kind of water in general; what do you see here?

A. The chlorides are 92,000 parts per million. Total dissolved solids are 149,000 parts per million. So it does not classify as drinking water.

Q. You have a number of well schematics here on Exhibit F. Do you see anything here that needs to be noted in terms of migration and fluids in a disposal

well either to the surface or shallower zones or going deeper?

A. I do not.

EXAMINER GOETZE: Continue, please.

Q. In part 8, you state that the closest possible underground source of drinking water above the proposed disposal interval are the red beds between 670 feet to -- 675 feet to 695 feet. Is that within the one-half-mile circle?

A. Yes.

Q. But your search found no active sources of drinking water?

A. Right. More to the point, there are no water wells within a two-mile radius. The information I provided here came from OCD completion reports; in other words, oil wells are supposed to report if they encounter any water-bearing sands. And so this information came from the oil well completion reports.

Q. Okay.

MR. PADILLA: We will pass the witness at this time and offer Exhibit 1 into evidence.

EXAMINER GOETZE: Any problems with Exhibit 1?

MR. FELDEWERT: No. That's an administrative filing.

EXAMINER GOETZE: Very well. Then Exhibit 1 is so entered.

(LG&S Oil Company, LLC, Exhibit 1 was offered and admitted.)

EXAMINER GOETZE: It is your witness, Mr. Feldewert.

CROSS-EXAMINATION

BY MR. FELDEWERT:

Q. Mr. Wood, we just visited Exhibit F. Could you turn to your Exhibit F. These are the well diagrams.

A. Okay.

Q. And I start on the first one of the Keohane A Federal No. 3. Is that the well you seek to inject into?

A. No. This is a different well.

Q. What does the question mark by TOC mean?

A. Oh. In other words, the information in the OCD's website did not indicate how the top of cement was determined.

Q. So we don't know the top of cement?

A. Correct.

Q. There's no information in the well file to indicate where the top of the cement is in this particular well?

A. That is correct. It shows that they ran

150 sacks, but it doesn't show if they circulated or if it did circulate, how much they circulated.

Q. So we don't know anything about the quality of that cement or the bonding of that cement, correct?

A. Correct.

Q. And then if I continue on -- these are all thin wells within your --

A. Correct.

Q. If I continue on to the third well, the Fullerton --

A. Okay.

Q. Do we have the same problem there?

A. That is correct. There's a lack of data in the website.

Q. Okay. And then you also have some question marks about -- if I'm looking down at that hole at 3,500, what's that about?

A. Are you still on the Fullerton?

Q. Yes.

A. Okay. In other words, there is a hole diameter. The hole diameter was not indicated in the OCD website.

Q. And did you do any further analysis of this wellbore --

A. Not beyond what was contained in the website.

Q. Okay. And if I go over to the well which is a couple of wells further in. This was a well that was P and A'd in '91?

A. Correct.

Q. And it has the same problem there with the cement, right?

A. Correct.

Q. Don't know the quality, don't know the height?

A. Correct.

Q. Go to the next well, Chemical Express Texaco Federal No. 2. It looks like we got the same problem there?

A. Correct. This is a common issue in the OCD records, is that operators do not always report the tops of cement or, if they do report the tops of the cement, they don't necessarily report how it was determined.

Q. And as the applicant in this case, did you undertake any other effort to determine the nature of the cement or the top of the cement in these wells other than just review the Division records?

A. That was it.

MR. FELDEWERT: Mr. Examiner, may I approach the witness?

EXAMINER GOETZE: Yes, please.

Q. Mr. Wood, would you turn to what has been marked

as Devon Exhibit 1. And I recognize that this has not been placed into evidence yet.

MR. FELDEWERT: And I, for the record, tell the Examiner that we will have a witness here to verify the information on this Exhibit 1. I think it's helpful to at least have a picture of what we are talking about.

Q. And, as I understand it, Mr. Wood, your client owns the acreage in the east half of the northwest quarter -- is that correct? -- that 80 acres?

A. Yes.

Q. Okay. And that they operate two currently producing wells in that east half of the northwest quarter?

A. Correct.

Q. And both of those wells produce from the Queen formation?

A. Correct.

Q. And are currently producing from the Queen formation?

A. As far as I know.

Q. And that is an interval that you seek to inject into?

A. Correct.

Q. And I think you testified at the last hearing

that they seek to inject now into the Queen because it's no longer economical to them to operate at least this well as an oil well?

A. Correct.

Q. And you mention that that was told to you by your -- someone that you work for?

A. Right.

Q. Do you recall who that was?

A. It was probably either Dennis or Louis.

Q. Sorry.

A. Dennis Shoneffer or Louis Edgett.

Q. You don't remember which one?

A. No.

Q. To your knowledge, did they conduct, show you any kind of an analysis as to why they thought it was no longer economical --

A. An analysis has been prepared now.

Q. Has been prepared now?

A. Yes.

Q. Is that going to be introduced here today?

A. Yes.

MR. PADILLA: Yes.

MR. FELDEWERT: Is that part of the existing --

MR. PADILLA: Part of the engineering

testimony.

MR. FELDEWERT: Is that one of the existing exhibits?

MR. PADILLA: It's not there. It is part in testimony. And it's based on the current production, the current production for oil and for water.

MR. FELDEWERT: All right.

Q. And so you didn't conduct an analysis?

A. No, I didn't.

Q. And your understanding is that they are going to present that here today?

A. Correct.

Q. Okay. Does the company that you work for, LG&S -- you have been employed -- you were asked to do this as a consultant, correct?

A. Correct.

Q. You don't actually work for them?

A. Correct.

Q. So your "client," let's put it that way.

A. Yes.

Q. Does your client hold any other leases, oil and gas leases in the state of New Mexico to your knowledge?

A. Yes.

Q. Do you know where?

A. They operate -- I am not positive if it's the exact same company -- I think it is more or less the same ownership structure -- the East Shugart Unit. And I believe there's other wells.

Q. When you say it's not the exact same company, you mean it is not the applicant here today?

A. It may not be. There's a sister company called Aqua Shisha.

Q. But the applicant here today is the operator of the two producing Queen wells in the east half of the northwest quarter?

A. Correct.

Q. Okay. And are these the only two wells that this applicant operates in the state of New Mexico?

A. I do not think so.

Q. Do you know where else they operate?

A. Elsewhere in southeast New Mexico.

Q. Let me step back.

Do you agree with me that they do not operate any other -- this applicant does not operate any other oil and gas wells in the state of New Mexico?

A. I think the applicant operates other oil and gas wells in New Mexico.

Q. So you don't know where?

A. Not offhand.

Q. Why do you think that?
A. Just conversations with...
Q. Okay. On this particular acreage here, the east half of the northwest quarter, LG&S does not own any rights for the Queen, correct?
A. I have no idea.
Q. Did they tell you that they own either the Bone Spring rights or the Delaware rights below this acreage in the northwest quarter there?
A. There was no such discussion.
Q. I want to go back to your Exhibit No. 1, the C-108. And I want to take a look at your notice letters that went out. I guess they are towards the back of the application -- your Exhibit K. Okay?
A. Okay.
Q. Those are dated April 6, 2015. And that's when I assume you signed these letters and sent them out?
A. Right.
Q. And the company didn't file this application till two months later in June of 2015. Can you explain why they waited so long to file their application after sending out these letters?
A. I cannot.
Q. If I look at the newspaper publication, your Exhibit J, this was advertised -- am I reading this

correctly -- in January of 2015?

A. Correct.

Q. And that was three months before you sent your letters?

A. Right.

Q. And five months before the application was filed before the Division?

A. I am not sure when it was filed with the Division. I would have to check on the date that we delivered it.

Q. If I look at -- does your exhibit have the OCD "Received" stamp on it?

A. No.

Q. Your Exhibit No. 1?

A. Mine does not.

Q. I am going to represent to you that the Division records shows it received in June of 2015.

A. Okay.

Q. Does that sound about right?

A. It seems odd.

Q. Well, that's what I thought, too. But that is what it says here on here.

A. Uh-huh.

Q. Can you explain why this was not filed until five months after this newspaper publication?

A. I cannot.

(Ambient Noise.)

Q. Are you concerned -- would you be concerned about the age of these notices in this newspaper publication given the change and potential changes in ownership out in this area since that time?

A. I think earlier notice is better.

Q. Do you normally -- is it part of your process to send out newspaper publications five months before an application is filed with the Division?

A. My normal practice is to file the application -- the text for the legal ad as soon as I've read the particulars that would go into the legal ad to get the maximum exposure to the public.

Q. Do you normally wait five months before you bring your case to the division?

A. I am not agreeing I waited five months.

Q. Well, somebody did -- right? -- before they filed this?

A. I am not sure. I am not going to say that we waited five months.

Q. Okay.

A. And I can explain why the application was filed in April -- which is compiling information from the time the legal ad was posted until the application was ready

to be submitted.

But my normal practice is within several days of doing the mailing to the public, filing the application.

Q. In this case, though, nobody filed it until a couple of months later?

A. I am not agreeing with that.

Q. I think -- you haven't seen the stamp that says it was received by the OCD in June?

A. I have not.

(Interruption.)

EXAMINER GOETZE: Continue, please.

Q. (By Mr. Feldewert:) If I look at your Exhibit J, it advertises for -- not only for the well at issue here, the Keohane B Federal No. 3, which is underlined here, but then it also advertised for the Keohane B Federal No. 2?

A. Correct.

Q. What is the status of that other well? That's still producing from the Queen, correct?

A. Correct.

Q. Do you know what the plans are for that particular well?

A. Yes. If we're successful in getting approval for the No. 3, we'll file an application for the No. 2

well.

Q. Do you know anything about the completion history for that particular well?

A. I believe it's similar to the No. 3, but I am not prepared to testify on that today.

Q. So you don't know?

A. No.

Q. Okay. Can you explain why they advertised for both wells?

A. We intended to file by both applications, but once we got the objection on the No. 3 well, we held up on the No. 2 well.

Q. And you just continued to produce from the Queen then in the No. 2 well?

A. Correct.

Q. Did you -- and I think you said you prepared this C-108, correct?

A. Yes.

Q. All right. If I go to page 2, what is marked as page 2 in the upper right-hand corner of this application -- so it actually says "page 2."

A. Okay.

Q. And going to subparagraph B-1, you say, The disposal will be in the SWD Queen, and then you give the pool code; do you see that?

A. Correct.
Q. Where did you get that code?
A. The OCD on their website has a table of codes, and that was the most appropriate code for disposing into the Queen.
Q. You found that on the website?
A. Yes.
Q. Do you know what acreage it covers?
A. I think it -- you know -- in essence -- and the staff can correct me -- but when you say you are going in a particular saltwater disposal well zone, it could be in Lea County, in the -- we call it the Acme, it could be Eddy County in the Acme. It would be classified as SWD Acme.
Q. So it doesn't pertain to any particular acreage area, that particular pool --
A. That's my understanding.
Q. If I look at B-5 here, you make the statement here that the Morrow is the only oil and gas zone below the Queen and in the area of review; do you see that?
A. Right.
Q. Is that correct?
A. That's producing.
Q. What about the Bone Spring?
A. It was not producing at the time I wrote this.

Q. When did you write this?
A. April.
Q. April. And you know now there has been a Bone Spring well developed in this acreage?
A. I am aware of that, yes.
Q. And that it's producing?
A. (Nodding head.)
Q. Correct?
A. Yes.
Q. Okay. Are you aware of any Delaware production in the area?
A. There was none at the time I wrote the application.
Q. Is there now?
A. I am unaware of that.
Q. What's that?
A. I'm unaware of that.
Q. You haven't examined it?
A. No need to.
Q. What's that?
A. I've had no need to.
Q. Okay. If I look at your cover page for the C-108, the one -- the actual first page of Application for Authorization to Inject, you are familiar with these requirements, correct?

A. Yes.
Q. And you see there's a part 7 there?
A. Okay.
Q. And then paragraph 4.
A. All right.
Q. It says, Sources and appropriate analysis of injection fluid and compatibility with receiving formation if other than reinjected produced water -- right?
A. Correct.
Q. Did you submit an analysis of the compatibility between your proposed injection fluids and receiving formation?
A. I did not. Because of the qualifying phrase there, I did include an analysis. But the plan is to reinject produced water.
Q. I understand that.

But if I look at page 4, which is your submission and your statement in connection with paragraph VII of subparagraph 4, you say here, for example, Existing wells within section 28 and the adjacent eight sections produced from the Atoka, Bone Spring, Delaware, Devonian, Grayburg, Morrow, Queen, Seven Rivers and the and Yates formations, correct?
A. Correct.

Q. Aren't you communicating here that the source of the potential disposal water could be any of these ten zones?

A. Yes.

Q. And did you provide the Division with an analysis of the produced water from these zones to determine its compatibility with the Queen?

A. I did not because it's produced water.

Q. So, in your opinion, under paragraph VII, subparagraph 4, you don't have to analyze the compatibility of the injection fluids with the receiving formation?

A. Correct.

Q. Okay. And this lists the Queen as a source of the produced water; is that right?

A. Right.

Q. Which tells me -- does it not? -- that the Queen is still producing?

A. In the eight sections and section 28?

Q. Yes. It is still a producing formation in that area?

A. Yes, yes. We've already determined it produces from this well.

Q. You are aware, Mr. Wood, that in this particular area the production from the Queen is actually reported

to a particular pool?

A. Yes.

Q. And are you familiar with the formations that are included within that Division designated pool?

A. Yes.

Q. That would be the Yates, the Seven Rivers, the Queen and the Grayburg?

A. Correct.

Q. They treat that as all one common source of supply?

A. That is my understanding.

Q. Okay. And when you report production from any of these zones, you report it to the same pool?

A. I do not handle production reporting, but that is my understanding.

Q. Well, if I looked at Devon Exhibit 2 -- this is a C-104 from the Keohane B Federal No. 2 well?

A. Correct.

Q. That is one of the wells that's operated by your client?

A. Correct.

Q. In the acreage that's involved here?

A. Yes.

Q. And that production is reported to the pool designated as Shugart, right?

A. Right.
Q. And you see "Y" means Yates, right?
A. Correct.
Q. "SR" means Seven Rivers?
A. Correct.
Q. "Q" means Queen?
A. Correct.
Q. And "GB" means Grayburg?
A. Correct.
Q. And then the next page of this exhibit is actually the C-104 for the Keohane B Federal No. 3; is that right?
A. Yes.
Q. And the production from that well is being reported to the same pool?
A. Yes.
Q. And currently being reported to that pool?
A. Yes.
Q. Have you looked at their -- are you familiar with the perfs for this particular well, this Keohane Federal No. 3?
A. Yes.
Q. And is it true that this well is only perfed for production in the Queen?
A. According to the records online, yes.

Q. And nobody attempted to perf in the Yates or the Seven Rivers?

A. I would have to go back and look at the -- because the well was drilled twice and plugged once, it could have been perforated earlier.

Q. Well, I think somewhere in here, doesn't it point out to the Division that this was twice completed as a Queen well?

A. Right.

Q. There you go, page 2, paragraph B-3 --

A. Yes.

Q. -- was twice drilled as a Queen well?

A. Correct.

Q. So there has never been any attempt to perforate this well in any of the other producing formations that comprise this pool to your knowledge?

A. I would have to go back and look at the well records.

Q. And if I take a look at your application, Mr. Wood, and I go to what's marked as page 1 in the upper right-hand corner --

A. All right.

Q. This is your language; you typed this up?

A. Yes.

Q. After consulting with your client?

A. Right.
Q. And getting the information from your client?
A. Right -- and online sources.
Q. I am focusing now on Roman numeral I.
A. Okay.
Q. The second paragraph; you provide there the cumulative production from '92 through December of 2014 for this well, right?
A. Right.
Q. And this particular well actually has been producing since '72; isn't that correct?
A. Correct.
Q. And then you note that cumulative production then for 2014 in the second paragraph about halfway down?
A. Yes.
Q. And then you state -- or at least on behalf of your client you state, It is no longer economical to operate the well as an oil well under current oil prices?
A. Yes.
Q. That's your language?
A. Yes.
Q. And then you say that the plan is to dispose into the Queen from 3280 to 3570, the same interval that

currently and then you say "uneconomically" produces?

A. Correct.

Q. So you are bringing application, as I understand it, not because the Queen is not a producing interval, but because it's not productive to your client under current oil prices?

A. State your question again.

Q. According to your application, you are bringing this to the Division because this particular well is not economic to your client under current oil prices?

A. Yes, that's what the client stated.

MR. FELDEWERT: That's all the questions I have.

EXAMINER GOETZE: Redirect.

REDIRECT EXAMINATION

BY MR. PADILLA:

Q. Mr. Wood, Mr. Feldewert asked you some questions concerning the timing of the application. Can you tell us generally how long it takes the Division to -- let me preface that by asking you, this was an administrative application?

A. Correct.

Q. After filing the application, approximately how much time expired before you knew that you had an objection?

A. I think it was around May 11th. If I could check my files here.

Yes, on May 11th, I received an e-mail from the OCD indicating that Devon had objected.

Q. And what happens after you received an objection, what information do you get from the OCD?

A. Well, usually -- sometimes they will forward what the nature of the objection is. It's more typical that it's just simply an objection.

Q. Was there any type of negotiation or any contact with Devon or Concho regarding -- let me ask, who objected?

A. Devon did.

Q. And at that time, did Concho object?

A. I am unaware of a Concho objection.

Q. So what happens generally after you receive an objection?

A. I contact the client and say, We need to go before a hearing, who is your attorney. And after that, I let the attorney take the lead.

Q. And do you know when we filed an application in this case?

A. Despite the date stamp, I am pretty certain it was within several days after April 6th.

Q. And, to your knowledge, what has happened with

this application since our filing?

A. There's been no changes on my part. In other words, we had a hearing, I believe, in November, a second hearing in January, and now we are here for a third hearing.

Q. So all this time is it fair to say that an application has been before the Division either pending --

A. Yes.

MR. PADILLA: No further questions.

EXAMINER GOETZE: Very good. Mr. Jones.

EXAMINATION BY EXAMINER JONES

EXAMINER JONES: Was there a move to change this from an SWD application to a pressure maintenance or a waterflood-type application.

THE WITNESS: Not that I am aware of.

EXAMINER JONES: I don't have any more questions.

EXAMINER GOETZE: Mr. Brooks.

MR. BROOKS: No questions.

EXAMINER GOETZE: Mr. Dawson.

EXAMINER DAWSON: I have no questions.

EXAMINER GOETZE: Just two.

EXAMINATION BY EXAMINER GOETZE

EXAMINER GOETZE: You note that the well was

drilled twice. Was any review of the drilling and its impact considered for the well construction; in other words, was there a redrilling through existing casing and recementing or --

THE WITNESS: That's my recollection, is that the initial drilling, the initial test, was unsuccessful, plugged and abandoned for a period of several years. And then a new operator came in and drilled out the plug and recompleted the well.

EXAMINER GOETZE: So it used the existing construction --

THE WITNESS: Right.

EXAMINER GOETZE: -- the original --

THE WITNESS: Right.

EXAMINER GOETZE: And I notice in one of the (inaudible) wells -- let's see. It's in the Fullerton Little A-1, we have a notation on the record and with you. What was the form of stimulation used?

THE WITNESS: On the Fullerton Little A-1?

EXAMINER GOETZE: Correct.

THE WITNESS: I do not know. Excuse me. It shows it was shot with nitro.

EXAMINER GOETZE: It was shot with a No. 5 shell of nitro. Was any assessment made as to the impact on the cement or this interval in the

Fullerton?

THE WITNESS: No.

EXAMINER GOETZE: I have no more questions for this witness. Thank you.

You may proceed to your next witness.

MR. PADILLA: We will call Dennis Powers to the stand.

DENNIS W. POWERS

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

DIRECT EXAMINATION

BY MR. PADILLA:

Q. Please state your name for the record, Mr. Powers.

A. Dennis W. Powers.

Q. And have you testified as a geologist and a geohydrologist in the past and had your credentials accepted by the Division in the hearings that you've testified at?

A. Yes.

Q. Briefly tell us what your educational background is.

A. I have a bachelor's degree in geology and a Ph.D. in geology.

Q. And have you made a study in connection with the

application before the Division today?

A. Yes, I have.

Q. And you are familiar with the geology and -- and have you prepared exhibits for introduction here today?

A. Yes. I have prepared four Exhibits, Mr. Hearing Examiner.

Q. And, generally, what have those exhibits been or what are they?

A. There is a structure contour map, there are two geophysical log cross sections, and there is a last short geophysical log cross section that is in the vicinity of the Sargas 28 4H and 3H wells.

MR. PADILLA: We tender Dr. Powers as an expert in geology.

EXAMINER GOETZE: Mr. Feldewert.

MR. FELDEWERT: No objection.

EXAMINER GOETZE: Very good. He is so qualified by.

Q. Dr. Powers, let's go to Exhibit No. 3 and tell us what that is.

MR. FELDEWERT: Exhibit number what?

MR. PADILLA: Sorry. No. 2.

Q. Exhibit No. 2.

A. Exhibit 2 is an elevation map on the top of the Queen sand that was produced a number of years ago. It

was the first place I looked to determine what the structure of the top of the Queen looked like at the prospective site in section 28. That is outlined in red. The source of this structure contour map is a Roswell geological society publication that is referenced in Exhibit 2.

Q. When was this exhibit prepared by the Geological Society?

A. They published this in their 1960 supplement.

Q. And what did you do to determine whether this is still an accurate representation of what is contained in this exhibit as shown by -- well, in 1960?

A. Well, Mr. Hearing Examiner, what I did was I checked the elevation of a number of the wells. As you will notice in section 28, there are a few data points and there are more data points now. And so I checked the reference elevations for the top of the Queen to determine whether there was a major change in the understanding and the interpolations represented here. And I did not see any gross or major differences.

Q. How is this exhibit relevant to this proceeding?

A. The main part is that I always try to look at a saltwater disposal prospect for evidence that it might be connected to groundwater or to horizons that are above the prospective injection horizon.

And so here there was a disinterested party, somebody who was not a party to this particular proceeding, who provided a baseline that indicates there is no particular -- there are no indications of faulting, there's a general south to southeast dip to the top of the Queen of roughly 100 feet plus per mile. And that was an important first step.

Q. Let's go on to Exhibit No. 3.

A. I have a larger print version of Exhibit 3 that is the same version as what you have in a smaller format that I would like to use.

Exhibit 3 is a geophysical log cross section using images from the geophysical logs. They are scaled vertically to as close to the same scale as I could make them.

They are placed relative to sea level so that they are all on the same elevation. That provides us with some evidence of whether there are structural elements in here that indicate faulting.

They are not placed relative to their horizontal position. They are not scaled horizontally.

Q. Why is faulting an issue that you had to examine?

A. Well, again, it's always important to feel that the injection horizon is going to be well constrained and that we are not communicating to the areas that

might provide groundwater in the shallow area.

Q. So in your cross section which is the injection, the proposed injection well?

A. The injection well is this 1/3rd from the left, and the injection horizon is generally indicated here in the yellow coloring. It coincides with the current -- my understanding of the current perforations in this particular well.

Q. Now, this is a north, south cross section?

A. Yes, this is a north, south cross section from section 28 to 32, and it includes several wells within section 28.

Q. Before I forget, let me ask you, Mr. Wood testified about red beds possibly containing freshwater. Where would those red beds be in relation to what you are showing here?

A. Well, some people would include the Rustler formation in red beds, because there are red muds that are inner bedded between some of the sulfate beds.

There are also some carbonates within that unit that I am very familiar with that are sometimes thought to be water sources, and rarely they are. Most of the time it's very saline if there is any water.

Above that, is the Dewey Lake, sometimes known as the Quarter Master. It's commonly called the Quarter

Master by the Bureau of Geology in Socorro. Above that, there would be normally either Dockum, which is part of the red beds, or in some of the these cases it would appear from the logs that we are very near surface and that it's either Gatuna or perhaps alluvium that's at the uppermost part of the formation or uppermost part of the drill hole.

So those are the red beds. Commonly, Dewey Lake and Dacum would be the most prominent of those. Some people like to include the Rustler.

Q. Dr. Powers, is there any barrier shown on this exhibit that would segregate those red beds from the injection zone; in other words, let's just say that -- and assume that there might be migration upwards for some reason where -- is there any barrier that would prevent migration other than mechanical migration?

A. The natural flow through this system would be the Salado salts. They are plastic. There is no indication of faulting in here.

And if there was migration up through here, whatever the composition of the original fluid was at the bottom, if it's coming up through a natural system, they would wind up being brines. There's no indication in here that there's any dissolution going on from natural migration.

So these beds are as near to zero permeability as you will generally find in nature.

Q. Tell us about -- generally, what kind of production -- do these logs show any type of permeability or porosity or things of that nature that would tell us whether or not there is potential oil production within the Queen?

A. As I look at the Queen, the structure is apparent, either on the small or on the large, that there are two major indicators of porosity above the green line, which is commonly accepted as the base of the Penrose.

And those two zones at the bottom and the top have been perforated in some other wells. They show varying signatures depending upon the logs that were taken and are available.

They generally show reduced acoustic, reduced density. They generally show increased gamma, which normally indicates more fines, less sand.

They also show generally a higher indicator of neutron porosity, either through the casing or in an open hole. And where there's an open hole and a resistivity log has been taken, they quite commonly show a very low resistivity, which I --

Q. What does that mean in terms of oil production?

A. Well, for oil production it is obvious that we need some porosity to hold the oil and some permeability to get the oil to where you want it.

And here these logs don't indicate permeability. It's something everybody I think in the room basically knows, is that we look at porosity or porosity indicators of one kind or another to try to estimate where the best prospects are.

And so a higher neutron porosity -- which is simply reflecting how much hydrogen is in that particular location -- is one of the prime indicators. And resistivity is basically the oldest log there is. And that reflects the resistivity and the connections -- the resistivity of the fluids in the rock and the connections thereof.

So lower resistivity, commonly going to be associated with fresher water or saline water, I should say, to freshwater. And oil or gas tend to have higher resistivity. So they're the general indicators.

And as you see in this particular well, those folks perforated exactly in those intervals.

Q. How about the other wells, do you see the same thing throughout the cross section?

A. Yes. The basic gamma and indicators of lithology and porosity or resistivity across the area wherever

they occur have a pretty similar pattern all the way across.

Q. Do you have anything further on Exhibit 3?

A. No, I don't believe so.

Q. Let's move on to Exhibit 4. Dr. Powers, what is Exhibit 4?

A. Exhibit 4 is a geophysical log cross section, images of geophysical logs, created in the same way that Exhibit 3 was, with vertical scaling as close to equal as possible, no horizontal scaling and hung, so to speak, with respect to sea level.

Q. When you say "scaling," what does that mean?

A. It simply means that you might choose to display it at 1 inch to 100 feet vertical scaling -- 1 inch to 100 feet or whatever, but the horizontal scaling does not reflect the distance between the wells.

Q. Do you have the same Rustler characteristics as shown by the logs as you had in Exhibit 3 in terms of resistivity and that sort of thing?

A. There's a good consistency across this area for the Queen interval that we're looking at.

Q. And in terms of potential oil production from the Queen, what conclusion can you draw?

A. Well, as I look at the -- the one geophysical log, the neutron log, simply indicates the presence of

hydrogen. It could be in water; it could be in oil, gas or whatever.

The resistivity log is showing the resistivity of the fluids within the formation. And here what strikes me is that these logs show really low resistivity, which, again, is consistent with water, broadly speaking -- sorry -- in the more porous zones as indicated by the neutron log.

Q. If you were to make a recommendation as to any horizontal drilling in this area, what might be your recommendation?

A. Oh, I'd go to the Bone Spring.

Q. Different deal?

A. Different deal.

Q. Anything further on Exhibit 4?

A. Only that the upper part reflects the same kinds of circumstances, isolation from the groundwater and very shallow indicators -- very shallow zones that may be alluvium or Gatuna formation that in this area commonly contain very little groundwater from my studies in the area.

Q. Let's go to Exhibit No. 4-A. What is that?

A. 4-A actually is just kind of an enlargement of part of 4. It is a two-geophysical log cross section that I have manipulated in certain ways that is based on

the two geophysical logs that are shown here in Exhibit 4, the second and the third from the left. That's the West Shugart at 29 Federal 5 and the Keohane B Federal 2, both in section 29.

And the reason I did this was that I was interested in the report that the two Devon -- from the two Devon wells that had been drilled really close to the B Federal 2 that encountered water. And so I wanted to make sure I understood the relationship of that water to the best of my ability to the Queen and the Penrose -- the Queen/Penrose interval, as designated here in light yellow, equivalent to the proposed injection interval.

And so what I did was -- because the -- I'm sorry -- so the 31221 and the 05640, using the last five digits of the API number here, have geophysical logs but they are not to the equivalent depths.

And the well that's adjacent to the -- that's adjacent to the No. 3H and No. 4H well was only drilled to about 3,800 or 3,900 feet. And so I took a piece of the log from the 31221 well and correlated it, showed where the correlation is, and let it fall below that to see where the approximate 4137 depth would be on that well.

So it looks like there is about 500-plus feet

difference in depth between the base of the proposed injection and the location of the reported flow in 41795.

Q. And is that shown in the red -- the correlation --

A. The correlation point is shown there in red.

Q. And you are talking about this is the difference in depth from the yellow to the red line; is that correct?

A. No. To the reported depth down below of 4137.

Q. Okay.

A. The red line is simply where I took the correlation point.

Q. So are you saying that the water from the Queen could not have impacted the Devon well?

A. Well, that was what I was really interested in -- was two parts -- was whether any injection that might have gone on in Queen or other intervals up here, how far separated it might be, as well as how far the interval that's being separated from this occurrence, even though there hasn't been any injection yet.

Q. So can you conclude that injection into the Queen will not affect drilling to deeper --

A. I do not believe it would cause such an occurrence at 4137 feet.

Q. And that was what was reported in the Devon well; is that --

A. That's correct.

MR. PADILLA: I pass the witness.

EXAMINER GOETZE: Would you like to introduce some of your exhibits?

MR. PADILLA: Yes, I would. I would like to introduce Exhibits 2, 3, 4, and 4-A.

EXAMINER GOETZE: Mr. Feldewert.

MR. FELDEWERT: I have no objection.

EXAMINER GOETZE: Exhibits 2, 3, 4, and 4-A are so entered.

(LG&S Oil Company, LLC, Exhibits 2, 3, 4, and 4-A were offered and admitted.)

EXAMINER GOETZE: Mr. Feldewert, your witness.

CROSS-EXAMINATION

BY MR. FELDEWERT:

Q. Mr. Powers, I want to take a look at your Exhibit No. 2. It seems to indicate that the dip here of this Queen structure is to the southeast; is that right?

A. Yes.

Q. And that the water -- will you agree with me that the water will naturally flow downdip?

A. That's not always true.
Q. In this case, do you have indication to believe that it's not going to flow downdip here?
A. You would have to look at the pressures. It flows according to pressure.
Q. Okay. Have you done any examination of pressures?
A. I have not.
Q. Okay. So just natural geology would indicate, without any influence by the pressures, it's going to flow downdip?
A. No. That's not a logical conclusion.
Q. Okay. Which way do you think the water is going to flow that you seek to inject?
A. Well, all of the things where I've been involved, it's moved updip.
Q. So you think --
A. But I don't know about this particular case.
All I am saying is that in previous places where I've been involved, the injected water has moved updip.
Q. Okay. And have you been involved in this particular area?
A. No. That's not relevant here.
Q. It's not relevant here.
A. No.

Q. So you don't have any indication as to which way the water is going to flow that you seek to inject?
A. No, I didn't say there was.
Q. So you don't know?
A. That's correct.
Q. So have you undertaken any kind of study to determine the impact that your projected water would have on Devon's offsetting acreage?
A. Not other than what I've just talked about.
Q. So if I go to Devon Exhibit No. 1 -- do you have that in front of you?
A. I do not.
Q. Hold on one second.

MR. FELDEWERT: With respect to Mr. Wood, the exhibits that you were looking at, did you take those with you?

MR. WOOD: Yes.

MR. FELDEWERT: Can we put that back up on the stand.

(Complies.)

Q. Devon Exhibit No. 1.
A. Okay, No. 1.
Q. Now I'm going to represent to you -- the acreage that's hatched there in red, do you see that?
A. Yes.

Q. That is Devon's acreage in which they own the Queen rights.

A. (No response.)

Q. Okay. And the proposed injection well that you seek to use, on here, as I understand it, is the Keohane Etal E3, do you see that?

A. Yes.

Q. And it shows, at least on this mapping software, as a plugged well, doesn't it?

A. I'm sorry. Say that again.

Q. On this particular mapping software it shows up here as a plugged well; is that how you read that symbol?

A. I read "D" and a funny symbol and an "A."

Q. But that's the well we're talking about here?

A. Yes.

Q. Okay. And you heard the prior testimony that that is actually a producing well from the Queen?

A. Yes.

Q. So my point here is you see that Devon's offsetting acreage here is to the south and the southeast of the area that you seek to inject?

A. I'm not a landman.

Q. You can't tell from this map that that's south and --

A. If that's what's represented here.
Q. Okay. Your Exhibit No. 3.
A. Okay. I'm sorry. I will have to make do with the big one. Would you like it back up here? It's easy enough to do.
Q. That's fine.
Now the second well from the left here, that is the Keohane Federal No. 2?
A. Yes.
Q. And that is one of the wells that is currently operated by your client in this acreage as a producing Queen well?
A. That's what I understand.
Q. Okay. Even though that it shows in that particular well that there's very few perfs in the Queen?
A. Yes.
Q. And then the next well over is the Keohane Federal No. 3, and that is also your client's well that's currently producing from the Queen?
A. Yes.
Q. And that shows a more extensive perforation; is that right?
A. It's the interval, the total interval, that includes all perforated zones.

Q. And as you point out here, you say "thin intervals re-perfed in 1972"; what do you mean by that?

A. That was the best I could glean from it, was that there were additional perforations.

Q. In 1972?

A. That is what I thought.

Q. And as a result of those and, perhaps, in conjunction with other perfs, that well has been producing from the Queen since 1972, correct?

A. As far as I know.

Q. And this indicates that there has been no attempt by any party in those two wells to perforate any other portions of this pool, that being the Yates, Seven Rivers?

A. I don't recall anything in the records that indicated that.

Q. And does this indicate, as I understand it, Mr. Powers, that the Queen sands that were productive here, under your client's acreage, extend across section 28?

A. Please repeat that.

Q. Does this indicate that the Queen interval, the Queen sands that have been productive on your client's acreage since 1972, that those sands extend across section 28?

A. Yes.
Q. And then if we could, I want to now move to your Exhibit No. 4.
A. Okay.
Q. And there's a couple of things that were puzzling to me on here. I see the third well from the left --
A. Uh-huh.
Q. -- which you label the Keohane B Federal No. 2; do you see that?
A. You saw my hesitation earlier. That's a mislabel.
Q. Okay. What is that well?
A. That is the Shugart A 09.
Q. The third well from the left?
A. Yes.
Q. So the number that has 05640, the last API number, that's --
A. That is correct.
Q. And that's located in section --
A. Section 29.
Q. -- in section 29, correct?
A. Yes.
Q. And that's located in the east half of the east half of section 29?
A. It is in Unit I.

Q. That's the east half of the east half, okay. And you label that as an SWD?

A. Yes. At the time, when I was looking at this and I saw the injection, I saw something that triggered me to label it SWD instead of WIW.

Q. What is WIW?

A. Water injection well.

Q. It's a water injection well, correct?

A. Yes.

Q. And it's for a water flood operation, right?

A. Yes.

Q. It's not a disposal well?

A. That's correct.

Q. And this is for a water flood operation in what zone?

A. It would be in that whole interval, as you can see where the perforations are, from part of the Seven Rivers on down.

Q. Including the Queen?

A. Yes.

Q. So it is part of a water flood in the Queen?

A. It would appear so, yes.

Q. And then the next well over is the No. 2 that we talked about, right?

A. Uhhh --

Q. Is that right?
A. Yes.
Q. And then the next well over that you label the Keohane B Federal No. 1; do you see that?
A. Yes.
Q. That is located in section 28?
A. Yes.
Q. And that is located in the west half of the west half of section 28, right?
A. Yes.
Q. And you've, likewise, labeled that as an SWD?
A. Yes. That was my understanding at the time when I prepared this.
Q. Another mistake, right?
A. It would look like it, yes.
Q. Well, it is, isn't it?
A. Yes.
Q. That's a water flood well?
A. Yes.
Q. Not for disposal in the Queen, is it?
A. No.
Q. It's for a water flood --
A. Yes.
Q. Now, I would like you to turn to what has been marked as Devon Exhibit No. 4. And I'm going to

represent to you, Mr. Powers, that this is a bubble map of production from wells that are perfed in the Queen around section 28, okay?

A. That's not how I read the caption.

Q. Well, which caption, sir?

A. The caption on this figure says this is a Guadalupian production map, not a Queen.

Q. Do you see at the bottom, it says, Yates, Seven Rivers, Queen, and Grayburg?

A. Yes.

Q. But we will have a witness here that will talk about this map.

But I am going to represent to you that these bubble maps are production from wells that are perfed in the Queen in this area, okay?

A. That's your representation.

Q. Start right there. So my question is, as I look at this, I'm looking at wells that are productive in the Queen; I see that you chose certain wells that go from west to east, right?

A. Roughly west to east, yes.

Q. But you see those bubbles in the north half of 32, those particular wells?

A. Okay.

Q. Those are Queen-producing wells --

A. Okay.

Q. -- is there a reason why you didn't use those wells in your analysis?

A. I simply used wells that had good geophysical logs that would represent the area across section 28. I didn't extend it infinitely or to a particular point other than --

Q. What about that Queen-producing well with the bubble there in the southwest to the southwest; is there a reason you didn't put that in your cross section?

A. No. I just did a north, south cross section; I did a, more or less, east, west cross section.

Q. The same way with the big producing wells in the northwest of 27, you chose not to put those in your cross section?

A. Yes, I chose a different well.

(Ambient Noise.)

Q. Would you agree with me that, similarly, this Exhibit 4 demonstrates that the Queen sands that have been productive in section 28 extend across section 28?

A. Say that again, please.

Q. Would you agree that Exhibit 4 demonstrates that the productive Queen sands in which your client's wells are completed and producing likewise exist across section 28?

A. I would agree that those sands do go across section 28.

Q. Your Exhibit No. 1 --

A. That's not my exhibit.

Q. Okay. Turn to LG&S Exhibit No. 1. I want you to turn to LG&S's Exhibit No. 1. That is your C-108.

(Pause.)

A. What page?

Q. And make sure when you leave that you leave the exhibits up there, okay?

A. I'm known for leaving those behind.

Q. Okay.

A. What page?

Q. Would you turn to what has been marked in the upper right-hand corner as page 5.

A. (Witness complies.) Okay.

Q. If I look up here at Exhibit 4 -- I know I am skipping around here and I apologize -- we had some discussions about the Rustler formation; do you see that?

A. Yes.

Q. How deep is that?

A. If you look here on that well, the top of the Rustler --

Q. Hold on. You got to be better than "that well";

which way are you looking at it?

For the record. I'm sorry, sir.

A. I thought we were looking at B Federal 3.

Q. You pointed to a well on Exhibit No. 4; which well did you point to?

A. This one, B Federal 3.

Q. Thank you.

A. 580 feet.

Q. That's the Rustler formation?

A. The top of the Rustler.

Q. And that's where you noted that the water-bearing sands exist?

A. What I noted was that the red beds, as they are commonly known, are most commonly thought to be the Dewey Lake and the Dockum. There are people in southeastern New Mexico that include the Rustler in the red beds.

Q. And the red beds being the --

A. That is simply a general description. If you look at the Rustler, you will see there's a lot of gypsum, anhydrite and so on that's not red, and so included in the --

Q. But if I look at page 5, when you talk about the water-bearing sands -- your client talks about the water-bearing sands, is that what they are talking

about?

A. Yes. Typically, they have said that there are sands from 675 to 695. Those would be in the Rustler.

Q. Okay.

A. I think that's what you are saying.

Q. Yes.

A. They actually coincide with anhydrite beds.

Q. The next question I have is -- you were, I believe, using either this exhibit or the prior exhibit to talk about the permeability of the Queen formation.

A. No. I was not talking about permeability.

Q. Was it porosity?

A. We spoke more about porosity, yes.

Q. Okay. My question to you is is there a sufficient porosity, in your mind, within the Queen to take the water that you seek to inject?

A. It would appear so.

Q. And, likewise, was there sufficient porosity in the Queen formation to produce oil since 1972 in these particular wells?

A. They have produced oil.

Q. And has there been sufficient porosity in this area to actually have water flood operations as reflected now in your corrected Exhibit No. 4?

A. Uh-huh, yes.

MR. FELDEWERT: That's all the questions I have.

EXAMINER GOETZE: Redirect.

REDIRECT EXAMINATION

BY MR. PADILLA:

Q. Dr. Powers, you were asked some questions about why you chose -- and it appeared that the questions were geared to some kind of selective selection of the wells on your cross section. Can you elaborate a little more why you chose the wells that you chose for your cross sections?

A. Sure. It is not actually terribly complicated. It is partly where logs are available and partly where those logs are good quality so that we can see the general continuity, see the relationships among them. It doesn't -- and make sure that we include the relevant proposed injection well in those cross sections.

It's not an attempt to avoid or include any particular well for other reasons.

Q. And they generally are designed to cover section 28?

A. Generally designed to cover section 28 and extend a little beyond that in order to show that that continuity is still there.

MR. PADILLA: That's all I have.

EXAMINER GOETZE: Very good. Mr. Jones.

EXAMINATION BY EXAMINER JONES

EXAMINER JONES: Dr. Powers, I don't have many questions. Have you run across any cores in the Queen or core analysis where you could plot porosity versus permeability?

THE WITNESS: I have not done that. I have seen them in outcrops, but I have not had any cores from the Queen.

EXAMINER JONES: But is it true that sandstones you can -- they correlate a little better across the permeability than carbonates?

THE WITNESS: Yes.

EXAMINER JONES: And do you remember how much this well had produced?

THE WITNESS: No, I do not. I believe the next witness may cover that.

EXAMINER JONES: Oh, okay. What about the clays in the Queen and the make-up of the Queen; the total porosity is not the effective porosity, is it?

THE WITNESS: No, sir.

EXAMINER JONES: What kind of clays do you see?

THE WITNESS: I can't tell from a -- you can't tell from a natural gamma. And the natural gamma

log is just a -- it's a metric for estimating sand, shale, if you like. It's very commonly used for that.

But we see many units that look rather clean, that don't seem to produce or have any oil and then others that seem to be silty or a bit clay, and they can be made to produce at times or 'take,' as the case may be.

EXAMINER JONES: Is there any kind of (inaudible); what was the history of the Queen?

THE WITNESS: Yeah, there's a lot of academic publications about the whole Guadalupian, and arguments over which transgression, high stand and so on. I've looked at it a lot. I have not gotten into the weeds.

EXAMINER JONES: Sometimes we've seen some improvement in the Queen production by -- especially in water floods -- by meticulously correlating the injection intervals with the production intervals. And they've actually had some improvements.

Have you looked at what the history of this well is to see -- let's say this well was continued as a producer. Is there anything that comes to mind that you could have improved its production?

THE WITNESS: I have not looked at that. Again, that might be a better question for the next

witness.

EXAMINER JONES: Okay. No more questions. Thank you.

EXAMINER GOETZE: Mr. Brooks.

MR. BROOKS: No questions.

EXAMINER GOETZE: Mr. Dawson.

EXAMINER DAWSON: Yes.

EXAMINATION BY EXAMINER DAWSON

EXAMINER DAWSON: Dr. Powers, on the Keohane --

MR. PADILLA: The Keohane.

EXAMINER DAWSON: -- on the Keohane B Federal No. 2 well, do you know what that was producing before?

THE WITNESS: I do not, sir.

EXAMINER DAWSON: But the 3 was producing four barrels a day?

THE WITNESS: I don't have those numbers in my head. Again, sir, I believe the next witness will address those better.

EXAMINER DAWSON: I guess the next witness probably can answer my questions regarding any subsequent stimulation on the well?

THE WITNESS: Yes.

EXAMINER DAWSON: Okay. That's all the

questions I have. Thank you.

EXAMINER GOETZE: Very good. I have just one question.

EXAMINATION BY EXAMINER GOETZE

EXAMINER GOETZE: As part of the requirements, the confining zone or layer, applicant has made a petition for the entire Queen, taking the Queen up to the Seven Rivers. Could you give us a little bit of a qualifier as the Seven Rivers being a confining element?

THE WITNESS: As we look at the geophysical logs in here, we see that there are some -- there are -- the Seven Rivers is obviously a very mixed zone, and we see a number of intervals in here that have quite a lot of clay as indicated by the natural gamma at least. And so those would, as we look at an uncased well over here, we see that --

MR. PADILLA: Which well are you pointing at?

THE WITNESS: This is actually the Shugart one that is in section 29. It just happened to be close to me and it's got an uncased log.

MR. PADILLA: And that's the first left on --

THE WITNESS: Yes, the first well on the

left on Exhibit 4. And so there are several relatively high gamma units. And they also seem to have a reasonably high density in here.

I think that those units would probably represent the best obstacle to vertical movement in the natural circumstances.

EXAMINER GOETZE: So these essentially inner beds, are they continuous or is this going to be a mix and match as we go across section.

THE WITNESS: There are several inner beds here that seem to go quite a bit across. If you look at some of the cased and the uncased logs in here, there are intervals that seem to be easily correlatable across the entire section.

They don't represent the full spectrum that we see over here in this particular log. But there are a number of those, especially in the cased holes. They offer a lower natural gamma. They don't look quite as prominent because of some of the attenuation going on.

EXAMINER GOETZE: Very well. That's all the questions we have for this witness.

Your next witness is going to be --

MR. PADILLA: The engineer.

EXAMINER GOETZE: The engineer. And his time of consumption?

MR. PADILLA: Probably 45 minutes with cross.

EXAMINER GOETZE: Okay. So let's take a five-minute break so we can stretch --

MR. PADILLA: Also, Mr. Examiner, I would like to reserve the right to recall Dr. Powers for rebuttal.

EXAMINER GOETZE: Very good. Let's stretch our legs.

(Brief recess.)

EXAMINER GOETZE: Let us go back on the record. Mr. Padilla, please continue.

MR. PADILLA: Mr. Examiner, I will call John Maxey at this time.

JOHN C. MAXEY

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

DIRECT EXAMINATION

BY MR. PADILLA:

Q. Mr. Maxey, please state your name.

A. John Maxey. I am from Roswell, New Mexico.

Q. And, Mr. Maxey, have you previously testified before the Oil Conservation Division and had your credentials accepted as a matter of record as a petroleum engineer?

A. Yes, I have.
Q. On what phases of petroleum engineering have you testified?
A. I've testified on matters relating to production engineering, drilling, reservoir primary and secondary recovery operations.
Q. Mr. Maxey, did you prepare and make a study of the engineering aspects of the application under consideration today?
A. Yes, I did.
MR. PADILLA: We tender Mr. Maxey as an expert petroleum engineer.
EXAMINER GOETZE: Mr. Feldewert.
MR. FELDEWERT: No objection.
EXAMINER GOETZE: He is so qualified.
Q. Mr. Maxey, generally what did you prepare, how did you approach your sphere of influence in this case?
A. After I looked at the client objective here -- this is a very broad area, it is a large field -- I narrowed it down to a nine section study area.
The applicant well is in section 28. And so what I did was look at section 28 and the surrounding sections for a nine-section study area.
Q. Okay. Let's turn to Exhibit No. 5, and I ask you

what that is.

A. Exhibit No. 5 -- and I apologize -- this -- there is a lot of well density in here. It is an old field; a lot of information on this map. This is probably the busiest exhibit I have.

This exhibit is the nine-section study area. And if I happen to refer to this field in some of my testimony, I'm referencing this nine-section area.

Q. Mr. Maxey, before you go on, the proposed well is the one in section 28 with a bold red circle?

A. Yes. And that is the focus of this map, is section 28 in the northwest quarter, there's a red circle around that black dot, 7,457 barrels of oil cum. That is the applicant well, the Keohane No. 3.

Q. Okay. What are you trying to show with this exhibit?

A. What this exhibit is is this is all the oil producers and their cum oil production, and it's also -- this area has been subject to water injection since 1966.

There's been several water flood units formed in the area. They primarily were formed for Queen. There's been comments made about allocation or unallocated production and injection. And it's correct that this is an unallocated area.

You have -- what this map represents is the interval from the Yates down through the Penrose, cumulative oil production and cumulative water production.

The black well symbols are oil wells. And the blue wells with black symbols in the middle were productive oil wells that were converted to injection under one of the various units that have been formed out there.

Q. Mr. Maxey, are all of these black wells Queen wells?

A. They are a combination. When I reviewed this area, I kind of worked my way out from the Keohane 3. And it is clear from looking at records, the predominant producing zone in here is the Queen formation.

There is Yates production and there is Grayburg production in the area. And this is a qualitative look at records. But the Queen is the primary production zone and the primary injection zone. The water floods were basically developed for the Queen.

However, there were a couple of units out here that did discuss injection into the Yates also.

Q. Mr. Maxey, there are some boxes or bullets that you have here -- well, let me call them boxes, I guess, with arrows. Let's start at the 11 o'clock position.

A. Okay.

Q. What are you trying to say here?

A. Okay. We will start -- I'm trying to give you a perspective of some of these injection wells that were immediately offset to the Keohane No. 3. And that's what these boxes are.

The yellow boxes, I want to make a specific point on those boxes. The white ones are more for your information to give you somewhat of a synopsis of what is offsetting as far as water injection wells.

When I go to the box at the 11 o'clock positions pointing to the well over the southwest of the Keohane over in -- it's actually in the east half of 29, that was an original oil completion from 3280 to 3774. That would be a Queen/Penrose. And it was completed in '61.

It was converted -- it produced 23,900 barrels of oil. And I'll forego these cums since they're on the map from here on. It was converted to injection into the Yates, Queen, Grayburg section in 1970. It was P&A in 2013.

Moving to the next box, just west of our target well, our applicant well, this was an original completion in the gross interval 3269 to 3538 in 1962. P&A in '65. It was re-entered and converted to an injection into 3265 to 3550 in 1972. And P&A in

1995.

Q. And how many barrels have been injected in this well?

A. In the well?

Q. In the well that is at 1130. I think that is the one that you were talking about; is that right?

A. I was talking about the well directly to the west of the applicant well.

Q. Okay.

A. The well directly west of the Keohane 3 has had just over 2 million barrels of water injected into that interval.

Q. And how about the first well, the one at 11 o'clock?

A. That well has had almost 5 million barrels of water injected into that interval.

Q. Where is that water in terms of -- where does that water go?

A. Well, primarily in the Queen. This injection was primarily in the Queen. As I stated, when you go back and look at the history of the orders in the area, it was primarily Queen units that were formed. This is primarily Queen production.

There was a question from an Examiner earlier about conformance, and that's one of the problems here

with unallocated intervals, is you don't know exactly where all the water has gone. But when the focus has been on the Queen, my opinion is that most of the water has been in the Queen formation.

Q. Are you ready to go to the 11:30 spot?

A. Yes.

Q. Okay.

A. Actually, I was moving clockwise up to the one o'clock.

Q. Okay. We have already talked about the 11:30?

A. Yes.

Q. And that is the one you said there had been 2 million --

A. Just over 2 million barrels of water injected into the well just to the west of our well, the Keohane 3.

If you move to the injection well just to the north of Keohane 3, that was originally an oil completion also, from 3284 to a 3570. In 1961, that is what the majority of these completions are going to be in the early sixties.

Convert to injection, water injection into the gross interval, 3282 to 3306 in 1970, the well is currently inactive, the water flood unit that this particular well was in was terminated last year. That

particular well, over its injection life, there were about three-quarters of a million barrels injected into that well. Moving on.

Q. Go ahead.

A. Moving on to the east, if you look at the descriptive box for the well on the east half, east half of section 28 -- that's due east of our Keohane 3 -- again original oil completion, 3875 to 3787. That's a Grayburg sand. They did not make a Queen completion in that well. They are making a Queen completion attempt. And I want to discuss that later.

They converted that to injection into that Grayburg interval in 1972. And then they added Queen injection perfs in 1983 from 3530 to 3565. And that one, again, the injection is inactive, chose to be inactive in 2015. That well, it's about 2.5 million barrels of water injected into that well.

Now moving down from that, going to the southwest, I have a yellow box, a descriptive box to the well in the northwest, northwest of 34.

You know, we are here today because there's been some objection I think on the basis of correlative rights. And in this particular well, in April of 2013, Endurance had a hearing up here for that particular well, and they received an order for water injection

into that well under R-13615.

When they came to hearing, if you read the testimony, they specifically stated that they needed the -- this well -- they needed injection primarily for saltwater disposal. Also within the testimony, there was no -- there's no other -- there's no opposition at the hearing.

So this order for injection which they stated was primarily for saltwater disposal for their purposes, there was no objection. This is an immediate offset to some of Devon's acreage.

That well currently -- they have injected about a half million barrels of water into that well since April of 2013 when disposal was -- excuse me -- when injection was initiated. And I believe my slide says "disposal," and this is an injection order, so this would be injection.

And, currently, they are injecting water at the rate of 673 barrels of water per day.

So I move around to the south, to that yellow box to the south, just slightly southeast of our well. It is at the bottom of the page. I'm pointing out two dry holes that are on the south half of 28.

The well on 28, Unit K, is the Keohane Etal A No. 3 TD 3650 in the Queen. And in April of 1962, the

reports, the OCD, the public record states that it's completely dry, P&A, did not produce any oil.

The well on 28 I, the Little, No. 1A, TD 3940, which would have been most likely Grayburg, they drilled through the Grayburg sand -- in March of 1953 that well was P&A. So I have two dry holes on the south half of 28 that I wanted to point out.

I've got the well that I previously mentioned in the east half, east half. That's the injection well that no Queen completion attempt was made.

Q. How about the other two dry holes in the northwest quarter of the northwest quarter in the northeast quarter of the northeast quarter of section 28 --

A. Well, those were shown as dry holes. But what I have seen in the records, they show no cumulative oil production; but they do state in records that the one in northwest, northwest, they had a test of 57 barrels of oil per day, but this well does not show cumulative production in the electronic records.

And in northeast, northeast, they state that they flowed oil. But there is no cumulative production.

Q. Are these wells plugged and abandoned?

A. Yes. That is why I have red dry hole markers. But the ones more specific to this case are the ones in

the south half of 28.

Moving over to the southwest, into that box, it's another point I wanted to illustrate. This was a dry hole in 1962. I'm looking at the well in the northwest, northwest of 33.

This was a well that was a dry hole; TD'd at 3855 in 1962. It was reentered to convert to a Yates injector in 1972.

Then in 1982 -- and if you'll note, this well was offset to a Queen producer that made 130,000 barrels of oil just to the north. So this well, an attempt was made to complete in the Queen in 1982, and they were unsuccessful. And they P&A'd the well.

So they offset a pretty good well but it was late in time and they did not make a Queen producer. They plugged the well. So that well is plugged.

Also, I wanted to point out, I don't have a box, but if you'll look at section 33, unit G, you will see the cumulative production on that well is 1,234 barrels. That well, the IP on that well, was eight barrels of oil a day from 3646 to 3857. And in the Yates, they perforated the Yates from 2668 to 2731.

What they also did in their completion attempt was they perforated Queen sand at 3412 to 3563. And they called that "wet," and then completed, in what they

described as middle Queen, from 3646 to 3857 plus the Yates interval.

This was just another data point out here. It is a poor completion. And so I've got -- what I am looking at is the lack of Queen production in the east half of 28, two dry holes in the south half of 28. I've got a dry hole with a more recent completion attempt in the Queen in the northwest, northwest of 33, and I've got this well in 33 G. There was also a very, very poor Queen attempt.

If you go back to Exhibit 1, Dr. Powers' Exhibit 1, you will notice that the lowest point in my -- in my study -- basically, the lowest point in the township, is the east half of 33.

So we are moving downdip from our well at 28, basically moving downdip to section 33.

Q. Mr. Maxey, you referred to Exhibit 1, but I believe it's Exhibit 2.

A. You're right. It's Exhibit 2. I apologize. Exhibit 1 was the C-108.

So I believe this is probably one of the reasons, potentially the reason for this poor completion in 33 G.

So those are the salient points I wanted to make with this map, Exhibit 5.

Q. Mr. Maxey, you have another well. I'm not sure

if you testified concerning that, the one circled in the north half of section 33.

A. Yes. Thank you for reminding me.

Q. Why did you circle that well?

A. I intended to circle that to bring that up during this part of the testimony. The well in section 33, Unit C with a red circle around it, that is a commercial disposal. The OCD records will state that that is a disposal within the Delaware San Andres interval.

I have another exhibit, similar to one that Dr. Powers had. And I believe that Devon has had some recent shallow drilling problems with water flow on their well in the east half of section 29, and I believe it's directly related to this commercial well. We will discuss that later.

Q. How much injection has gone into that well?

A. That well has -- there's been over 7 million barrels of water injected into the well in 33 C. And I might add in this nine-section area, this map that you're seeing, there's been nearly 60 million barrels, 58.4 million barrels of water injected in these nine sections in the blue dots.

Q. Are you ready to go to Exhibit 6?

A. Yes.

Q. What is Exhibit 6?

A. Exhibit 6 is a rate-time curve; it's a performance curve on the wells in the nine section area.

As you are probably familiar with, the monthly data is accessible from 1970 forward, the electronic data. Prior to 1970, you can just get a prior cum, unless you actually pull it from engineering books that are in the library in Roswell.

So as I stated before, injection started with two wells in this area. They were converted in 1966. There were two more put on in 1968, and there were two more in 1970. And I got this out of the engineering books in the New Mexico Energy library.

So you have six injectors up through 1970. And then they continue to expand these units. There continued to be more injection.

So you see an increasing -- let me just on this plot, let me go back. The green plot -- this is a rate-time curve, so we have years on the X-axis, we have volumes on the Y-axis.

Green curve is oil, red curve is gas. The lighter blue is water volumes. The purple dots are injection volumes. And then the darker blue at the top is just your water in a cut, in a percentage cut.

There's a lot to be gleaned from this curve. No.

One, as the flood was expanded, you see the water cut starting to increase on the left-hand side from about -- let's see -- 40 percent up to the current 96 percent water cut in the field.

Drop down to the next curve, the purple dots, you see that they were injecting makeup water in this flood up through about 1991. And then you see those purple dots fall and ride on the blue line. All they are doing is taking produced water and reinjecting it. So this flood has started to mature to a point where they're pulling injection wells off. Okay.

This has been basically a recycle flood, a disposal flood, whatever you want to call it up to the current date. Basically, whatever water is produced is reinjected.

You can see the peak oil was probably about 1976. And then natural gas, you can see the decline, you know, as gas was produced -- you are losing your natural energy and, just typical water flood, they are replacing that energy with water pressure.

One other thing that is pretty telling is the lower light blue line -- and I forgot to mention that one earlier -- but the lowermost blue line is well count. And if you'll notice in 2008, there is a definitive point where wells are going offline. And

it's just my opinion that there's a reason for that and it's probably economics.

You'll see the well count declining dramatically to a current, approximately, 40, 42 wells in the field.

And looking at the laser production data, similar to IHS production, you've got eight active injection wells, 47 active oil wells. The average injection rate would then be 246 barrels of water per day per injection well. And the average oil rate would be 1.5 barrels of oil per day per well on the producing wells.

And, again, that comes from the laser database or similar IHS data.

Currently, the overall nine section area is 72 barrels of oil per day. That's a 4 percent oil cut with the amount of water being produced.

Q. So what is the remaining 96 percent?

A. Pardon me?

Q. What's the remaining 96 percent?

A. Water.

Q. And that's going right back in the --

A. It's going right back in the ground, probably recycling from the injection wells over to the producing wells.

Q. And this oldest production is all around -- let

me ask that, is all around section 28 essentially?

A. It's the nine sections that are on the map on the initial exhibit that I have.

Q. Ready to move to Exhibit 7?

A. Yes.

Q. What is Exhibit 7?

A. Exhibit 7 is a little bit bigger than the initial exhibit. It is strictly the injection wells. It's a little easier to read. But these are the wells that add up to 58 million barrels of injected water.

Q. Let me ask, what is the difference between, say, a saltwater disposal well and an injection well in this area? I mean what effect would it have on oil production? In other words --

A. I'm not sure what your question --

Q. Well, you have an injection well and it's the sign to push oil to a producing well as I understand this --

A. Right.

Q. And what's the difference in this nine section area between injection wells and the proposed well?

A. There is really no difference between injection and disposal as far as the mechanics of what's going on down --

Q. Okay.

A. -- if I understand your question correctly.

Q. You've answered. There's no difference; it's basically the same deal, except, down here, in section 34 where you have what appears to be a pattern of injection wells as a sign for something.

A. Yes. Down in section 34, that is the East Shugart Unit, and it is undergoing active injection. I don't have the actual numbers down there. There are active injectors and they're producing -- it's at very high water cut-offs. It's on its last leg. And as far as a water flood, it's very mature.

It was initially some 20 -- I believe I'm correct -- 20, 25 years ago they established a line drive pattern over there. That's why you see that line of injectors.

Q. You have some boxes in here. Would you explain what those --

A. Yes, this map, I kind of wanted to get a little deeper into. I understand there will be questions about correlative rights as one issue. It was my understanding that there may be questions about shallow drilling problems, pressuring up shallow zones and creating problems for offset drilling as some of the other questions. So I wanted to try to address these.

This particular exhibit -- No. 1, you see the

Keohane 3, the location of it there in section 28. Devon has recently drilled the Sargas -- I believe I am saying that correctly -- or Sargas 29 Fed Com 3H in section 29.

They had a water flow in that well on their intermediate casing. And I know their sundry notice, they were at a TD of 4137. And, quote, unquote, on the sundry notice it said, "With the water flow at the bottom of the well." So I took that to mean at 4137 they have a water flow. They had encountered a water flow.

There happens to be a sand right there that they had drilled into. Now, one thing I noticed in these records, which was a little ironic, was, I believe, Devon had planned to drill 4,700 feet on this intermediate casing, and the BLM -- and I can't state that as fact -- but in your BLM permit, a lot of times they scratch that up with pencil, give you your conditions of approval. And 4,700 was scratched out on the APD, and 4,100, right in that area, was inserted.

So I don't know if the BLM did that or what. But they had to go back to the BLM in a sundry notice and request permission or they chose to, which was the wise thing to do, was drill past this problem another

300 feet and set their casing. I don't know if there is going to be any implication made as far as our well creating shallow drilling problems.

So I brought this up to illustrate that we have this commercial saltwater disposal in section 33. It is in the Delaware San Andres Unit, and I got another exhibit a little further back. We will just look at a correlation between that well and its injection interval versus a nearby offset to the Sargas.

There's no logs on the OCD website for the Sargas, so I had to use the nearest offset I could get. That's mainly the purpose for this exhibit.

Q. You also circled the Endurance well here.

A. Yes. That Endurance well continues to -- this entire area to the south that is directly offsetting Devon's acreage, they did not object to Endurance's injection application in the northwest, northwest of 34 just a couple of years ago.

I find no evidence they injected to this commercial disposal. I find no evidence that they -- that's not even on my map, but there's a Ray Weststall just recently approved SWD in the northeast, northeast of 32.

I find no record of them objecting to that. They've had this water flow, and now they are objecting

to this application by LG&S.

So I'm not sure exactly why the objection, but that's why I circled the Endurance again on this exhibit.

Q. Mr. Maxey, you have a line of cross section on this, what do you intend to show with that?

A. That's going to be -- that's the A to A Prime. It is a two-well cross section from a well very near the Sargas in section 29 down to the T-Bone well, the commercial disposal in section 33.

Q. Is that -- are you trying to illustrate some kind of drilling problem --

A. I'm going to illustrate my opinion of what's going on, that their water flow came from their well.

Q. Anything else on Exhibit 7?

A. No.

Q. Okay. Let's go to Exhibit 8. And tell us what that is.

A. Exhibit 8 is -- again, this is oil and injection well spots with some of the data removed to clarify -- well, basically, clarify the map.

What I have done is gone in and on all the -- what shows to be active producers, I have drawn a large black circle around, around the smaller either blue or black dot. The one exception is again that commercial

disposal well, I drew a black circle around it just so you could identify it.

I then went around, just in a clockwise fashion again, looking at some of the nearest active producers to give you an idea of what kind of rates we're talking about here as far as oil.

Going from the northwest, working my way clockwise, we're looking at 1.9 barrels of oil a day. One well it shows no rate.

Our offset is the Keohane 2, which is operated by LG&S. It produces at the rate of .4 barrels of oil per day. We got a well over at the northeast of us that's at 1.2 barrels a day.

Going due east, we've got .7 barrels a day. Going to the southwest, we've 1.8 barrels a day, which may -- that is the second highest well on here, and it may be because of injection support possibly.

You come around to the northeast, northeast of 32, you have .9 barrels of oil a day.

This is all the interval from Yates, Queen, Penrose. Primarily Queen.

I put this together just to illustrate pretty marginal production you have out in this area. And, keep in mind, the average water cut on these is 96 percent. The average of all of these wells that I

have just gone around here and illustrated is 1.1 barrels of oil a day and 28 barrels of water.

Q. Anything else on Exhibit 8?

A. No.

Q. Let's go to Exhibit 9. What is that?

A. Exhibit 9 is a rate-time curve on our applicant well. I think I am going to answer a couple of questions here that may have been asked earlier.

This well -- the applicant well was --

Q. Let's start out with telling us what the colors mean on this map --

A. Okay.

Q. -- or this exhibit.

A. Again, this is similar to the field water, the nine-section-wide curve. It's rate-time, we have rates, volumes, actually on the left-hand side, in barrels per month -- or rates in barrels per month.

The lower axis is time. So we are basically looking at monthly volumes over time.

And what I've done -- one, it's similar to the last curve. The top blue square boxes is a water cut. The scale is on the right-hand side.

The green -- it's actually symbols, but they are run together, and it looks like a big bold green line. That's cumulative oil. And that scale is on the

left-hand side. The green triangles that are all over the place, they are the actual monthly rates for the well.

Q. And what kind of -- you have a one-barrel-per-day line there; is that the solid black line?

A. Yes. I need to go backwards in time. When this well was originally drilled -- it was originally drilled in April of 1962. And they actually completed in the same interval it is in now, virtually, Queen/Penrose.

They acidized the well and they fracked it with approximately 30,000 pounds of sand. The completion reports indicate they got one barrel of oil a day. And they plugged the well.

Then the well was re-entered in 1973 utilizing the same casing. The only thing they did different was break it into two actual stimulation intervals. And they put 30,000 pounds of sand on the upper part and 30,000 pounds on the lower part. And they reported one barrel of oil per day.

And this well, if you look at this rate-time curve when it was reentered in 1973 -- I have drawn a big black bold line on there that's the average of one barrel of oil per day.

And you will see that what they said in their completion report is what they got. Back in 1972

through 1976, roughly '80, very marginal production. You can see that this well was on and off over a period of time.

LG&S then purchased the well or acquired the well, I should say. I don't know -- I don't know how they acquired it, but they have acquired it.

They've made several attempts to increase production. They went in -- the first time they went in and increased the speed on their pumping unit. And they got a bump on oil production and a bump on fluids that quickly fell off to under a barrel a day.

They cleaned the well out to TD. They acidized with 500 gallons. Really didn't have much success there.

They went ahead and bumped the unit again, thinking they'd get an increase. And they did get an increase in oil production that fell rapidly to the current producing rate of half a barrel of oil per day.

If you go look at the annual production on this well and you average it, you are going to say this well is doing a lot more than it is. If you put a decline on this, you are talking about -- this is almost a harmonic decline. It's got a .9 exponential factor on it. And this to me is a true fit on what we got.

So you are looking at -- those last few points

there at the end of the projection is half a barrel a day and 76 barrels of water a day.

Q. Mr. Maxey, from the standpoint of economics, can the applicant make money on this well?

A. No. And there's been some focus on, you know, the C-108, and it said, you know, they want to convert this well because it is not economic at the current price.

Well, if you actually look at their operating expenses and you look at their producing rate now and you see what it takes to their -- they are losing money.

What it takes to a get to a break-even standpoint on this well right now is $348 a barrel. So, basically, you can say it's uneconomic at any price. We've never seen $348 a barrel.

And that's the essence of a lot of this production out here. I think prior to the collapse in oil prices, you saw the collapse in the well count curve on the wells in this nine section area.

Q. So at $100 a barrel you're not making money?

A. No.

Q. Is that because of water production and that sort of thing?

A. Well, they got water production, electrical costs, and the other ancillary costs you have. And

disposal, they have disposal cost on that, too.

Q. Are you done with --

A. Yes.

Q. With Exhibit 9?

A. Yes.

Q. Let's go to Exhibit No. 10. What is that?

A. No. 10, one of the things that I noticed when I looked at that commercial injection well -- and I see this in wells that I work on in southeast New Mexico. With the advent of Bone Spring production, there's a lot of water being produced. Disposal systems, disposal wells are being taxed to the max.

And in that particular case, in that commercial disposal, there is no production in that interval in this area, in the nine sections. I looked everywhere.

So you are talking about -- unless there is something to the south, which wasn't in my area of review, which you wouldn't think there would be, because regional dip is to the south and southeast. It probably was wet just like this was.

You are having to inject fluids at an initial reservoir pressures. And the first barrel you put in there, you are going to raise that reservoir pressure above a normal gradient. So that's part of, I think, the problem between the commercial well and why they had

no water flow.

The thing I wanted to illustrate here in this exhibit is -- I just went back ten years. I took a slice of time from current, went back ten years.

And this reservoir -- and what I tried to illustrate -- whether I did a good job or not -- the reservoir is in a net voided position. In other words, over the last ten years, there's been more liquids taken -- more fluids taken out than put back in. That means you have a declining reservoir pressure.

If you -- what this particular slide shows is your cumulative net voidage in barrels on the left-hand axis, over time on your X-axis. And monthly injection, the red curve, is on the right-hand axis.

So your net voidage is the blue curve with the axes on the left-hand side.

So what I am showing you here is, the red curve is pretty simple. It is just your water injected over this time interval.

What the blue curve is is a combination of oil, water, and gas removed versus how much water was put back in. So if I take two barrels of fluid out of the reservoir and I put one barrel back in, I've got a negative one barrel of voidage.

That's what this is illustrating. If I go back

ten years and start with just a set voidage to zero, that reservoir has been voided by 1.8 million barrels over a ten-year period of time.

So, basically, you could put 1.8 million back in this reservoir in this nine section area, and you'll be back at the pressure you had on January 5th, if you quit producing. But because people aren't going to plug their wells when this injection starts -- actually, you will not fill this reservoir up with 1.8 million barrels. It will take more than that.

So my point here is that to consider voided reservoirs for water disposal when they are mature, when they have been depleted, when they have -- when they have been fully developed, and are no longer economic, it will provide some relief to the disposal situation we have in southeast New Mexico.

This particular reservoir is very mature. There has been a lot of water put in this reservoir. All the wells have been impacted by it that I have looked at. And what I am attempting to show here is that there is room in this reservoir to fill it up before you ever actually reach where it was in the past.

Q. Let's go on to Exhibit No. 11. This is your cross section; is that right?

A. It's the second to the last exhibit I have. This

was depicted on that earlier map. I have the T-Bone Federal No. 1 on the right-hand side. That's the commercial disposal in section 33. And --

Q. Mr. Maxey, let me ask you, how did you prepare this exhibit?

A. Well, let's see. How did I prepare this? I initially --

Q. Let me ask you this. Did you confer with Dr. Powers in making this --

A. Yes, I initially 'suspicioned' there was a problem. As I looked around the water flow that Devon was having and I found this commercial disposal, I initially suspicioned there could be a problem with that well.

I found no other injection around the well that I felt could be an issue in their well. So I was a little curious what was going on.

I noticed this T-Bone well in section 33. So I pulled the log. I correlated it. I couldn't find a log on the Sargas. The West Shugart 29 Fed No. 5 is an immediate offset to the Sargas. So I used that log as a proxy for the Sargas well.

So I correlated these two logs and came up with the correlation and collaborated with Dr. Powers on the geology to make sure the correlation was correct. And

we had a discussion about it. We both agreed on the correlation. And I developed this to show -- this particular exhibit to show that the intervals in the T-Bone -- I've indicated the injection intervals in the T-Bone, the perforations, are the black boxes on the right-hand side of the depth scale on the T-Bone log. You will see there's injection at approximately 4,000 and there's injection at 4,200.

Both of these sands correlate over to this West Shugart 29 Fed No. 5. And it just so happens that the TD of 4137 is right in the middle of the sand in the Shugart 29 Fed No. 5 that correlates to the open perforations in the injection well.

It's my opinion that this is -- this is the reason for the water flow in the Devon well.

MR. FELDEWERT: Mr. Examiner, I am going to object at this point in time. I've sat here for a little bit and listened to testimony on this Exhibit No. 11. And, as I understand it, they are talking about a well in the north half of the north half of section 33 and a well in the east half of the east half of section 29 and attempting to ascertain the potential source of the water flow in the east half, east half of 29. And I don't understand the relevancy of this testimony to this hearing.

EXAMINER GOETZE: At this point they are presenting their opinion as to what they think the source is. And I would feel that since they have that opportunity to present it, that on cross you could certainly weigh in on it.

But it's still relevant and I am going to allow it to continue. And as to your point, yeah.

MR. FELDEWERT: Okay.

EXAMINER GOETZE: But so noted, and continue.

A. Part of the relevancy in this is that if there's any opinion that injecting into the Queen is going to create shallow drilling problems, there's already shallow drilling problems in the area created by a very pressured up injection well in section 33.

Q. (By Mr. Padilla:) And that is a saltwater disposal well?

A. That's a commercial disposal well in section 33.

Q. How about all together injection that has occurred in this nine section area, what effect does that have?

A. Well, because there has been -- there's been close to 60 million barrels injected in this area. There has been 10.4 million barrels of oil produced, 4-1/2 bcf of gas and 26.4 million barrels of water

produced.

Q. Let me ask this --

A. So to answer your question, we have been -- in the producing operations, fluids have been removed. In the injection operations, fluid has been replaced. So it affects the reservoir pressure.

Q. So let me ask this in terms drilling to deeper formations. Given the amount of injection that has occurred in at least your nine section area, you are going to counter that as you drill beyond the injection zones, correct?

A. Correct.

Q. Is that a common occurrence out in southeast New Mexico?

A. Yes. Anytime you offset any type of injection, whether it be disposal or water fluid, you have the potential for water flow in your well that you're drilling.

Q. How many water floods are in southeast New Mexico?

A. A bunch.

Q. Let's go to Exhibit 12.

A. Okay. My last exhibit was just to further support the injection into the commercial wells, created a problem in the shallow beds. The well section 33, the

Oxy T-Bone, they inject currently at a rate of 1,700 barrels of water a day.

They initially got a .2 psi per foot for their permit. They obtained a pressure increase in May of 2005 to 1,400 psi. And in January of 2007, they obtained another increase to 1,750 psi for their surface pressure.

My whole point in the presentation of these exhibits for this commercial well is that, in my opinion, because we have voided this reservoir in the Queen, we will not see these types of pressure increases needed in this reservoir for quite some time because it is in a net voided position and there continues to be some production from it as well as injection in certain areas.

Q. Mr. Maxey, would approval of this application be the best interest of conservation of oil and gas?

A. Yes.

Q. Can you elaborate on that?

A. Well, we have an area that is in a very mature state of flooding. Both producing and injection wells are being plugged. It's very evident on the rate-time curve.

There was a question about conformance. Can you track where the water's gone in these various intervals?

No, you can't.

But I have taken the gross interval and looked at withdrawals versus injection; I've looked at performance, and I've looked at the well counts, what's producing, the rates, the economics.

And that's my opinion, that this area is -- there is not one economic well there based on a 96 percent water cut with those rates that were illustrated on one of those previous exhibits.

MR. PADILLA: I pass the witness, Mr. Examiner. And we'll offer Exhibits, I believe, 5 through 12.

EXAMINER GOETZE: Mr. Feldewert.

MR. FELDEWERT: I know how this is going to turn out, but I do have my relevancy objection to Exhibits 11 and 12.

EXAMINER GOETZE: So noted and denied.

MR. FELDEWERT: That is what I figured.

EXAMINER GOETZE: So Exhibits 5 through '13' are accepted into record.

(LG&S Oil Company, LLC, Exhibits 5 through 12 were offered and admitted.)

EXAMINER GOETZE: We pass the witness to you, Mr. Feldewert.

MR. FELDEWERT: Mr. Examiner, I suspect my

cross of this witness is going to take --

EXAMINER GOETZE: You're hungry?

MR. FELDEWERT: Well, it's going to take -- we can proceed.

EXAMINER GOETZE: No, no. That's a good point. At this point, we should go ahead and continue the cross after lunch.

Just one question, does anybody have a limited schedule this afternoon as far as getting out of town?

(No response.)

EXAMINER GOETZE: I don't want to catch you folks short and have you stay overnight if you don't want to. Let's get back here about a quarter of 2:00, 1:30 -- let's go for 1:30 then. We will recess.

(Whereupon, luncheon recess was taken from 12:20 p.m. to 1:30 p.m.)

EXAMINER GOETZE: Let's go back on record. At this point, we were having cross by Devon of a witness, the third witness of LG&S.

Mr. Feldewert, please proceed.

CROSS-EXAMINATION

BY MR. FELDEWERT:

Q. Mr. Maxey, looking at your Exhibit 11, that's the one where I was trying to figure out why you were

presenting that; do you remember I raised the relevancy issue?

A. Yes.

Q. And you mentioned that you wanted to just point out -- I think your words were that there's already a problem for developing the lower zones because of the water that they encounter, that Devon --

A. Well, to clarify, I thought one of the issues that Devon might have was that this would create a -- that injection into the Queen would create a problem similar to what you've encountered in the area.

Q. Uh-huh.

A. So I was presenting this to show that this is a little bit different than injecting into the Queen. This was injecting into a reservoir that has not had any withdrawals.

Q. So it was into a lower zone?

A. Yes, it is into a lower zone. That's correct.

Q. And they had -- and because of that, you would agree that Devon had some problems drilling in section 29, correct?

A. Yes.

Q. And you would agree with me that when you have a flooded zone it does raise a risk of drilling?

A. I will agree with you that when you have an

overpressured zone that you can have flow in your drilling well.

Q. And that comes from having the water flows that you see -- that Devon saw?

A. I am not sure what comes from what.

Q. I mean the issue that you saw with Devon's well, you would agree that that created a drilling risk for them, correct?

A. It created a drilling risk very common in southeast New Mexico.

Q. And it increased their costs of drilling a well --

A. Yes, whenever water flows are encountered, it increases cost.

Q. Make sure I finish my question so that she can take it correctly.

A. Sorry. You're right.

Q. Okay. And you haven't presented any evidence -- have you? -- of any similar water flow issue in any wells in section 28?

A. No, I haven't presented any evidence of a water flow in 28.

Q. But you are here today on behalf of LG&S for a company that wants to now flood through a disposal well in the Queen zone adjacent to Devon's acreage in section

28, correct?

A. Yes. They want to inject into the Queen.

Q. And thereby create a flooding of that particular productive zone?

A. Yes, I guess you could say that. I am not sure "flooding" is the right word to use.

Q. In talking about that well that they now want to convert from a producer to a water flood well, you pointed out --

A. Okay. It's not a water flood well.

Q. You're right. That was my bad. You want to convert from a producer to a disposal well?

A. Right. That's where "flood" got me mixed up.

Q. And I am glad you corrected me there.

You mention that -- you made reference to their statement in the application where they say, in their application, that it's not economic to them at today's prices; that is what they said in their application, right?

A. Yes, I believe that's correct. I believe -- yes.

Q. And as a result, you, apparently, did some kind of an analysis where you said you came up with a break-even oil price for them?

A. Yes.

Q. Do you have that analysis here today?

A. I've got the figures I used, yes. It is simply -- it's very simple --

Q. Is there a reason why you have not presented that?

A. No.

Q. Do you have it?

A. I do.

Q. Can we see it?

A. You know what, I am under a confidentiality agreement with my client. And this is information they have given me on their lease operating expenses, so I am not sure if I could give it to you right here. I would ask my client.

Q. So you are not willing to share the work that you said --

A. No -- I'm sorry.

Q. You are not willing to -- or you were unable to share the work that resulted in what you provided in a break-even oil price?

A. That's a better characterization.

Q. Okay.

A. It's not that I am not willing. That's incorrect.

Q. Your client has not authorized you to show that information?

A. Right.
Q. So as a result, neither the Examiner nor we can conduct any kind of an analysis about how you arrived at your break-even oil price.
A. Well, if my client would like me to share the information, I will. And I'll provide it to both the OCD and to you.
Q. What was the -- sorry. You can't tell us what their operating costs -- what operating costs were utilized in your analysis?
A. I will if they give me permission to do so.
Q. Okay.
A. And I can tell you that we are looking at electrical costs, disposal costs, typical overhead.
Q. But you don't have that number?
A. Yes, I have the number.
Q. I'm sorry -- you can't share that number with us?
A. I don't feel comfortable sharing it just yet. I have a written confidentiality agreement. I am just watching out for my client.
I don't know if they will have any issue with that. So then I would be glad to share it. That's all I am saying.
Q. Do you recall when they acquired this particular

well?

A. No. I don't know the exact date.

Q. Was it fairly -- let's look in your -- what's that time graph chart that you have?

A. Yeah, the rate time --

Q. The rate time --

A. -- on that individual well.

Q. Is that your Exhibit No. 9?

A. Yes.

Q. Does it reflect on there that LG&S did some kind of work on the well in -- in 2000-and-when?

A. 2008. That is my understanding, it was acquired shortly before this initial work was done on that first bump in the cumulative oil curve.

Q. And what was the well producing at the time that your client LG&S acquired the well?

A. If, in fact, it was shortly before that work, it was not making anything.

Q. Okay. And then they acquired the well and there was a -- if I am looking at Exhibit 9, you did some work and there was a bump, an increase in production?

A. Yes.

Q. And then they did some additional work in 2012 and there was a subsequent increase in production?

A. Yes. A bump in production, yes.

Q. What happened --
A. It wasn't a sustained increase.
Q. Well, I am looking at your curve here. It hasn't flattened out, has it?
A. No. It's declining. That's what I am saying. It's not --
Q. It's declining?
A. Yes.
Q. And that is what you show here with that green line?
A. Yes.
Q. Is there is a reason why this particular exhibit was adjusted from what you had previously provided to us?
A. No.
Q. Do you recall that it has been changed from the exhibit that you previously provided to us?
A. That may have been. I don't know. I don't recall the exact change from the previous exhibit.
Q. Did you do the work?
A. The change?
Q. Yes.
A. Yes.
Q. Why did you make the change?
A. It may have been based on the information you

guys provided in your exhibits.

MR. FELDEWERT: May I approach?

EXAMINER GOETZE: Please.

MR. FELDEWERT: (Handing.)

EXAMINER GOETZE: Thank you.

Q. I've handed you what we've marked as Devon Exhibit 14. Is that the previous version of this exhibit that you had provided to us?

A. Yes. The only difference here is the addition of the decline.

Q. The addition of the decline --

A. And the scale has changed, but it's the same curve.

Q. I am looking -- and I am no expert on this, I concede that. But I am looking here at your squiggly green lines; do you see that?

A. Yes.

Q. And I see -- at the last part of that squiggly green line I see a spike.

A. Yes.

Q. Right there at the end, right at about twelve; what year was that? 2014?

A. Yes. Those are two-year increments.

Q. And according to your squiggly lines, there's a spike there; do you see that?

A. Yes.
Q. And then that's reflected as you move up there to the top of that green line, that still shows an upward spike; is that right?
A. The second spike?
Q. I am talking at the top of that exhibit.
A. Yes.
Q. That portion up there.
A. Right.
Q. Do you see an upward trend?
A. Yes.
Q. That was in your first analysis of the same information?
A. Yes.
Q. And that was after they did some work on this particular well, correct?
A. Yes.
Q. You mention that in your opinion there's -- is it your opinion, Mr. Maxey, that there is absolutely no difference between a Division's considerations that are involved when they are asked to permit a disposal well and the considerations that they take into account when they are asked to approve a water flood injection well; is that your opinion?
A. Okay. I am not sure I followed. Are you asking

me my opinion of the OCD's opinion?

Q. No. You testified that you didn't see any difference between a permitted water flood well and a permitted disposal well; is that your testimony?

A. My testimony was the mechanics behind a water flood well. The question was about -- I believe that was on direct or when my attorney was asking me questions, and he asked, Was there any difference? And I said, Mechanically no.

Q. But you agree there's a difference, right?

A. Well, what kind of a difference? You just asked me a question, if there's a regulatory difference. Well, I was testifying to a mechanical difference, so which difference do you want me to testify to?

Q. Is there a regulatory difference?

A. Between a water flood -- an injection well for a water flood and a disposal well?

Q. Yes.

A. How so? In the C-108, the C-108 is the same thing.

Q. Okay. I'm asking, is there a regulatory difference in the two?

A. I am unaware that there's a difference in the C-108, other than a couple of boxes checked.

Q. Would you agree that when it comes to water flood

and permitting a well for injection as a water flood, that the Division examines how that particular injection well is going to be utilized and maintained for purposes of enhancing production, correct?

A. Yes. I would agree with that.

Q. And as part of that process, there will be adjustments in the rate of the injection, depending upon the response that you get from the offsetting producing wells, correct?

A. I don't know that it is common for the OCD to adjust rates. They usually set pressures.

Q. But an operator?

A. An operator, yes.

Q. Will adjust the rates, correct?

A. Yes. They can adjust rates for conformance issues.

Q. Up and down, depending upon what kind of reaction they get for producing purposes.

A. If they feel they need to.

Q. And that the whole design of the injection is to enhance production?

A. On a water flood?

Q. Yes.

A. It is to provide pressure support to the reservoir.

Q. To enhance production?

A. Well, it's going to provide pressure support. Enhanced production, I'm not sure I'm following on that.

Q. And then, for disposal purposes, when you are dealing with a disposal well, an operator of a disposal well, their ultimate goal is to dispose as much water as they possibly can through their permitted well?

A. Potentially, could be.

Q. And that you would have a mixture of produced waters with different chemistries perhaps?

A. Well, I know in East Shugart Unit that that is a water flood well, and it's not uncommon to have make-up water of all kinds and chemistries.

And I know in the East Shugart that there's Devon Production produced water that's being taken over there as make-up water, so even there you have different chemistries.

Q. But in terms of a disposal well, I mean, it just serves a different purpose -- correct? -- can we agree on that?

A. Yes.

Q. As I look at your exhibits, first off, let's go to Exhibit 8.

A. Okay.

Q. Now, you provided the Division an analysis here, and you have -- in the upper right-hand corner, it says, Recent average daily oil rate; do you see that?

A. Yes.

Q. There is not a number there; am I missing something?

A. No. That is what -- that is kind of a reminder for me on these boxes, under the recent daily average oil.

Q. And what time frame is involved?

A. It is the latest production that I had at the time from the electronic data.

Q. So the current production?

A. Yes.

Q. As of the time that you created this --

A. The date was November -- when this was prepared was November 4th, and the actual production sometimes is, you know, a couple of months old on electronic data from the time you look at it.

Q. In a lot of the wells -- actually, in all the wells that you identified here in terms of their production, that's their current production after having gone through a period of primary production, correct?

A. Yes. It is their most recent production.

Q. And then having gone through after that a period of what? An enhanced recovery?

A. A secondary recovery.

Q. Okay, a secondary recovery.

And if my math is right, a lot of these fields, there has been production in these fields either by way of primary production or even by way of water flood operations for the areas that you focused on as much as 40 to 50 years, correct?

A. Yes. There's been secondary operations for -- well, basically, since they -- they kind of started in 1966.

Q. Secondary operations?

A. Correct.

Q. And prior to that, they had primary production, right?

A. Uh-huh.

Q. Correct?

A. Yes.

Q. And that all occurred in the area around Devon's acreage of section 28?

A. Yes.

Q. There has been no such primary production or secondary recovery operations in Devon's acreage in the section of the Queen?

A. Well, where is your position?
Q. Why don't you take a look at our Exhibit No. 1.
A. Thank you.
Q. And I am going to represent to you the area that is hatched in red is the acreage in section 28 in which Devon owns the Queen rights; do you see that?
A. Red hatches?
Q. Yes.
A. Yes.
Q. All right. And I believe none of your analysis involves any wells in that particular area?
A. The -- are you talking about this one particular exhibit?
Q. Yes.
A. Because the well in the -- on this exhibit, Unit B of section 28, it is on Exhibit 5; it's produced 58,400 barrels of oil.

And when you discuss --

Q. I am on Exhibit 8, but we'll walk to the other exhibit..
A. All right.
Q. So your analysis on Exhibit 8 doesn't involve any wells on Devon's acreage in section 28?
A. I do not have a rate on the well because it's plugged. There's no -- this is -- let me clarify this

exhibit.

If you look in the box on the exhibit, it says, Active Laser Wells. Those are -- Laser is a similar commercial database, the same as his -- very similar, if you know what his is.

These are the wells that indicate to be active now based on the laser data that I have, the latest CD that I have. That well -- there's only one well on the Devon acreage that you've shown me, I believe -- just looking at this quickly -- and that well is plugged. So there is no reason to include it in this analysis or in this exhibit.

Q. You mentioned on here that there is a commercial SWD; do you see that?

A. Yes.

Q. That's the north half of the north half of 33?

A. Yes.

Q. Now, that is not for disposal in the Queen, is it?

A. No.

Q. That is for disposal in a lower zone?

A. Yes.

Q. Okay. In fact, there is no commercial SWD in the Queen anywhere in your nine-section area?

A. Not that I know of. Not a commercial, just what

Endurance has articulated at hearing.

Q. And if I then go to your Exhibit No. 7.

A. Okay.

Q. If I'm understanding this, you are providing me cumulative injection of various wells in your nine-section study area?

A. Right.

Q. And first off, do you show again one commercial disposal well in the north half of the north half of 33?

A. Yes.

Q. And does that identify the disposal interval?

A. Yes.

Q. And what is that?

A. Delaware and San Andres.

Q. So that is below the Queen?

A. Yes.

Q. So it is not in the Queen?

A. No.

Q. All right. All of the other wells that you show on here, all these other blue symbols, you label them as "water injectors"?

A. Yes, that's the blue with the arrow through it.

Q. And these are all -- these were all for water flood projects over the last 40 years?

A. Yes.
Q. Not for disposal but for water flood operations?
A. That's correct.
Q. And we don't see any such water flood operations on Devon's acreage yet in section 28?
A. There's injection on the east half, but that's not on your red-hashed acreage.
Q. And that was part of a different water flood project over there in section 27; isn't this correct?
A. That is probably correct. As I stated earlier, there is four or five orders that I pulled up from the sixties and early seventies.
Q. That's quite a few --
A. Yes.
Q. And then that well that you show there in the west half of the west half of 28, that was part of the water flood project offer there in 29; isn't that right?
A. I believe that's correct, yes.
Q. If I then go to Exhibit No. 6 -- actually, before we go to that, let's go to Exhibit No. 5.
A. Okay.
Q. Are you there?
A. Yes.
Q. First off, if I start down there -- let's just

start at the bottom, your first yellow box on the bottom.

A. Okay.

Q. Okay. You point out what are labeled on here as the dry holes in section 28?

A. Yes.

Q. And you point out -- correctly so -- that these were both drilled -- one in 1962 and one in 1953, right?

A. Right.

Q. And then they were P&A'd at that point in time; is that correct?

A. That's correct.

Q. So they were not subject to the treatment that was done on the Keohane No. 3 in 1972?

A. There was no treatment reported. That's all I know.

Q. So nobody did the work on them that the operator of the Keohane well did in 1972?

A. If they did, they didn't report it.

Q. And as a result of work that was done on the well in 1972, that has been producing from the Queen for the last 40 years?

A. Which well are you on?

Q. The Keohane No. 3, the one you circled there

that --

A. The Keohane 3, yes. It was since 1973, that's right.

Q. Okay. Now I continue on, and I'm going to go clockwise, to the left.

A. That's counterclockwise.

Q. Isn't that clockwise?

A. Oh, you're at the bottom going --

Q. I'm going this way.

A. Okay. I thought you were at the top. Got you.

Q. The next well you show on here, you label as a dry hole in '62, right? Your next yellow box.

A. Yes.

Q. Now, that eventually became one part of a water flood; isn't that right?

A. Yes.

Q. And, then, if I continue on around to your next box, again that's -- that was an injection into the Queen, that was for water flood purposes, right?

A. Back up here? Yes.

Q. Okay. The same, if I continue all the way around, going clockwise here, your next well that you label on here in the west half of the west half, we've already talked about that. That was part of that same water flood operation, right?

A. Yes.
Q. And then the well on the south half of the south half of 21, which you said was converted to an injector, that was a water flood operation?
A. Yes.
Q. It continued until 2015?
A. I'm sorry.
Q. That water flood operation up there in the north, that was ongoing until 2015?
A. That's what I saw in the records, was that unit was terminated in 2015. I don't know when water flood operations were terminated. I just know that unit was terminated in 2015.
Q. But that was a water flood well?
A. Yes, water flood injection well.
Q. And then the next well, your next box, you say that was completed in 1969?
A. The one to the east of -- the well to the east of our well?
Q. Let's say east half of the east half of 28?
A. Yes, that's 69, right.
Q. And it was drilled as an oil well?
A. Yes.
Q. And then it looks like it produced for three years?

A. Yes.
Q. And then was converted to a water flood project in 1972?
A. Yes.
Q. And that was in the Queen, correct?
A. It was a Grayburg producer. It initially was a Grayburg injector. And then the Queen was added.
Q. In 1972?
A. I don't have the date on the Queen addition.
Q. But, eventually, it became part of the water flood in the Queen?
A. Yes.
Q. And then we get to your next yellow box. And, first off, you label that was an uneconomic oil well; do you see that?
A. Yes, sir.
Q. Are you talking about today?
A. I am talking about what I read in the hearing testimony.
Q. Did you look at the production history from this well?
A. No.
Q. Do you know the identity of that well?
A. Do I know the identity?
Q. Yes.

A. You mean the well name?
Q. Yes.
A. No, I don't have it here in front of me.
Q. Could it be the Hinkle B Federal No. 19?
A. I don't know. I know it is R-13615.
Q. That was the order number?
A. Yes.
Q. That approved the injection; what right now you call the injection, right?
A. Yes. They did it as a -- I believe that was a pressure maintenance application.
MR. FELDEWERT: Give me one minute, Mr. Examiner.
(Pause.)
MR. FELDEWERT: May I approach the witness?
EXAMINER GOETZE: You may.
Q. Okay. Let's go -- it would appear to me -- and you correct me if I am wrong, Mr. Maxey -- that the well that you show here on Exhibit No. -- your Exhibit No. 5, in the east half of the east half of 28, corresponds to what we show on Exhibit No. 8A with the yellow triangle; do you see that?
A. Yes.
Q. And if you go to -- with this exhibit, there's a number of additional documents associated with it that

corresponds to the number on the sheet, okay?

A. Okay.

Q. So I want to go to what has been marked as No. 3.

A. Okay.

Q. Wait a minute. I'm messed up. Your yellow box there --

A. Yes.

Q. That corresponds to the well in the northeast of the northeast of 34, right?

A. No. The northwest, northwest of 34.

Q. I'm sorry. The northwest, northwest of 34, not the east half of the east half of 28?

A. Right.

Q. I apologize.

So with that in mind, that's the well that you labeled as an uneconomic oil well?

A. Yes.

Q. So let me restart. I apologize, Mr. Examiner.

Did you look at the production history of what you call an uneconomic oil well?

A. Did I --

Q. Did you look at the production history for that --

A. No. As I said, uneconomic oil well was what they stated in the hearing. It is not relying on me. I am

stating what is in the hearing under R-13615. I read the testimony.

Q. And that corresponds with No. 5 on Exhibit No. 8A -- correct? -- the red triangle?

A. Wait a minute. Corresponds with No. 5 --

Q. So let's go to Exhibit 8A. And there's a red triangle --

A. Are we on your exhibits or mine?

EXAMINER GOETZE: That would be Devon's.

THE WITNESS: Okay.

Q. Do you see the red triangle?

A. Yes.

Q. You got a number 5 on that?

A. Yes.

Q. Go to the legend. Do you see the red triangle where it says, Order No. R-13615?

A. I see the red triangle -- over here?

Q. In the legend on Exhibit 8A.

A. Yes.

Q. And it says, NMOCD WF Order R-13615?

A. Yes.

Q. That's the same order that you reference?

A. Yes.

Q. All right. If I go to the package behind this document --

A. Okay.

Q. -- under the -- what's labeled 5 in the upper right-hand corner is an actual copy of the Order Number R-13615.

A. Uh-huh.

Q. And you'll see that that was an application for approval of a pressure maintenance project; isn't that correct?

A. Yes. That's what I stated.

Q. And that the well that was involved is -- if you look at the second paragraph on the first page of the order --

A. Yes.

Q. -- Hinkle B Federal Well No. 19.

A. Okay.

Q. Right?

A. I see it.

Q. So that's the well that's involved there with that red triangle on our Exhibit 8A.

A. Okay.

Q. And that's the well that is the subject of your yellow box on your Exhibit No. 5.

A. Okay.

Q. In the northwest of the northwest of 34.

A. Okay. I'm with you.

Q. Thank you.

Now I hand you what has been marked as Devon Exhibit No. 16.

MR. FELDEWERT: If I may approach the witness.

EXAMINER GOETZE: Please.

MR. FELDEWERT: I'm sorry. Exhibit No. 15.

Q. Devon Exhibit No. 15 is the well -- is the Division records for that same well, the Hinkle B Federal No. 19.

Do you see that, Mr. Maxey?

A. Sorry. Say that again.

Q. What I've handed you as Devon Exhibit No. 15 --

A. Okay.

Q. -- that is the production record from the Division files for the well --

A. This is 15, because it looks like a "6" has been written over it.

Q. It's 15.

A. It's 16.

Q. It's 15.

A. So it is not 16. Okay.

Q. Okay. Is that the same well that you are talking about as an uneconomic oil well in your yellow box?

A. Well, I guess if it ties with everything, yes. I

don't know specifically.

Q. And if I start paging through this document and I go to the third page.

A. Okay.

Q. And I am on the back side, and there's an area that is labeled production/injection.

A. You're on the back of the third page?

Q. Yes. Are you with me? I'm about halfway down.

A. Yes.

Q. It says, "The earliest production in OCD records was 1992"; do you see that?

A. Uh-huh.

Q. Correct?

A. Yes.

Q. And then it goes on to, on a year-by-year basis, identify the production from that well all the way through to 2012, correct?

A. Yes.

Q. So that according to the Division records, this is what you called an uneconomic oil well produced from 1992 through 2012 and then the rates are reflected on this document?

A. Okay.

Q. All right.

Now, you mentioned that this was then, according

to your yellow box -- did you mean to convey that this was permitted as a disposal well?

A. No. I made that correction in my testimony.

Q. This was, in fact, a pressure maintenance well, correct?

A. Yes. And I called it injection after -- I made that correction.

Q. And if I look at the order that was entered by the Division, R-13615, and I go to the third page, paragraph 12 -- I'll read it for you.

A. Okay.

Q. Paragraph 12 says, "The proposed secondary recovery injection project or water flood within this lease is feasible and should result in recovery of additional oil and gas that would not otherwise be recovered."

So this was, in fact, a well that produced for quite some time and then was converted to part of a water flood project; isn't that right?

(Ambient noise.)

A. I don't know if it was converted to part of the water flood project. The pressure maintenance project, I think it may have only involved their wells on the northwest. So we'd have to get into that on that specific application and testimony.

Q. And then just to the southeast of that well, you see what I think everybody recognizes as the East Shugart water flood project.

A. Yes.

Q. That's what that would be, correct?

A. Some portion of it, yes, or all of it. I don't know.

Q. And then just to wrap this up with this exhibit, as I look around section 28, we see various waterflood fields -- right? -- on your Exhibit No. 5?

A. Can I clarify something?

Q. Let me ask my question -- well, answer my question first.

A. I would like to clarify something when we are done.

Q. Exhibit No. 5 -- I will restate. Exhibit No. 5 reflects your nine-section study area, correct?

A. Yes.

Q. And that would be comprised of the sections that surround and are adjacent to section 28?

A. Yes.

Q. So that when I look at your Exhibit No. 6, what you called your analysis of the nine-section area, that's what you are talking about?

A. Okay. Wait a minute. Ask me that question

again, because I am trying to find 6. The rate-time curve?

Q. Yes.

A. Was the wells in the nine-section area.

Q. So you used, for purposes of your analysis, wells and acreage that had been subject to water flood operations for -- what? -- 40 years or more?

A. 50.

Q. 50. Okay.

A. Yes.

Q. And don't you think that that would influence the water cut that you show on this particular exhibit?

A. Most definitely.

Q. Okay. And if I go back to Exhibit No. 5.

A. Okay.

Q. None of the data that you utilized to create Exhibit No. 6 would have come from any well on Devon's acreage in section 28?

A. Say that again. Everything that I used in Exhibit 6, none of it came from Devon's --

Q. None of it came from any well on Devon's acreage in section 28?

A. Why wouldn't it have? This is a historic curve.

Q. Is there any data point from Devon's acreage in section 28 that went in your analysis in Exhibit

No. 6?

A. Yes.

Q. Which one?

A. All of them. Any data point there.

Q. What data point on Devon's acreage did you utilize?

A. Let me just make this real easy. Every point in the nine-section area went into that curve.

Q. And what production data from Devon's acreage in section 28 went into that nine-section area curve? Zero, right?

A. I'm sorry. I don't understand your question, because -- this is -- this is a historic curve. It incorporates all the production data from every point in the nine-section area.

So why are you saying that I didn't incorporate anything on Devon's acreage?

Q. And there is not a single production data point available on Devon's acreage that you could utilize to put into your Exhibit No. 6?

A. So are you telling me that the data for unit 28B is nonexistent?

Q. Which data?

A. On the well in 28B that you are telling me that I didn't use.

Q. Which well is that, sir? I am on Exhibit No. 5.
A. It is in 28B.
Q. Is that in the -- can you point me to the well in Exhibit 28? How would I see it?
A. Okay. Do you see the well in the northeast -- excuse me -- the northwest of the northeast that has 58,000 barrels of cum.
Q. Uh-huh.
A. Okay. I used that data in the curve.
Q. Is that on Devon's acreage?
A. It wasn't Devon's acreage at the time. But, yes, it is on -- it's right there, the well spots on your acreage, on your map, on your exhibit.
Q. But that is not on Devon's acreage.
A. Well, it's in the red hash mark. That's what you told me was your acreage. Are we backing up, and that's not your acreage?
Q. That was the one data point that's utilized in your analysis?
A. That's the only data point that I --
Q. Okay. So the only data point on Devon's acreage that you utilized in your analysis was at 58,453 total barrels of production?
A. No, that's incorrect. Let's see if the -- that injection well -- it's hard to tell on the scale, so it

is probably not on your acreage.

So if I used this one well and it is the only one that produced, I used every single data point Devon has on their acreage in my plot.

Q. So is it fair to say, then, that this analysis that you did for Exhibit 6 is not an analysis that would pertain to Devon's acreage in section 28?

A. I thought I'd labeled that pretty clearly. That's a rate-time curve on the nine-section area, the Shugart, Yates, Seven Rivers, Queen, Grayburg, production.

Q. Okay. And that nine-section area primarily included, if not exclusively included, wells that had been first -- first had primary production and then had secondary production for up to 50 years?

A. It did not exclusively include certain wells. It was all the wells in the Yates, Seven Rivers, Queen Grayburg in the nine-section area, period.

Q. The other thing I observe from your Exhibit 5 -- and I think you said this, that this is fairly tight well spacing?

A. No. The well spacing is not tight. It's just dense well spacing for the scale used on this map.

Q. Okay. Dense?

A. Dense for the scale used on this map. Keep it in

context.

Q. And Devon's acreage is -- sits right in the middle, undeveloped right in the middle of this oil field?

A. Of section 28, yes.

There is a description of what this pressure maintenance project was for, if you would like to look at it, because it's a small portion of the section over there.

The implication was it was part of the East Shugart, and I think that is incorrect. If you look at the description on that order number that we were referencing, under paragraph 3 -- excuse me -- paragraph 2 are the Hinkle B Federal Pressure Maintenance Project, the project area shall consist of the north half of the northwest quarter and the southwest quarter of the northwest quarter of section 34.

Q. You would agree it was a pressure maintenance project?

A. I would agree that it's a pressure maintenance project, but it probably does not include the East Shugart as that was implied.

Q. Well, I hope I didn't imply that if that's the case.

A. That is the way I took it.

Q. But, certainly, it is just to the northeast --
A. My understanding of my reading of the testimony in this case, this was Endurance's lease, they did this, and Devon did not object to offset injection next to their acreage that they own as referenced by your plat.
Q. Offset lease maintenance well, Mr. Maxey, correct?
A. I'm sorry.
Q. You are saying they didn't object to an application for a lease maintenance well?
A. I am saying they did not object to an application to inject water offsetting their lease.
Q. For purposes of lease maintenance?
A. For purposes of pressure maintenance.
Q. Pressure maintenance --
A. Yes.
Q. Did --
A. -- have any injection wells, and there is no producer between this injection well and your acreage, so you'd have nothing to intercept the water that's going to encroach on your acreage. And you guys didn't object.
Q. Did you read that transcript?
A. Yes.

Q. Where was the influence going to be from that particular well?
A. It was back towards their producing wells.
Q. Which direction?
A. To the east and to the south, I believe.
Q. Thank you.
MR. FELDEWERT: Those are all the questions I have.
EXAMINER GOETZE: Very good. Redirect.
MR. PADILLA: Yes, sir.

RE-DIRECT EXAMINATION

BY MR. PADILLA:
Q. Mr. Maxey, would you turn to Devon Exhibit 8A.
A. Okay.
Q. I want you to go to the order labeled No. 5, which would be the Endurance order.
It's this exhibit.
A. Okay. Exhibit 8.
Q. Exhibit 8A.
A. I just got an 8 -- oh, in this other package?
Q. Yes. That's it.
A. Got you. Okay.
Q. You have Endurance order labeled No. 5 in this exhibit?
A. I'll get it. Yes, 1 through 6.

Q. Are you on the first page?
A. Yes.
Q. I want you to read, in entirety, Finding number 3 towards the bottom of that page.
A. Read what now? I'm sorry.
Q. Read finding No. 3 towards the bottom of that page. I want you to read it in its entirety.
A. Okay. "Endurance submitted to the Division in July of 2011 an administrative application for saltwater disposal into this well.

"The Division directed Endurance to set the matter for hearing due to the presence of producing wells within one-half mile of the proposed well in the proposed disposal interval.

"The case was heard March 15, 2012, but the decision was delayed until August 12th due to bonding requirements."
Q. Okay. I want you to go to and read for the record finding No. 5 on the next page.

(Ambient noise.)
A. Okay. No. 5: "Endurance requests permission to convert the Hinkle B Federal Well No. 19, the proposed well, from a depleted, inactive oil well to injection of oil field produced water into the Queen and upper Grayburg formations from perforated depths of 3410 to

3902."

Q. Does this -- do these findings conform with your understanding from reading the transcript that this application of Endurance was originally for saltwater disposal --

A. Yes. And they made that comment in the pressure maintenance hearing that this is specifically why they needed it, it was just saltwater disposal.

And, furthermore, on my cross-examination, pressure maintenance would have an effect on oil wells to the east and to the south. But, more importantly, when that was cut off, it is also going to impact Devon's acreage to the northwest. They just don't have a well out there.

Q. Let's look at Devon's other exhibit, the land exhibit, which is Exhibit No. 1.

A. Okay.

Q. In your study of section 28 or the wells in section 28, did you find any wells operated for Queen production and operated by Devon?

A. No.

Q. Do you know whether Devon operates any Queen wells in the nine-section area of your study?

A. They do operate some wells according to the electronic data. Let's see. Over in section 22, I

believe those are Delaware wells, and I'm not going to state that as fact right now, because I know there's Delaware wells up there, because I saw the production and I looked at it. And I compared that to this commercial disposal to see if that same interval was what was being injected into.

As far as anything else -- and this is public data right here -- I don't see anything else.

Q. Do you know --

A. Other than -- you said Queen, right?

Q. Yes.

A. Yes.

Q. Do you know whether Devon has proposed any wells to be drilled and completed in the Queen formation, either vertical or horizontal wells?

A. I know of no proposals for Queen drilling by Devon in this area.

MR. PADILLA: I believe that's all I have.

EXAMINER GOETZE: Very good. We'll start with you, Mr. Jones.

EXAMINATION BY EXAMINER JONES

EXAMINER JONES: Okay. Well, I think we've hashed this a lot here already. But that Hinkle B pressure maintenance project, Mr. Maxey, did you see any response on the production wells around it?

THE WITNESS: I did not look, Mr. Examiner.

EXAMINER JONES: Okay. But they are going down in the Grayburg a little bit; is that correct?

THE WITNESS: Yes. I would suspicion a 3902, that's Grayburg.

EXAMINER JONES: Is it not -- is the well that's being proposed now going to be connected with any other zones beside the Yates formation?

THE WITNESS: Are you talking about the Keohane 3?

EXAMINER JONES: Yes, the proposed --

THE WITNESS: The Keohane 3 is proposed for the Queen.

EXAMINER JONES: The Queen. I'm sorry. Will it migrate up into the Yates?

THE WITNESS: No.

EXAMINER JONES: Will it migrate down into the Grayburg?

THE WITNESS: No. I'm sorry. Because Penrose is the lower part of the Queen that is also the injection interval. "No" on the Grayburg.

I've looked at that wellbore and it's cemented all the way to surface on the 4 1/2 casing. So it's good isolation.

EXAMINER JONES: What about the relative --

the permeability, vertical to horizontal permeability ratio out there, is it -- in other words, why do you say it won't go out and then go down or up or -- why will it stay in zone? Is it because of the stress?

THE WITNESS: You know, I thought we maybe had that exhibit up. But we've got some very tight intervals between the porous Grayburg and the -- I'm sorry -- the porous Penrose piece and the upper part of the Queen. And we've got some very tight intervals above and below.

EXAMINER JONES: Okay.

THE WITNESS: And that is why I am saying, along with very good wellbore integrity from what we can tell and with these tight intervals between the base of the Penrose and above the Queen, there should not be any migration of fluids.

EXAMINER JONES: Okay. If you had a bigger well here, like a seven-inch casing or something, could you have deepened it down into that -- to compete with that other commercial disposal well?

THE WITNESS: Hypothetically, if you -- you probably would need a minimum, bare minimum of seven-inch to deepen, because that's probably going to leave you with maybe a five-inch flush joint at the largest to operate through on a deeper well.

EXAMINER JONES: So you're kind of stuck in this case with --

THE WITNESS: With the four-and-a-half casing.

EXAMINER JONES: With the four-and-a-half casing. And is it true in this area of this well there is no producers within a half mile of the well?

THE WITNESS: The Keohane 2, which is LG&S operated, it -- directly to the north.

That is on -- if you reference exhibit --

EXAMINER JONES: Is that well going to be maintained in production status?

THE WITNESS: They are going to maintain in production for now. They would ultimately like to convert that well also. But that is not being brought for application.

EXAMINER JONES: Does it make a lot of water --

THE WITNESS: Yes. It's very similar production. It's very high cut, 96 percent.

EXAMINER JONES: So you have to keep your well pumped off, and it may have some more water cut issues or water production issues, I should say, after this goes online?

THE WITNESS: Yes, it's possible,

definitely.

EXAMINER JONES: So they would have to weigh the economics of keeping it going or not?

THE WITNESS: Right. And that's their intent, is to --

EXAMINER JONES: Okay.

THE WITNESS: They understand that.

EXAMINER JONES: But is this area between -- I saw the testimony in that Hinkle case for Endurance. And this section 28 is not that lucrative, is it?

THE WITNESS: Well, the problem I have with section 28, to be quite frank -- and I articulated it in my testimony -- the two wells -- the well in unit A that produced 126 barrels of water was a Grayburg well.

They didn't produce the Queen. And I can't tell you why they didn't, but they didn't. And this was completed years and years ago. To the south, that injector, they did not complete in the Queen, but they did convert it to injection into the Queen.

So, you know, I combined that -- when you look at the Keohane 2 that is due north of our Keohane 3 --

EXAMINER JONES: Okay.

THE WITNESS: -- the Keohane 2 was drilled first. It was frac stimulated just slightly more than

what the original Keohane 3 was. It came on at eight barrels of oil a day in '62. Okay.

So they saw that response. They moved south and drilled the Keohane 3, stimulated in a similar fashion. They only get one barrel a day.

Continuing south, you have a dry hole that was drilled at the same time as the Keohane 3. So I can only draw the conclusion that as you move south from the Keohane 3 to the 2 to the dry hole, it's not looking very good.

EXAMINER JONES: What about waterwise? You said -- you talked about oil; but that dry hole, was that just a water well or --

THE WITNESS: I quoted what was in the completion report. Completed dry, P and A, did not produce any oil. I don't know if it produced water.

EXAMINER JONES: What about the number 3, the well that's being proposed, has it been a high water producer all along?

THE WITNESS: Yes. It's in -- let's see here. It's in Exhibit 9.

EXAMINER JONES: Okay.

THE WITNESS: You can see -- so this was drilled in 4 of '62. Injection was commenced in the area on my map in '66. I reference that in one of my

exhibits. So you don't have the influence of water injection on this initial production; yet you have one barrel of oil a day and over 90 percent water cut in this well.

And that's why I said earlier, you move south, continue south from -- you know, the Keohane 2 was a little better. It's a 19,000 barrel cum. The Keohane 3 was only 7,000-something.

You got this high water cut. There's no injection in the area yet, you continue south, you have a dry hole.

And as you continue south, you are going downdip if you look at the structure map. And I believe Devon's exhibit is going to show the same thing. The lowest portion in this whole thing, in my whole study area, is the east half of section 33.

And I think you are talking on the order of -- if I can find Exhibit 2. You lose over on the Keohane, going into section 33, you lose 100 feet of structure. I got a high water cut well up here on the north half. So, you know -- and I already testified to the fact that the well in section 33, Unit G of 33, they attempted the Queen and they said it was wet.

They came down and perforated the middle Queen and the Yates, and they made a completion with a

frac job. But it only made 1,200 barrels of oil.

I can draw no conclusion from this other than you've got crummy production up in section 28 with the Keohane 2 and 3. Moving south, you got a dry hole. You got another dry hole on the southeast quarter. And you continue moving downdip, and you got another producer that they state was wet in the Queen.

So I don't -- I don't see the Queen being productive in 28. And to state that you are going to propose a horizontal well in here -- which I think I heard in Devon's opening remarks.

I don't know how you propose a horizontal well to your management that has produced all its primary energy in the form of natural gas and you have to repressurize with an incompressible fluid, water, and now injection support has been lost, because everybody is shutting and turning off their injection. You can see it in that recent curve on Exhibit 6.

So how you convince your management to drill horizontal wells in a completed reservoir that has no injection support, I don't understand.

EXAMINER JONES: Well, where does LG&S take their water right now to be disposed of?

THE WITNESS: They have a pipeline. It may be going to the East Shugart where Devon's producing

water -- some of Devon's producing water is going to right now also.

EXAMINER JONES: So overall the reservoir here is primarily Queen; is that correct?

THE WITNESS: Yes.

EXAMINER JONES: Even though it says Shugart 7 --

THE WITNESS: Oh --

EXAMINER JONES: The pool is --

THE WITNESS: When I look at the entire area, primarily I see Queen/Penrose perforations, stimulation, and tests. But there are Yates tests.

You have spotty but good Grayburg production. And that's pretty spotty stuff. The Queen/Penrose portion is more continuous.

I think Dr. Powers showed in his exhibits how continuous it is across the area. And that's what I saw in the production data, the testing data, the stimulation data.

EXAMINER JONES: Okay. Your Exhibit 6, later on in life, like '92, it shows there's some -- there's some oil stimulation that went on there, oil response. Did they drill some more wells or something --

THE WITNESS: If you'll notice the well

count curve, you go from 90 to just over -- well, there's an increase in the well count curve by about ten. I don't know why, if it's drilling. It could be some type of rework from a deeper well into a shallow.

For some reason the well count curve increased. The oil production curve, you got a bump in it and then it resumed its decline.

EXAMINER JONES: You were able to get data before '93, because our data only goes back to '93?

THE WITNESS: Yes.

EXAMINER JONES: So that laser system has it built in.

THE WITNESS: Laser and his are good back to '70 normally.

EXAMINER JONES: Okay.

THE WITNESS: You have to check the cums that come from prior to that into your spreadsheets and software up to '70 to make sure you are getting the prior cum in there.

And then your monthly production will continue with that prior cum. And it will add to your cum as you go through the months from 1970 forward.

EXAMINER JONES: Okay. Your injection-withdrawal ratio, it looks like about a one to one out here after '92; is that correct?

THE WITNESS: That's correct. That is where I see this as just the economics started to diminish and people started to shut in injection.

EXAMINER JONES: So they started blowing it down? They started producing it.

THE WITNESS: Yeah. Essentially, without doing some kind of material -- No. 1, as I testified, this is unallocated, so I can't pinpoint the Queen/Penrose. Okay. I think that's been very established.

But the fact that you have a one-to-one injection-to-water-production ratio -- because it's less than one to one on the production. That's where you are losing pressure.

So they are starting to lose pressure at that point, and --

EXAMINER JONES: So the current pressure in this well, what do you think it is?

THE WITNESS: I don't know. I just know what I see where they've started going into avoidage-type mode in '92.

EXAMINER JONES: Have they already done an injection test on this well?

THE WITNESS: No. They are still producing.

EXAMINER JONES: Okay.

THE WITNESS: Yeah, they're still producing. But there's been enough injection in the area in all these wells, East Shugart -- that there's information on injection rates.

EXAMINER JONES: Okay. Do you think using this well for a disposal well will harm minerals in the proposed disposal zone?

THE WITNESS: I do not see commerciality for minerals in section 28 at all, so I do not believe there's going to be harm.

EXAMINER JONES: There is no harm but there is no help either because there is no wells.

THE WITNESS: There's no wells. If there were well there, it could potentially help.

I mean, as stated earlier, it would -- it could function as a flood, but that's not the intent.

EXAMINER JONES: What kind of remaining oil-in-place percent is out there? I mean, what kind of primary recovery percent did you get?

THE WITNESS: I knew I'd be asked that question. And because you -- number one, the production is unallocated, so I don't know firmly where all the production came from.

The water injection is unallocated. I don't know where all the water injection went into. And,

plus, I've got mainly 1960 vintage wells. So in order to figure that, you are going to have to take electric logs and radioactive wells from 1960 vintage and come up with something you think is close.

And then you have to somehow allocate the production and injection. And by the time you get there, I would have no confidence in the numbers.

EXAMINER JONES: Even though there has been a lot of testimony in other cases out here about -- the pressure maintenance cases -- about that sort of thing.

THE WITNESS: Yeah. If you have proprietary records within a company and you bring something to hearing, you've got the data.

EXAMINER JONES: So this is --

THE WITNESS: Unfortunately, LG&S picked this up in 2008. And when I asked them where are your well files, they said, All we have are OCD files.

EXAMINER JONES: Yes. We hear that a lot. And that shows that lumping a bunch of formations into one pool is detrimental to figuring how many wells you need to drill some day.

THE WITNESS: Yeah, that makes it more difficult, more challenging to figure out what's going on.

EXAMINER JONES: Thank you.

EXAMINER GOETZE: Mr. Dawson.

EXAMINATION BY EXAMINER DAWSON

EXAMINER DAWSON: On your Exhibit No. 5, the well that I was looking at was the one that's in the -- it looks like unit letter B of section 28.

THE WITNESS: Okay.

EXAMINER DAWSON: And looking at Devon's Exhibit No. 1, would that correspond to the Gulf No. 1 well that's on Devon's acreage?

THE WITNESS: I believe that's correct. Let me look at something. (Looking through documents.) Yes.

EXAMINER DAWSON: And your indication on that well on your Exhibit No. 5 states that that well produced 58,453 barrels of oil?

THE WITNESS: Yes.

EXAMINER JONES: Do you happen to know when that well was P&A'd?

THE WITNESS: P&A'd --

EXAMINER DAWSON: Or is it P&A'd?

THE WITNESS: Yes, it is P&A. And that was a Queen. And judging from the depth of 3910, that's the Queen/Grayburg. Grayburg was good over the northeast corner of this section, Grayburg production. But it is unallocated. I can't make a firm statement on that.

I don't have the -- wait a moment. I'm on

the wrong well. I've got the date of last production which may or may not be accurate as to when it was plugged and abandoned -- September of 1991.

EXAMINER DAWSON: 1991. And that -- the red dot over there in unit letter A of section 28.

THE WITNESS: Yes.

EXAMINER DAWSON: That was the well that was drilled and abandoned?

THE WITNESS: Yes.

EXAMINER DAWSON: And it says "float oil."

THE WITNESS: Yes. Float oil, that's all I found on the --

EXAMINER DAWSON: You didn't have a rate or anything?

THE WITNESS: No, no. It was an old, old well.

EXAMINER DAWSON: Okay. And then going to your -- this was an exhibit that was presented to us from Mr. Padilla -- Exhibit No. 9. And you have the increased unit speed?

THE WITNESS: Yes.

EXAMINER DAWSON: That well was really never stimulated; they just increased the pump speed; is that correct?

THE WITNESS: No. Initially, it was

stimulated back in -- let me just run through the history real quick. That was initially drilled in '62 and stimulated with -- it was frac stimulated -- approximately 30,000 pounds of sand. They indicated they got one barrel of oil per day on the potential.

They plugged the well. It was reentered in '73. They did similar frac stim on it, but it was in two stages, so this is -- the reentry is what you see on this can curve, the reentry forward.

And so it was initially stimulated. You can see that it only produced about -- what? -- five years at less than a barrel a day after initial stimulation. Then it went through a period of being mostly off. Not producing.

Then when LG&S picked it up just before 2008, they increased the pump speed -- well, they actually brought it back on, is what they did.

And you can see they got the -- the surge they got from this well being shut in for years was about 150 barrels of oil a month. And then it started falling off dramatically.

And then they cleaned the well out to TD, they acidized, and they sped the pump up a little bit, and they got a bump in 20 -- I think that's the end of 13 or 14. And that's the bump you see, and then you see

the dramatic fall off again.

EXAMINER DAWSON: And your curve there on the bottom is the exponential decline curve?

THE WITNESS: Yes. It's pretty close to a harmonic curve. A harmonic curve would be exponent of 1 and it's a .9. So it's basically a hyperbolic curve with an exponent of point 9.

EXAMINER DAWSON: So you, on the bottom down there, it looks like you calculated the well?

THE WITNESS: That showed --

EXAMINER DAWSON: The program calculated it at 7,777 remaining barrels.

THE WITNESS: Well, I did not attempt to calculate EURs, but the final rate on that is set at ten, which is uneconomic. So the EURs that you see of 7,700, they are not even that much. Basically, you are at your EUR because you're uneconomic.

EXAMINER DAWSON: So that was based on ten barrels per month?

THE WITNESS: Yes. The only reason I did that was to get the curve extended so you could kind of see. If I had cut this off at an economic limit, there wouldn't really be a curve.

EXAMINER DAWSON: What would you feel would be the -- I know it depends on price, but maybe today's

price being $33 a barrel, what do you think the economic limit would be on that --

THE WITNESS: You mean just an economic rate?

EXAMINER DAWSON: Yes.

THE WITNESS: At $33?

EXAMINER DAWSON: Yes.

EXAMINER JONES: You have electricity out here, correct?

THE WITNESS: Yes.

Okay, $33. So that's equivalent to maybe like a 38 WTI because you get a deduction back to the wellhead.

So we're talking at the wellhead -- (witness calculating) you're talking about six barrels of oil a day, which it's never done except for one brief moment.

EXAMINER DAWSON: And it's currently making about four barrels a day average?

THE WITNESS: Actually, that six barrels of oil a day would be higher, because if you were to be able to extract that, you'd extract more water, my LOEs would go up. So that is inaccurate. It has to be higher than six.

EXAMINER DAWSON: And it is currently making

four?

THE WITNESS: No, it is not. It is making a half.

EXAMINER DAWSON: Oh, a half.

THE WITNESS: I think I saw some exhibits from Devon that said it was making four. Well, they just took the average -- the annual production -- which is very misleading -- and they divided by 365, is the way I believe they came up with that. But they can testify to that.

EXAMINER DAWSON: Okay.

THE WITNESS: I may be incorrect in how they did that.

EXAMINER DAWSON: I have no further questions. Thank you, Mr. Maxey.

EXAMINER GOETZE: And I have no questions for this witness.

MR. PADILLA: I just want to make a comment, if I may. Mr. Dawson, you asked about the well in Unit B of section 28. And that well is shown on one of the schematics. And it's Exhibit F of Exhibit 1. And that was plugged and abandoned on September 24, 1991.

EXAMINER DAWSON: 1991. Thank you.

MR. PADILLA: And I have no further

questions.

EXAMINER GOETZE: Well, we do have one Exhibit here, No. 13. It's an affidavit I believe prepared by you.

MR. PADILLA: Yes.

EXAMINER GOETZE: Shall we enter that?

MR. PADILLA: I would love that we enter that.

EXAMINER GOETZE: I thought that you might. So no objection?

MR. FELDEWERT: No objection.

EXAMINER GOETZE: So we will accept the affidavit of Mr. Padilla regarding notification.

(LG&S Oil Company, LLC, Exhibit 13 was offered and admitted.)

EXAMINER GOETZE: Do you want to take a few minutes and then we will start on your round?

MR. FELDEWERT: Certainly.

EXAMINER GOETZE: Let's take a five-minute break, and then we'll return. Thank you, Mr. Maxey, for your testimony.

THE WITNESS: Thank you.

(Brief recess.)

EXAMINER GOETZE: Let's go back on the record. At this point, we are going to hear Devon and

their presentation. Mr. Feldewert.

MR. FELDEWERT: I'll call our first witness.

DEVON ENERGY PRODUCTION COMPANY

CASE-IN-CHIEF

MEG MUHLINGHAUSE

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

DIRECT EXAMINATION

BY MR. FELDEWERT:

Q. Would you, please, state your name, identify by whom you are employed, and in what capacity?

A. Meg Muhlinghause. I am employed by Devon Energy Corporation as a senior land adviser.

Q. And how long have you been with Devon?

A. Almost 20 years.

Q. And have your responsibilities included the Permian Basin?

A. Yes, sir, they have.

Q. Have you previously testified before this Division as an expert in petroleum land matters?

A. I have.

Q. Are you familiar with the area where -- the LG&S 62 Operator disposal well?

A. I am.

MR. FELDEWERT: Mr. Examiner, I would once

again tender Ms. Muhlinghause as an expert in petroleum land matters.

EXAMINER GOETZE: Mr. Padilla.

MR. PADILLA: No objection.

EXAMINER GOETZE: Very well. She is so qualified.

Q. Would you please turn to what's been marked as Devon Exhibit No. 1.

A. Yes.

Q. Would you please identify it and explain what's shown on here.

A. This plat, all the yellow in this plat shows where Devon has acreage. I mainly focused -- for matters of this hearing, I focused on section 28.

In section 28, the red crosshatch shows where Devon has rights from surface to 4,000 feet. The balance of the acreage in section 28, Devon has deep rights, below 4,000 feet.

Q. And the hatched area there, that shows where you have your Queen rights?

A. Yes, it does.

Q. Is the nature of this acreage throughout this area federal?

A. Yes, it is.

Q. And have you identified -- I think we talked

about the well at issue being the Keohane Federal No. 3?

A. Yes. Located in the southeast quarter of the northwest quarter. And here it is indicated as a dry hole, but as we have heard previous testimony, that was initially completed as a dry hole and then they went in and re-completed that as a producer.

Q. Now with respect to that acreage, there was some confusion as to what LG&S owns. Do they own on their 80-acre tract there below the Queen?

A. To my knowledge, they own in the northeast of the northwest and the southeast of the northwest surface to 4,000 feet.

Q. And then does Devon own the deeper rights?

A. Devon and some other working interest owners, yes.

Q. The blue well that you -- the blue lines that you see on here -- there's two of them -- what are those wells?

A. These two wells are current Bone Spring wells that Devon drilled. We have a pad that they share, being the Sargas 28, Fed Com 3H; and the Sargas 28, Fed Com 4H, one using the north half of the south half and the other the south half of the south half.

Q. And what do the green lines represent?

A. The green lines represent first and second Bone

Spring wells that Devon has planned, utilizing six wells per half section in the first and six wells per section in the second.

Q. So just to be clear, the blue lines have been drilled and the green lines have not?

A. Correct.

Q. Is the proposed disposal well close to an existing gas producing well?

A. Yes. If you will notice, directly north of the Keohane B3 well is Devon Shugart 28 Federal No. 2 well. And it is 330 feet away from the proposed disposal well.

Q. And what formation does it produce from?

A. It currently produces from the Morrow formation.

Q. Is that a high pressure gas well then?

A. It is.

Q. And you have an engineer here that's going to discuss concerns rising out of the proximity of that high pressure gas well to their proposed injection well?

A. We do.

Q. Ms. Muhlinghause, does Devon believe that the Queen formation is productive under section 28?

A. We actually do. And we have -- after looking at this for this hearing, we have actually really been

excited about it.

Generally, our method of working through the production on a particular section is to do the deepest horizons first and then move up to the shallower horizons.

Q. Has the pricing environment that we find ourselves in today, has that influenced Devon's interest in the Queen rights in section 28?

A. It actually has. We have actually been looking at shallower zones. Because the drilling is cheaper and is not as expensive, we have been looking at shallower zones. And, coincidentally, we have been looking at this for this hearing and have looked at this as prospective acreage.

Q. Has the company brought a geologist today to discuss in more detail why Devon believes the Queen is commercially productive in section 28?

A. Yes, we have.

Q. And Ms. Muhlinghause, you're here as a representative of Devon?

A. I am.

Q. Speaking here as a representative of Devon, the owner of these Queen rights in section 28, does this company, the owner of these rights, consider the Queen formation under its acreage a viable potential for

hydrocarbon development?

A. Yes, we do.

Q. Ms. Muhlinghause, was Devon Exhibit No. 1 prepared by you or compiled under your direction and supervision?

A. Yes, it is.

MR. FELDEWERT: Mr. Examiner, I move the admission of evidence at this point, Devon's Exhibit 1 as well as Exhibit No. 2, which is the C-104 which I previously introduced with the prior witness.

EXAMINER GOETZE: Mr. Padilla.

MR. PADILLA: No objection.

EXAMINER GOETZE: Exhibits 1 and 2 are so entered.

(Devon Energy Production Company, LP, Exhibits 1 and 2 were offered and admitted.)

MR. FELDEWERT: And that concludes my examination of this witness.

EXAMINER GOETZE: Mr. Padilla, your witness.

CROSS-EXAMINATION

BY MR. PADILLA:

Q. Ms. Muhlinghause, when you say you or Devon owns the acreage in yellow, does that mean that you own operating rights in the red-hashed area for the surface to all depths?

A. In the crosshatch area, yes, we own from surface to -- I mean surface to all depths, yes, we do.

Q. How about the other acreage in yellow, do you own Queen rights or operating rights in the Queen?

A. We do not in the balance of section 28. That is not in crosshatch. In section 29, we own below -- it's either below 4,000 feet in section 29, in 20, and in 21. So the rights from -- and then in 22, I believe we own all depths.

But in the other acreage we own -- the best of my recollection is 3,800 feet or generally most of it is below 4,000 feet. So the chains of title have been very different from who owns the deep rights with respect to 38 or 4,000 feet to who owns the shallow rights.

Q. What do you consider to be the deep rights?

A. I am just saying deep rights below 4,000 feet.

Q. Is Devon the record title owner for all the lands in sections -- well, the yellow lands?

A. I know we have operating rights. I did not check record title. I know we have operating rights under all of it, but I did not check record title for this particular hearing. I will be happy to do so if you need me to.

Q. Have you recommended or been on a team that

recommended drilling the Queen to your management?

A. We have not as of yet. We were actually focusing on the Bone Spring until this came up, and then we started looking at the shallower zone. And we would like to recommend Queen -- to explore the Queen formation.

Q. Do you work with a team in terms of proposing wells to your management?

A. I do.

Q. Have you worked up a proposal for the Queen?

A. I have not as of yet. No, we have not. We have been working on -- we had been working on the Bone Spring most recently until we got this application.

Q. How many proposed locations do you have in section 28 for the Bone Spring?

A. We have -- what we have shown planned here would be six wells in the Second Bone Spring and six wells in the First Bone Spring.

That was -- that's our preliminary planning. And we are in the process of -- some have already been staked and we are in the process of staking the rest.

Q. Now you operate two Morrow wells in section 28; is that right?

A. We do.

Q. And do those wells produce any water?

A. I'm not familiar right at this moment as to whether or not they produce water.

Q. How about the Bone Spring wells, do they produce water, the completed well, the two wells?

A. I don't know how much, but I do know the Bone Spring does produce water.

Q. What do you do with the produced water?

A. I do not know where it goes right now. I know that our production folks either dispose of it in a well that we own or send it to a company that disposes water for us.

Q. Do you know whether you put this produced water in an East Shugart field?

A. Pardon?

Q. Do you know whether you take any of this produced water to the East Shugart field?

A. I do not know.

Q. So how long is this Bone Spring drilling program going to take?

A. Well, I mean when prices were a lot higher, we were becoming very aggressive with it. And, actually, the BLM has asked for us to do -- master development plans to show -- to plan out what our full development plan would be. But with the price of oil as it is right now, we have backed off some of that as well as most

everybody else in the industry.

Q. Does that master plan include any notion of drilling the Queen at this time?

A. We had not -- prior to this we were working on -- as I told you before, we were working on the Bone Spring. And, actually, our master development plan that we are working on right now has Bone Spring wells across a vast majority of this acreage.

But as I had stated before, as we were looking at this, we did notice the Queen rights that we have here and the fact that there is very good offsetting production as our geologist will testify to. And it has led us to want to explore that further and to bring that forward. So that will be part of a master development plan.

Q. Do you have any Bone Spring wells proposed for section 29?

A. We do not have any proposed. We have them planned in the north half. We don't own -- I believe in the south half, I believe, Concho is the operator -- if I am correct, I want to say it's the Blind Squirrel wells. I am not positive. I would have to double-check with that.

But our acreage in the southwest quarter of 29, I believe stops at the Delaware.

Q. Do you have any proposed wells in the yellow acreage in section 20, 21, and 22?

A. We have planned wells that are going to be in our master development plan.

Q. Isn't the focus of your master development plan here confined really to the Bone Spring formation?

A. As I stated before, our general way of working through an area is to go from the deepest zones to the shallowest zones. And that's how we generally have worked through our acreage. And that was what we were working on here because the Bone Spring was what we were working on producing.

And we actually have got a lot more acreage to the south here that we have been developing. And as we were developing the acreage to the south, it has caused us to continue to develop our acreage to the north. So that's what we're working towards.

Q. So you already have wells in, say, sections 32, 33, and 34?

A. We do not, no. I am talking about in 1931.

Q. How about section 27.

A. Section 27, no, we do not -- we do not have any ownership there.

Q. Do you have any plans for developing the Strawn horizontally?

A. I don't know -- here?
Q. Here, in this area?
A. We have not discussed it to my knowledge. I don't know if the geologist has it in the back of his head.
Q. How about your team? You said you worked with a team, so have you heard any plans or discussed any --
A. We have discussed Strawn to the south that -- to the south in 1931. We have not discussed doing the Strawn up here.

We had been focusing on the Bone Spring up here as an addition to some acreage we have over here in section 25. We've developed Bone Spring, and we have been moving up over here, doing the Bone Spring over on this side.

Q. To the west?
A. To the west, yes -- and to the south in 1931. We have a lot of production in the south. And we had discussed Strawn there. I don't know whether or not it's prospective up there.
Q. What kind of production are you getting out of the two wells that you drilled in the south half of section 28 in the Bone Spring?
A. I don't know what the current production is. I

would have to look. I know they were producers. I don't know what the current production rate is. I don't have that.

Q. Let me put it this way, let me ask this --

A. I know they were both producers.

Q. Do you know whether or not the results from those two wells encouraged further development of the Bone Spring in section 28?

(Ambient Noise.)

A. Yes, they did.

Q. So I take it production is good enough to continue --

A. Right. I just didn't have the exact numbers to testify to. That's why I didn't...

MR. PADILLA: Well, I believe that is all I have.

EXAMINER GOETZE: Redirect?

MR. FELDEWERT: No questions.

EXAMINER GOETZE: Mr. Jones.

EXAMINATION BY EXAMINER JONES

EXAMINER JONES: I'll be quick.

Who are the Littles and the Sargases and the Keohanes; are they surface owners out there?

THE WITNESS: Sargas is -- I don't know what Keohane is, because those were not our wells.

The Sargas had been our previous geologist. We were using stars, and we were just continuing on with stars. We'd been using stars down in 1931.

And we've continued with -- we were trying for the brightest stars. And we're just continuing on. I've been learning a lot about constellations.

EXAMINER JONES: The surface owner, is this a federal section, but it's got surface -- is it homesteaded or something? Has it got surface fee owners?

THE WITNESS: I don't recall. I think that it was BLM surface, but I'd have to double-check.

EXAMINER JONES: But that northwest, northwest, that's a hole in your --

THE WITNESS: That's actually owned by Nearburg.

EXAMINER JONES: Okay.

THE WITNESS: They are involved in our west half operating agreement for the Shugart Fed 2 well, so it's shown as a blank, but we have contractual rights to it. I don't believe -- our contractual rights, I think they're below 4,000 feet.

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

EXAMINER GOETZE: Scott.

EXAMINATION BY EXAMINER DAWSON

EXAMINER DAWSON: On the map on Exhibit 1, the Little -- those wells in the west half, west half, the Little A-1, the Keohane B-1, A-2, and A-1, those are all Queen wells, right?

THE WITNESS: Those are all shallow.

EXAMINER DAWSON: Those are the ones you have on the exhibit with some associated production, correct?

THE WITNESS: Correct. And Zach will have more -- our geologist will have more on the production on his bubble map.

EXAMINER DAWSON: And you are not sure when you are going to commence drilling on those Bone Spring wells?

THE WITNESS: Well, we are in the process. We are continuing on with our master development plan in hopes that we will turn back around, as the industry has been known to do. And we are all in hopes of that.

So we are continuing -- because it's federal acreage, you're well aware that it takes a long time to get all your APDs in process and in place.

And so actually we have been working on this. And this is -- this whole acreage, right here, is our next set of master development plan. We have been

working on some to the southwest that we are going to submit and then this is the next one.

They have -- the BLM has asked us to -- in order to mitigate our footprint up here and in order to mitigate pipelines and we've got prairie chickens and sand dunes and all kinds of things here, they have asked for us to do a full field development and that's what we've been in the process of doing.

But in doing that, we certainly -- it will not stop us from doing Queen development in the southeast portion of 28.

EXAMINER DAWSON: So the leases within this section are all held by production?

THE WITNESS: Yes, they are.

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

EXAMINER GOETZE: Very good. I have no questions for this witness.

Your next witness, Mr. Feldewert.

MR. FELDEWERT: I call Zach Poland.

ZACH POLAND

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

DIRECT EXAMINATION

BY MR. FELDEWERT:

Q. Would you please state your name and identify by whom you're employed and in what capacity.
A. Zach Poland, geologist, Devon Energy Corporation.
Q. How long have you been with Devon?
A. Five years.
Q. Sorry?
A. Nearly five years.
Q. Have your responsibilities included the Permian Basin of New Mexico?
A. They do.
Q. Have you previously testified before the Division as an expert in petroleum geology?
A. I have.
Q. And have you -- are you familiar with this application?
A. I am.
Q. Have you conducted a geologic study of the lands that are the subject of this application?
A. I did.
MR. FELDEWERT: I tender Mr. Poland once again as an expert witness in petroleum geology.
EXAMINER GOETZE: Mr. Padilla.
MR. PADILLA: No objection.
EXAMINER GOETZE: He is so qualified.
Q. Mr. Poland, you have been sitting here today.

Are you aware of the location of the proposed disposal well?

A. I am.

Q. And you're aware that Devon owns rights in the Queen directly offsetting to the east, south, and southeast --

A. We do.

Q. -- of the disposal well?

A. Sorry. Yes.

Q. If injection is approved in that well, in your opinion, which direction will that proposed injected water flow?

A. Downdip from northwest to southeast, in the general direction.

Q. Go right into Devon's acreage?

A. Yes.

Q. If you turn to what has been marked as Devon Exhibit 3, is that a structure map that you prepared for this hearing?

A. That's correct.

Q. And does it reflect that Devon's acreage is, indeed, downdip of the proposed injection well?

A. Yes.

Q. And, for the record, why don't you just tell us how this map was created and what it is hung on.

A. This is a structure map on the top of the Queen sand or Queen formation. It's in subC depth. But since the Queen is shallower than sea level -- is above sea level, the numbers are positive numbers. But the dip is in a northwest to southeasterly direction.

Just for reference, the proposed SWD well is in the southeast of the northwest of section 28. The contour interval is 50 feet.

Q. Do you see any real difference between your structure map and the one that was presented by LG&S?

A. They are very similar.

Q. Now, I want to then go to a different subject, Mr. Poland, and I want to ask your opinion as an expert in petroleum geology.

In your opinion, the Queen formation underlying Devon's acreage, does it present a viable potential for appearances of hydrocarbon resources?

A. Yes, it does.

Q. And have you prepared exhibits to support this conclusion?

A. I have.

Q. If I turn to what's been marked as Devon Exhibit 4, would you please explain how you created this and what it shows.

A. Okay. This is what I call a Guadalupian

production map. So because the state of New Mexico has considered the Yates, Seven Rivers, Queen and Grayburg formations all a common source of supply, differentiating production and allocating production to each individual formation is often near impossible, because the operators often perf and commingle these formations together.

But the green dots are producers from the field group and with the size of the bubble scaled relative to cumulative oil production from those formations.

Now, with that being said, with it being said that it's different to differentiate production, for the purpose of this map, I have only included wells that for sure have perforations in the Queen.

So if it's not in the Queen, if there's not perforations in the Queen -- there might be perforations in the Grayburg and the other formations, but I did not include those in this map.

Q. Okay. Just to get us oriented, there's a cross section A to A Prime line on this map; do you see?

A. Yes.

Q. The well there in section 28 that you utilize in your cross section, is that the proposed disposal well?

A. Yes.

Q. And focusing on that, just to get an idea of the scale of the bubbles here, if I look down just in the southwest quarter of the southwest quarter of section 28, I see a production bubble there?

A. Yes.

Q. What does that represent in terms of cumulative production?

A. That well made about 130,000 barrels of oil from the Queen and associated formations.

Q. And then, in comparison, I see a very large bubble in the northwest quarter of section 27; what would that represent in terms of production?

A. There's over 600,000 barrels of oil credited to that well.

Q. When you examine your bubble map here, what do you observe with respect to the production from the pool that involves the Queen in this area?

A. Well, what is immediately apparent, there's kind of two things. No. 1 is Devon's acreage in section 28, the Queen rights are directly on trend with existing Queen production and surrounded by production essentially in every direction.

Their engineer testified. I think he was trying to insinuate that this production is structurally controlled with, you know, downdip water leg. I don't

think that's consistent with the existing production or the structure map.

Q. Why do you say that?

A. Because there's production downdip, and I have yet to find a water leg in a field.

Q. What do you observe with respect to the varying degrees of production in terms of one well to another across this particular field?

A. If you look at the map, the size of the bubbles varies even for wells right next to each other, which leads me to the interpretation or the thought that there's a significant amount of lateral variability possibly, and permeability that contribute to the variable overall production in the field.

So you can just see large producers directly offset by small, maybe, you know -- by much smaller production and for no apparent reason really other than probably a lateral change in permeability, is my interpretation.

Q. Is there, also, given the age of the offsetting production in terms of the wells, is the lateral variability perhaps a function of how the well is completed and the time frame in which it is completed?

A. That is correct. Well vintage and completion type could also and very likely play a part in the

overall productivity of these wells.

Q. You show you're a to A Prime cross section here; is that right?

A. That's correct.

Q. Why did you choose these particular wells?

A. I chose these wells basically because they existed, more or less, on structural dip and also because they had, you know, some of the better logs, I mean for aesthetics basically.

Q. Better quality logs?

A. Yes. And, obviously, I made sure to include the proposed SWD well.

Q. And then turn to what has been marked as Devon Exhibit 5, is that the cross section that corresponds in A to A Prime on Exhibit 4?

A. It is.

Q. Would you please start by orienting us to the location of the proposed disposal well and then explain what you show in here?

A. The proposed SWD well is the second well on the left in the cross section. The cross section goes from northwest over on the left to southeast on the right.

What I have shown here is -- I posted at the bottom the producing field group -- that's the formation given in green -- for a lack of space basically.

The other formations aren't included. But just know that the Yates, Seven Rivers is referencing the pool, and so the Queen and Grayburg are also included in that. The red number at the bottom --

Q. Let me stop you right there. These well logs, all of these show a date they were produced and perfed in the Queen, right?

A. Right. All the wells in the cross section have perforations in the Queen interval. And that is shown with the pink rectangles in the depth track of each well log.

Q. How have you identified the Queen formation on this?

A. The top of the Queen, the surface that is mapped in the structure map is the -- is the upper black line that connects between the wells. And on each side of the cross section is abbreviated as the "Q-u-e-n," as the top of the Queen. The base of the Queen is the lower black line that connects between the wells.

Q. Then if I look at the bottom of each, you mention these production numbers. What does the red signify?

A. The red is cumulative gas production in MCF.

Q. And then the green?

A. The green is cumulative oil production in barrels

and then the blue is cumulative water production in barrels.

Q. Okay. And I see some red and blue shading on the wellbores to the right of this exhibit. What does that signify?

A. That's just something I do in my daily work. It is a quick look method for me -- it helps me -- it attracts my eye to differentiating between different lithology types.

The blue shading is just a resistivity cut off. It shades anything less than 20 ohm meters. Deep resistivity in blue. And the orange shading is anywhere where you have neutron porosity crossover to the right of the density porosity.

And these are -- the sands that are out here typically show that neutron density crossover and lower resistivity, so it just helps attract your eye to differentiating between sands and non-sands, typically, carbonates in this area. You can see that there is two main sand bodies in the Queen.

Q. You were here for the testimony of Mr. Powers; is that correct?

A. Yes.

Q. The geologist?

A. Yes.

Q. Do you agree with his observation that the productive Queen interval that we see in this area extends across Devon's acreage in section 28?

A. Yes. There is no question in my mind that these sands are laterally continuous and present over the entire area including Devon's acreage.

Q. So let's talk about Devon's acreage.

A. Okay.

Q. Did you conduct an actual study of the Queen formation under Devon's acreage?

A. I did.

Q. And as part of that focus, did you have the opportunity then to examine the -- to create an isopach map for Devon's acreage in the Queen?

A. Yes, I did.

Q. If I turn to what's been marked as Devon Exhibit 6, is this your net isopach map?

A. It is.

Q. Go ahead and explain what you show on there.

A. It's a net isopach of the Queen sandstone, using a 10 percent porosity cutoff. And it's contoured on a 20-foot contour interval.

The map shows that Devon's acreage in the Queen, there's an isopach thick in the east half of section 28 which corresponds to Devon's acreage.

Q. So, for example, the Examiner could look at Exhibit 1 and compare that with your isopach map here on Exhibit 6?

A. That's correct.

Q. And based on your observation where is the thickest portion of the Queen interval in section 28?

A. The east -- the west half of the east half.

Q. And is that under Devon's acreage?

A. Yes.

Q. And as a result of that, what is the potential for hydrocarbon storage, for example, in the east half of section 28 where Devon's acreage is located versus west of that area?

A. Well, it's greater.

Q. On the east side?

A. Yes.

Q. In fact, is the greatest capacity for hydrocarbon storage in the Queen actually under Devon's acreage?

A. Yes.

Q. And that is the acreage that has yet to be developed in this oil field?

A. That's correct.

Q. In addition to looking through this isopach map, did you take an additional step to examine the porosity

height in section 28?

A. I did.

Q. Why did you take this additional step?

A. Because net isopachs are useful in a lot of cases, but sometimes misleading, because they just use a porosity cutoff, and essentially treat everything greater than that cutoff as equal.

However, we know that 16 percent porosity, for example, is better than 11 percent porosity, even though if you're using a 10 percent porosity cutoff, they'll map as the same.

So this kind of brings out those differences and helps -- just helps explain what's going on a little bit better.

Q. If I then turn to what's been marked as Devon Exhibit 7, is that your porosity height map that you created for section 28?

A. It is.

Q. Now focusing on Devon's acreage here and focusing on the Queen interval which is at issue, is that what you examined here?

A. Yes.

Q. And did data that you utilized, is it the same data that you utilized for your prior maps, and that is production intervals in the Queen?

A. Yes.

Q. And with respect to the Queen here, what does this show with respect to the potential for hydrocarbon storage under Devon's acreage in the Queen formation in section 28?

A. Well, not only is Devon's acreage in section 28 a net porosity thick, it is also a porosity height thick. And shows greater potential in the west half of the east half, in particular, than the adjacent areas.

Q. Okay. In your opinion as an expert in petroleum geology, is the greatest potential for hydrocarbon storage in the Queen formation under section 28 under Devon's acreage?

A. Yes.

Q. If I then go to -- one second here. Did you also in preparation for this case examine the injection wells in the surrounding area?

A. I did.

Q. And did your examination confirm that with the exception of two wells all the remaining injection wells in the area were for water flow projects?

A. They were.

Q. And you probably don't need to spend as much time on this as I originally thought. But if I turn to what's been marked as Devon Exhibit No. 8, does this

contain your work and analysis of the Division-approved injection wells in the area?

A. Right. This is a map that my geotech helped me put together based on some results that I found. And, basically, any well with a triangle on the map is a well that has been approved by the NMOCD for water injection, pressure maintenance, or water flooding purposes.

And the triangles are color-coded by the water flood order that those wells were approved in. And if you look over in the legend, you can see which colors correspond to which individual orders.

Q. Okay. And the proposed injection well at issue here, is that shown on this particular map?

A. It is.

Q. And how do you identify it?

A. It is the well in the southeast of the northwest of section 28. If you look right beneath it, there's some text associated with that well.

Q. So when it says, Spud 1962 --

A. Right.

Q. And then it was reentered in 1972?

A. Right.

Q. Does this map -- you also identify -- let me step back. Does this map confirm the location of the only two approved disposal wells in this area?

A. The only two approved commercial SWDs that I was able to find in the area are shown on the map. And that is in the northeast of the northwest of section 33, and then the northeast of the northeast of section 32.

Q. And were those approved for disposal in the Queen formation?

A. They were not.

Q. Where were they approved for disposal?

A. They were approved for disposal in the San Andres and Delaware.

Q. And that's below the Queen?

A. Both those formations are below the Queen and the rest of the formations associated with the pool.

Q. Okay. Now, do you have Exhibit 8A in front of you?

A. Yes.

Q. And just for purposes of identifying this for the record, in preparation for this case, did you focus on the approved injection wells immediately surrounding section 28?

A. Yes.

Q. And label them 1 through 5?

A. Yes.

Q. And did you provide then for the Division the corresponding Division orders demonstrating that those

were for water flood projects?

A. Yes.

Q. And that comprises Exhibit 8A?

A. Yes.

Q. All right. Going back now here to Exhibit 8, you also have some information here about the dry holes that are reflected on the acreage in section 28; do you see that?

A. Yes.

Q. Why don't you walk us through these?

A. Well, there was some discussion in the previous testimonies about the dry holes that exist in section 28. I have posted each one of these dry holes that are pertinent to the discussion in section 28, and I have given their spud date, their treatment, and then their result.

I am of the opinion that the dry holes don't truly show the productive potential of the Queen in this area. And I say that because I was unable to find any treatment given for three out of the four plugged and abandoned Queen wells.

Whether that means they did it, did stimulate it and didn't report it or didn't do a -- or didn't stimulate it, I'm not positive. I would like to trust that if they did, they would report these things. And,

you know, I think that maybe this might be a prime example of where stimulation is needed to commence production.

The proposed injection well, in particular, was originally completed as a dry hole. And it was only after reentry and, you know, acidized and fracked that production commenced in the area.

Q. And that was in 1972?

A. Right.

Q. So, essentially, have the remaining three wells on here that are shown as dry holes, they were drilled at about the same time as the proposed injection well, correct?

A. That's correct.

Q. But the difference is they have never been subjected to the enhanced completion techniques that were utilized on the proposed injection well?

A. It certainly doesn't appear that way.

Q. All right. Does the offsetting production that you show on your bubble map, Exhibit No. 4, does that in your mind indicate that the production is -- that Devon's acreage is potentially productive as commercial hydrocarbons?

A. Yes, it does.

Q. And does the fact that these were offsetting

acreage that was subject to water flood operations, does that further enhance the prospects for commercial production from Queen under Devon's undeveloped acreage in section 28?

A. Would you state your question again.

Q. In other words, the water flood projects that you see, that you show here in Exhibit No. 8, surrounding Devon's undeveloped acreage in section 28 --

A. Right.

Q. -- does that enhance, in your opinion, the potential productivity of the Queen formation under Devon's acreage?

A. I don't know. I don't know if it's true.

Q. Let me ask you this. Would the company like the opportunity to do to its acreage what has been done in all the surrounding acreage?

A. Yes. I mean, basically, the -- all the -- all the areas around us have gone through the entire oil field maturity cycle, basically, from primary to secondary production, really no production over Devon's acreage.

So I think that Devon would prefer to have the opportunity to develop any of their rights in a manner that everyone else out here has already done.

Q. Okay. Now in preparation for this case, did you

have an opportunity to look at Division Order R-14091, which involved an order recently issued by the Division for a disposal well application?

A. I did.

MR. FELDEWERT: Mr. Examiner, I think you have a copy of this.

EXAMINER GOETZE: I probably do.

MR. FELDEWERT: May I approach and give you a copy.

EXAMINER GOETZE: You may.

Q. I am looking at Division Order R-14091, which was entered by the Division in December of 2015. And I am going to represent to you -- well, you will see that this was issued by the Division to address proposed injection in an area where there was a consideration of development potential. Okay?

A. Okay.

Q. And I want you to look at paragraph 25, which is on page 4. And the issue here was whether there should be injection in the area in Brushy Canyon formation. Okay?

A. Okay.

Q. And the Division says, in paragraph 25, that opponent's testimony in evidence supported a viable potential for occurrences of hydrocarbon resources in

both the Cherry and Brushy Canyon formations; do you see that?

A. Yes.

Q. Okay. In paragraph 26, it states, "Opponent stated an interest in investigating both the Cherry and Brushy Canyon formations for hydrocarbon resources with development using horizontal wells"; do you see that?

A. Yes.

Q. And then with respect to the other zone, which is the Bell Canyon, paragraph 27 says, "Both applicant and opponent confirm" -- so they both agree -- "low potential in this area in the Bell Canyon formation for hydrocarbons resources that would support further investigation and possible development," okay?

A. Okay.

Q. All right. Now, speaking here as a representative of Devon and having conducted a geologic study in this area, does Devon have an interest in investigating the Queen formation under its acreage in section 28?

A. They do.

Q. And in your expert opinion, does the Queen formation under Devon's acreage in section 28 at least present a viable potential for hydrocarbon development?

A. It does. As a matter of fact, I am going to tell

a story here. When I was an undergrad in geology, I worked a small outfit in Wichita, Kansas, and the old geologist that I worked for had a saying that said, The best place to find oil is in an oil field.

And I think that's exactly what we see in section 28. I mean, we are in the middle of a Queen oil field, so to say anything other than a viable chance of producing hydrocarbons, I believe to be false.

Q. And, in your opinion, if the Division authorizes LG&S to commence injection into the Queen formation, into this productive zone, is that going to cause waste of recoverable federal minerals in the Queen formation underlying this acreage?

A. I believe it will.

Q. And impair Devon's correlative rights to at least explore and have an opportunity to develop what is a productive interval underlying their acreage?

A. Yes.

Q. Were Devon Exhibits 3 through 8A prepared by you or compiled under your direction and supervision?

A. Yes.

MR. FELDEWERT: Mr. Examiner, I would move the admission into evidence of Devon Exhibits 3 through 8A.

EXAMINER GOETZE: Mr. Padilla.

MR. PADILLA: No objection.

EXAMINER GOETZE: Exhibits 3 through 8 and 8A are so entered.

(Devon Energy Production Company, LP, Exhibits 3 through 8 and 8A were offered and admitted.)

Mr. Padilla, your witness.

CROSS-EXAMINATION

By MR. PADILLA:

Q. Mr. Poland, how do you spell your name?

A. Like the country, P-o-l-a-n-d.

Q. Okay. On Exhibit 8A, let me direct your attention to the Endurance order, which I believe is the last one in that exhibit. And I want to direct your attention to finding No. 5 on the second page of the order.

A. Okay.

Q. Do you have any quarrel with the finding that states that the Hinkle B Federal Well No. 19 was a depleted, inactive oil well?

A. I mean I can just take their word for it. I haven't looked at that well, so I assume that's true. But it was depleted because it had produced oil from that formation previously.

Q. All good things come to an end, don't they?

A. Some haven't started yet.

Q. Let me direct your attention to Exhibit No. 4, your bubble map.

A. Okay.

Q. Let's start out with the well in the southwest quarter of the southwest quarter.

A. Okay.

Q. That well is plugged and abandoned, correct?

A. I believe so.

Q. How about the one in the northwest of the southwest quarter?

A. I think it is also plugged.

Q. How about the other wells that are shown in the north half with the -- are they producing or are they plugged and abandoned?

A. Are you referencing a well in particular?

Q. I'm asking about the wells in the north half of section 28. Do you know whether any of those wells are producing oil at this point?

A. At least two of them are producing oil currently.

Q. I said with the exception of the applicant's wells.

A. Well, I know of no other wells producing oil or gas from the Queen or associated formations in that area.

Q. The big bubble in the northwest quarter of

section 27, is that a Grayburg well or is that a Queen well?

A. My understanding is it has perforations in both the Queen and the Grayburg.

Q. Do you know whether it's -- how many perforations are in the Queen and how many are in the Grayburg?

A. Not off the top of my head.

Q. And do you know the depth of the perforations in this well?

A. No.

Q. How about the well in the extreme northwest of the northwest, is that plugged and abandoned?

A. I can't tell you that.

Q. In fact, all the wells you show here are cumulative production, and you haven't made a study as to whether or not these wells are producing or not; is that fair to say?

A. I think it is fair to say that what is being shown on here is cumulative production.

Q. But you can't tell us whether or not these wells are currently producing or not?

A. I would say most of them are probably inactive right now, but as for going through each well individually, I can't do that.

Q. Have you made -- when did you commence your study

on this particular -- in section 28 as far as the Queen is concerned?

A. Well, we started to take a look at it whenever we got the application to dispose of water in it.

Q. Did you have any prior studies for the Queen in this area prior to the time you got the notice of application?

A. No.

Q. Since you received the application, have you made any recommendations to your management to drill the wells and to develop the Queen on the acreage that you have identified as having -- where Devon has rights in the Queen?

A. I haven't. But to be clear, I haven't made any recommendations to drill anything right now with current prices, so we are not drilling in this area today.

Q. Are your plans to drill the Bone Spring first if you are going to do any drilling?

A. Yes, most likely. We like to proceed from deepest to shallowest in general.

Q. Let me direct your attention to Exhibit No. 1, which is your land plat. Do you know whether any APD's for all of the wells shown in green have been approved?

A. I'm not -- I don't know which wells have approved APDs or not today.

Q. Who prepares APDs for you?

A. It's our -- usually our land and regulatory group.

Q. You have no say in whether or not the -- in the preparation of the APDs?

A. No. That's not true. I mean, these things proceed -- geology and geophysics makes a recommendation, sends it to you, usually a reservoir and the other engineers for evaluation.

And then once it clears those hurdles, then it moves on to the land and the regulatory group. And, you know, as soon as that happens, I am looking at the next thing. So we have to -- this is a continuing process, so I can't walk these things through the entire process.

Q. I understand that. But have you had any input into any of the APDs that have been submitted for drilling the green wells here?

A. Most of these wells were the result of the previous geologist that I took over for in the area. So I didn't directly have any input in these particular wells.

Q. So is it fair to say that your input in this proceeding has been solely with -- to contravene the application before the Division today?

A. What is your question?
Q. Your input into --
A. Into section 28?
Q. -- into section 28 has been solely to contravene the application here today?
A. My work in section 28 has been in preparation for this hearing, that's correct.
Q. But in looking at Exhibit No. 1, did you ask whether or not the APDs had been approved or not or somehow beat yourself up in preparing yourself for this hearing; did you make any study of where you are with progression with the Bone Spring?

And I understand oil pricing has some effect on whether you are going to continue drilling. But I'm trying to figure out where you are with progression of the Bone Spring play here?
A. I don't -- I have a hard time understanding what the Bone Spring has to do with the Queen.
Q. I'm trying to figure out whether or not you are actively -- you are telling us here that the Queen has potential. And I am trying to figure out when you're going to get to the Queen, if you are going to get to the Queen, or whether you're just simply opposing this application because you don't agree with it?

MR. FELDEWERT: I object to the form of the

question and the relevancy, because, in my mind -- you guys correct me if I am wrong -- the Division is not here to decide when the Queen should be developed, and the order of development is up to the operator that owns the acreage.

The issue here and the only issue here is whether the Queen is potentially -- is a viable candidate for hydrocarbon production. Is it a potential target for development. And it doesn't matter if that development is going to occur a month from now or five years from now, because your duty is to look long term and waste is not defined on what prices are today or what companies are intending to drill today, but is it a zone that has a potential production of hydrocarbons that has yet to be developed. That is the issue.

EXAMINER GOETZE: Mr. Padilla.

MR. PADILLA: I am trying to figure out if the opposition to this case is just an objection for the sake of objection or whether Devon is really actually going to develop the Queen here.

And their work in section 28 seems to be progressing, as I understand the testimony, from the Bone Spring up to the Queen, in this case. And I'm trying to find out if, indeed, Devon has any plans to

develop the Queen.

I think it's a fair question, and I think he can answer that.

EXAMINER GOETZE: At this point, it's somewhat of a situation that the motivation for someone to consider the reservoir and the conditions of the reservoir as driven by an application go hand and hand. We do it in OCD, and we do consider it when we review the applications.

So in a way, having the application be the source of dispute is not really relevant. The application does make us consider what is around the application in the area, what's the influence.

With regards to development, again, relevancy is not here. They've had interest. I would lean towards the fact that they've considered it. What we would be focused on, would the disposal well impact, what would have been protected, and that is to reduce waste or prevent waste of a hydrocarbon resource.

So at this point, I would ask you to move on with another question, please.

BY MR. PADILLA (cont'd:)

Q. Let me direct your attention to Exhibit 6. Clarify for me what that exhibit is.

A. It is an isopach map.

Q. I believe your testimony was that the thickest part of the sand here is the west half of the east half of section 28; is that fair?

A. That's correct.

Q. What well control did you use to develop this?

A. All the well control we used for the map is posted on the map. So, for example, if there's -- there's the well. The proposed SWD well is in the southeast of the northwest of section 28. And below it, there's 78 feet. That means 78 feet of net thickness there. So any number with that posted data was what was used to make the map.

Q. Where did you get the figure 78 feet?

A. From the wire line logs.

Q. Right smack in the middle, there is a little symbol there; is that a dry hole? It's in orange.

A. In 28. No, that is a deep gas well. That well is not used because it was a deep gas well. They set casing quite a bit -- intermediate quite a bit lower.

And I didn't have anything other than a case hole neutron log, which is not -- I don't think it is -- I don't think it is a true representation of porosity, so I only use open hole logs in this map.

I can get a gross thickness in that well. We have gamma ray and that sort of thing. But for net

isopach purposes, it can't be used.

Q. Did you use a well up there in the north half up their way there in green?

A. It doesn't appear that I did. I can't say for sure. But, again, I am going to say that the logging suite was not what was appropriate to make this map.

(Ambient noise.)

Q. I am curious how do you come in the northwest section of 28 to a figure of 40 and then you go to another contour 60 and 80, how do you reconcile that? Do you have actual data to determine that?

A. Again, any data that I used on the map is posted there. So there's a 43 in the southwest, southwest of 22, meaning that I have to have a 40-foot contour line in there somewhere.

And then there's a 58 and a 74 -- there's a 74 in section 22, and there's a 58 in the east half, east half of section 28, meaning that there has to be a 60-foot contour in there. This is standard geologic practice, interpolation between data points.

Q. And this is a porosity isopach, right?

A. Yes, net porosity height, thick.

Q. Let's go to the next exhibit, Exhibit No. 7.

A. Okay.

Q. Let me ask you what data did you use to go,

again, from the northwest quarter of section 47 -- to go from 4 to 8 to 12?

A. Again, this data is not made up. It's real. It exists and it's posted there. So there's a 10 in I guess it would be northeast of the southwest of section 28. There is a 13 in the southeast of the southeast of section 21, meaning there has to be a 12-foot contour in there somewhere.

Q. You don't know where?

A. It's interpolation. You're right, I don't exactly know where it is. But it exists and it's somewhere in there.

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

EXAMINER GOETZE: Redirect.

MR. FELDEWERT: I have no questions.

EXAMINER GOETZE: Very well. Mr. Jones.

EXAMINATION BY EXAMINER JONES

EXAMINER JONES: Those two gas wells, they are spaced 320 Morrow gas wells; is that correct?

THE WITNESS: I believe so.

EXAMINER JONES: How old are those wells; do you remember what they are making right now?

THE WITNESS: I don't know current production. If I recall, they were drilled and

completed by, I believe, Ocean, which was acquired by Devon. So we made that acquisition in 2008 -- is that right?

MS. MUHLINGHAUSE: Actually observing the (inaudible), I think it was 2002.

THE WITNESS: So they have been producing for a while.

EXAMINER JONES: They're still decent production?

THE WITNESS: I believe so.

EXAMINER JONES: Do you have any plans uphole from those wells, like in the Strawn -- I guess you talked about that already. But can you reiterate that, maybe the Atoka or the Strawn?

THE WITNESS: We are always having discussions on prospectivity, whether it's Strawn, Cisco Canyon shale or the upper Pen shale, the Wolfcamp, Bone Spring sands. I mean, we're constantly mapping, evaluating opportunities. So I would say that --

EXAMINER JONES: But you are not in danger of losing these leases, I take it, because you've got production --

THE WITNESS: That's correct. We are held by production with the gas wells and the Bone Spring in the south half of section 28 as well.

EXAMINER JONES: Okay. If you drill a Queen or a Grayburg or a Yates well out here, where would you drill your first one?

THE WITNESS: Are you talking about a location?

EXAMINER JONES: Yes. Would you pick it? You drew this map, right?

THE WITNESS: Yes. Well, I mean, first we need to run the economics on whether horizontal versus vertical. That work still hasn't been done.

EXAMINER JONES: Okay. So you're considering horizontal?

THE WITNESS: Yes. Devon is a working interest owner in a different area, different formation, San Andres in Lea County, that's very similar in --

EXAMINER JONES: I think I know what you are talking about --

THE WITNESS: -- oil field maturity and history; that we think that this could be an analog we drill. We have drilled horizontals in that stuff and the results are quite good. So I don't know why this -- that -- we kind of think that could serve as an analog for something like this.

EXAMINER JONES: Okay. Your contour map goes right alongside those dry holes, and it is a bit

mystifying. You put in the numbers and you just let the computer do the contour map?

THE WITNESS: No. This is a hand-contoured map. Both isopach maps are hand-contoured maps.

EXAMINER JONES: Okay.

THE WITNESS: That's why they look so ugly.

EXAMINER JONES: This is a lateral oil country and a limestone matrix logs?

THE WITNESS: Yes. But I will say all my isopach maps, the launch would run on a limestone matrix, but I did convert those logs to sandstone matrix.

EXAMINER JONES: You had digitized --

THE WITNESS: Yes. So we have LAS data out here. That's real sandstone. It's using 6.28 grams per cubic centimeter grain density, so...

EXAMINER JONES: Okay. Thank you.

EXAMINER GOETZE: Mr. Dawson.

EXAMINATION BY EXAMINER DAWSON

EXAMINER DAWSON: Mr. Poland, on your Exhibit No. 6, those wells in the south half of 28, the two dry holes, one depicting 79 feet and the other has no net figure on it.

THE WITNESS: Uh-huh.

EXAMINER DAWSON: Did you look close at

those logs?

THE WITNESS: The wells in the -- I guess the northeast of the southeast were -- I don't recall what the logging suite is there. But I did -- the answer to your question is, yes, I looked at those logs.

EXAMINER DAWSON: Those well logs are probably kind of hard to read because they were old.

THE WITNESS: Those wells were both spud in -- well, the well in the northeast of the southeast was spud in 1953 and the other one was 1962. So I mean data out here is less than ideal, I guess.

EXAMINER DAWSON: The reason I am asking is because those look like they are roughly 79 to 80-plus feet of net pay --

THE WITNESS: Right.

EXAMINER DAWSON: -- within those logs?

Did you look at the completion reports on them?

THE WITNESS: I went through the NMOCD website, and that is what is posted on Exhibit 8 and 8A. And I was unable to find any sort of completion given on either of those wells.

EXAMINER DAWSON: Okay. And then the 12 -- they are roughly both about 10 feet on your Exhibit 7?

THE WITNESS: That's correct. The one is 10 and the other I am contouring as about 10, yes, that's correct.

EXAMINER DAWSON: That other one might be 11 on the west side? Well, you get it off the logs --

You guys probably wouldn't want to reenter those wells, I mean if you want to save some money? They're producing --

THE WITNESS: I think the engineer can probably speak to this more, but Devon has not had a lot of success reentering ancient wells.

EXAMINER DAWSON: Yes. Those are really old wells.

And then it looks like there's another well -- kind of the east half, east half there. That is probably the northeast quarter of the southeast quarter?

THE WITNESS: Yes.

EXAMINER DAWSON: That well there, that apparently was a Queen producer at one time -- or do you know?

THE WITNESS: Let me check my production map.

EXAMINER DAWSON: On his production map, on the one that was provided by Mr. Powers, it looks like

it produced roughly about -- I'm sorry. It was Mr. Maxey -- it looked like it produced roughly 26,000 barrels; is that the same one?

THE WITNESS: I'm not showing that well in the east half, east half of 28 as being a producer on my production map.

EXAMINER DAWSON: And, then, the one up in unit letter B, which would be the northwest of the northeast, that one shows it produced roughly 58,000 barrels?

THE WITNESS: Yes, that is probably right.

EXAMINER DAWSON: And that is within the 12 contour?

THE WITNESS: Yes.

EXAMINER DAWSON: Okay. And that well has been plugged and abandoned, so it is probably depleted up there? In that location.

THE WITNESS: It is possible in that 40.

EXAMINER DAWSON: Okay. And then northwest of 27 on your bubble map, you said that's about 700,000 barrels.

THE WITNESS: Yes. I think it was about 630 commingled between Queen and Grayburg. It was the whole gamut, I think.

EXAMINER DAWSON: Would you anticipate that

Devon would commingle the Queen and Grayburg if they were -- if they were indicated to be productive on the logs.

THE WITNESS: The only way they could do that is to be vertical wells. I guess you could potentially drill a horizontal in the Grayburg and then perforate the Queen in the vertical part.

But it would be -- without drilling vertical wells on a 40-acre spacing or something, commingling, that would be difficult -- I mean, it would be difficult in a horizontal well.

EXAMINER DAWSON: So you would probably drill a pilot hole through those formations and then move uphole from there? I mean perf the --

THE WITNESS: Yeah, I mean --

EXAMINER DAWSON: -- (inaudible) if it proved to be -- had indications of being productive, you'd probably produce the Grayburg first and do a --

THE WITNESS: Yeah.

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

EXAMINATION BY EXAMINER GOETZE

EXAMINER GOETZE: Mr. Poland, just one question. On your Exhibit 7, you said you can find the extremes (inaudible) what porosity levels to make this?

THE WITNESS: So this is just a summation of the porosity height. So I didn't use a porosity cutoff on the porosity height map.

EXAMINER GOETZE: So you were still considering 10 percent and above when you constructed this or did you limit yourself on the porosity --

THE WITNESS: 10 percent and above on the isopach map. And then the porosity height is just a summation of all porosity.

EXAMINER GOETZE: Okay.

THE WITNESS: I didn't use a porosity cutoff on the --

EXAMINER GOETZE: I just wanted to make sure what we are looking at.

THE WITNESS: Okay.

EXAMINER GOETZE: All right. I think we are done with this witness.

MR. FELDEWERT: May I ask for a two-minute break and then we will call our third witness.

EXAMINER GOETZE: Two minutes, that's all?

MR. FELDEWERT: I can be quick.

EXAMINER GOETZE: Let's take a break. Don't wander off. Come back in five.

MR. FELDEWERT: Thank you, sir.

(Brief recess.)

EXAMINER GOETZE: We are back on the record. Mr. Feldewert, you have one more witness for us.

MR. FELDEWERT: Yes, sir.

KEVIN SMITH

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

DIRECT EXAMINATION

BY MR. FELDEWERT:

Q. Would you please state your name, identify by whom you're employed and in what capacity.

A. My name is Kevin Smith. I am a production engineer, a team lead for the Devon Energy Company in Oklahoma City.

Q. Do your responsibilities include the Permian Basin of New Mexico?

A. Yes, it does.

Q. And, Mr. Smith, how long have you been a production engineer?

A. I worked the oil fields for 42 years. I have been a petroleum engineer now for 35 years.

Q. Have you previously testified before the Oil Conservation Division?

A. No, I have not.

Q. Would you briefly outline your educational background.

A. I have got a bachelor's of science degree in petroleum engineering from Marietta College in Marietta, Ohio.

Q. And then you mentioned you've been acting as a petroleum engineer for the last how many years?

A. For 35 years.

Q. For 35 years. Have your responsibilities included drilling, completion, and production operations?

A. Yes. All my experience -- not all of it. I've worked some out here now -- but the bulk of my experience has been up in the Appalachian Basin in Ohio, Pennsylvania, New York, West Virginia, Tennessee and Kentucky.

Q. And have your experiences included the drilling, completion, and production --

A. Yes. When I graduated, a petroleum engineer had to wear all the hats.

Q. As a result, were you also involved in designing saltwater disposal wells?

A. Yes. I spent 22 years with a company called the Oxford Oil Company out of Ohio, one of the largest privately-owned, independent oil producers in that area.

I served 11 years as its vice president. But at my tenure there, we had numerous saltwater disposal

wells, both new drills and conversions into production wells into saltwater disposal wells.

Q. And are you associated with any professional affiliations or associations?

A. I just wanted to add one other thing. I also put together -- when I had my tenure with CNX Gas, Consol Energy, I wound up drilling a deep -- I selected the location, I designed the well, drilled it, and put it in operation, an ultra deep saltwater disposal well in eastern Ohio, which also wound up being the discovery well for the Utica in eastern Ohio.

Now, professional affiliations, yes, I've been a member of the society of Petroleum Engineers since 1979.

Q. And are you familiar with this application?

A. Yes, I am.

Q. And have you analyzed the wellbore issue and the impact the proposed injection operations will have on Devon Energy's acreage in the subject area?

A. Yes, I have.

MR. FELDEWERT: Mr. Examiner, I tender Mr. Smith as an expert witness in petroleum engineering.

EXAMINER GOETZE: Mr. Padilla.

MR. PADILLA: No objection.

EXAMINER GOETZE: Very well. He is so

qualified.

Q. Mr. Smith, I want you to go to LG&S's Exhibit No. 1, their C-108 application.

MR. FELDEWERT: Mr. Padilla, do you have a copy of that exhibit?

MR. PADILLA: This is mine.

THE WITNESS: Okay.

(Interruption.)

Q. Back on the record. Now that you have LG&S's Exhibit No. 1, would you turn to their wellbore diagram in this C-108 application?

A. Yes.

Q. You reviewed this diagram?

A. Yes, I have.

Q. Have you also studied the well file?

A. Yes, I have.

Q. What did you observe with respect to the cement bond log that's available for this proposed injection --

A. I didn't see any record of any cement bond log available with the application. The only thing I can note is there is a report that they circulated cement to surface. That is still no guarantee that you have an adequate cement job.

Q. Is there any indication about the nature of the cement that was used for this --

A. The 1960 vintage, my father was drilling wells back in the sixties and that was a standard type completion, short string of the surface pipe, and very inexpensive production cement.

Q. That type of cement that was utilized at that time, was it actually designed for, in your opinion, injection?

A. No.

Q. Given the age of this well, do you have any concerns about the integrity of the casing?

A. Yes. One of my other jobs that I had, I worked as a storage engineer for the Columbia Gas Transmission company. And I operated four natural gas storage wells.

And one of my jobs in reconditioning old production wells was converting them from natural gas storage wells. And, quite often, when we had wells of that vintage in the sixties, it was typically a lower-grade casing and, quite often, we ran into casing integrity issues, where we'd actually have to do all kinds of remedial work on casing of that vintage.

Q. You were also here for the testimony today about the freshwater zones in this area?

A. Yes, I have.

Q. And, in fact, you've reviewed the application, a

portion of the application where the applicant states on page 5 that these water-producing sands occur from 675 to 695?

A. Yes. It says, "Closest possible underground source of drinking water above the proposed disposal intervals are the red beds between 675 feet and 695 feet."

And that begs my next contention of this wellbore that the surface casing is set at 259 feet. There is no casing identified as a surface casing or an intermediate casing to protect the deepest possible freshwater at 675 to 695.

Q. So there is no -- the deepest casing is 259 feet?

A. Surface casing, that is correct.

Q. And there is no intermediate casing?

A. No, there is not.

Q. So there's no casing through the freshwater zone as identified by the applicant?

A. The only thing they could contend is the production string is through there and it is cemented. But it has been my contention where I have put together saltwater disposal wells in other states, states requested an additional string of casing through deep freshwater zones not to be included as the production zone -- the production casing.

If I wanted to use production as a surface casing, I would have had to cement an additional string of casing inside that production casing.

Q. In your expert opinion, is the casing in this well sufficient to protect the freshwater zones identified by the applicant?

A. Not in its current configuration.

Q. Now, you were here for the testimony about the proximity of this proposed disposal well to Devon's deep Morrow gas well?

A. Yes. This is another one of my concerns.

Q. And how close is that deep Morrow gas well to their proposed disposal well --

A. It is 330 feet due north.

Q. What concerns do you have arising out of the proximity of this proposed disposal well to that existing gas well?

A. They, according to their permit application, are going to have a wide diversity of production fluids, that they would accept anything from the shallow producing formations clear on down into Devonian production formations.

It has been my experience, from what I've gleaned in my short period here, that quite often Devonian production fluids -- the Devonian tends to be sour so

you will have a certain quantity of hydrogen sulfide dissolved in that water. The water could become acidic, either by sulfuric acid or sulfurous acid by the presence of the hydrogen sulfide in the water.

I'm afraid of that plume of water migrating away from this well and immediately interacting in the R wellbore region of our current Morrow gas well.

Q. Just to put some meat on that testimony. If I refer back to page 4 of the C-108 application, is that the page where you identify all the potential sources of the produced water that they seek to inject?

A. Yes, it is.

Q. And you mention that in some of those formations, the deeper ones could have H2S put in?

A. Yes, they could.

Q. And you were here for the testimony that there has been no analysis of the compatibility of these sources of water with the proposed Queen formation?

A. That is correct. I could not find any of that in the application.

Q. Does that exacerbate your concerns about the impact that this plume of water would have on the existing deep gas well in this area?

A. Absolutely. Another point of contention is that this well, the Keohane, has been hydraulically fractured

and the volumes of water would tend to -- the volumes would tend to indicate that quite possibly your fracture lengths could exceed 100-plus feet.

So now we are even in closer proximity to our well. Because immediately upon injection, you would start disturbing the formation a hundred feet away from the existing disposal well. So it would be accelerated.

Q. Let's turn to what has been marked as Devon Exhibit No. 9.

A. Okay.

Q. Is that a wellbore diagram for that nearby Morrow gas well?

A. Yes. This is our Shugart 28 Fed 2. And as you can see, we wind up having shallow surface casing strings set at 624 feet.

And then we do have another immediate string of casing set at 4,825 feet. And then the final production casing is set at 12,000 feet.

Q. Okay. And in terms of the cement bond log for this well, have you had an opportunity to look at that?

A. Yes. We did run a cement bond log. I shouldn't say "we." The company that drilled and completed this well ran a cement bond log on the production casing.

Q. And if I turn to what has been marked as Devon Exhibit 12, is that the cement bond log --

A. No. It's actually Exhibit 10.
Q. I'm sorry. Thank you. Exhibit 10.
A. Yes. I'm --
Q. Let me stop you right there.
Is that the cement bond log for the nearby Morrow gas well?
A. That is correct.
Q. And what do you observe in looking through the cement bond log?
A. Well, the very first page shows that your indicated top of cement is just slightly above 2,900 feet. Now, that would bring the cement back up inside the immediate casing.
The cement bond log, just basically, shows the quality of cement both bonded to formation and to the casing.
The far right track actually shows the quality of the cement, and the color is wonderful to show that there are actual voids present in the cement.
As you move further on down the depth track of this well, further down you can continue to see voids in the cement. I would expect that. This is what they would call your lead cement, and this is more or less a filler-type cement just to bring cement back up inside the intermediate. So the quality of the cement is going

to be rather poor.

By the time you get down to 3,600 feet, you do have some density of cement there, right from 3,500 to 3,600 feet. But from 3,600 feet, further on down, we, once again, lose quality of the cement. At 3,800 feet, 3,900 feet, we are actually having large voids in the cement itself. So it is a very poor quality cement.

Q. Is this cement designed to counter or address the corrosive effects of the proposed disposal water?

A. No. This would have been just cement that was designed for production. It was probably a lead cement, a very light cement, so they would not break down deeper formations whenever they cemented this.

Quite possibly, it might have had a lot of gilsonite or whatever else added to keep it light. And that is why you would have a very poor quality cement there.

Q. In your opinion, Mr. Smith, is it generally approved to operate a commercial disposal well within 330 feet of an active gas well?

A. Absolutely not.

Q. In your opinion, is there even more of a concern where the water compatibility and the corrosive nature of the proposed injection fluids is unknown?

A. Yes. There is nothing in their application to

determine the compatibility of any injected water into the formation that they're injecting.

Q. In your opinion, does this proposed saltwater disposal well in its proximity to the existing Morrow gas well cause a threat to public health and the environment?

A. Absolutely. If you go back to Exhibit No. 9, and it actually shows a cross section of the wellbore schematic. If you were to breach that intermediate casing through the cement into that intermediate casing --

Q. Why would that occur? How would you breach that casing?

A. Again, you would have corrosive water. Typical production water that is saline would have a tendency to have a lower Ph so it would be somewhat corrosive.

Q. Is it even more corrosive if it had H2S in it?

A. Absolutely. If you were to breach that intermediate casing, you would be attacking a very poor quality of cement. And if it would actually degrade the quality of that cement, you'd now have a direct conduit to surface, and that water could flow to surface.

Q. We will now switch gears and talk about the statement in their application that this particular

proposed disposal well is no longer economic to LG&S under the current oil prices.

A. That is correct.

Q. All right. To be commercially viable, what do you have to cover?

A. You have to cover your operating expenses. Operating expenses could be anywhere from a saltwater disposal to paying your lease operator and then paying for any minor repairs to your production equipment and, then, also, of course, for your power for your unit.

Q. And they mention current oil prices. We're currently in one of those oil price swings right now, correct?

A. That is correct.

Q. Have you been through these before?

A. Oh, yes.

Q. In your opinion, having looked at this particular well in its production and getting the information you were able to gather --

A. Uh-huh.

Q. -- could this well, even at current production rates, become commercially viable again?

A. Yes.

Q. And did you actually do some economic runs for the Examiner today?

A. Yes. The projection engineers, I kind of mentor the production engineers at Devon. And we've created a very simplistic economic analysis tool. It's more or less an Excel spreadsheet. No fancy areas or anything else. It is just a very quick look.

Q. If you turn to what's been marked as Devon Exhibit 11, is that your analysis?

A. Yes, that is correct.

Q. Why don't you explain the inputs and then what this shows?

A. Okay. This simple tool, the engineer just plugs in the current oil production rate, the current water production rate, and a gas rate, if there was gas available. We can go ahead and select any kind of decline rate. I chose a 10 percent decline rate, which is still rather aggressive for a well of this vintage. You shouldn't have this steep of a decline with a well of this vintage.

The expense tab up there, this is to actually term whether or not we need to work on a well or not. So in that column, you would actually put on a workover cost. If it's a rod job or whatever else, you put 25-, 30-, 40,000 dollars, whatever your expense would be.

Your next box would be an Opex fixed cost, what your fixed cost is to operate that well on a daily

basis. And then the next box down also takes into account saltwater disposal costs.

And I went ahead and ran the economics on this thing at $55 a barrel and two, twenty-five gas. And I know this well doesn't make any gas. We have to put some kind of gas number in there, so I just put about 100 cubic feet of gas a day, which is none existent. It has no bearing on the economics on this well.

Q. Why did you choose $55 a barrel?

A. At the time they made application for this saltwater disposal well, oil was well north of $55 a barrel.

Q. And then what did your analysis show with respect to the potential economic viability of this well if prices recover?

A. Well, just to go back, we went with an Opex fixed cost of about $1,000 a month. We operate others. We do operate shallow vertical wells in other regions in New Mexico. And that's typically about our fixed costs for electric and everything else.

I chose $2.25 a barrel. That's what we are paying for the bulk of our saltwater disposal in and around what we call the Hackberry area, which would be the surrounding area there.

If we go ahead and make the run on this, and if

you look down there on the undiscounted cash flow, we show an economic life of another 23 months for an cumulative amount of money at $2,400. I know it doesn't seem like much, but it is still economically viable.

Q. Now you didn't have LG&S's operating costs, did you?

A. No, I did not.

Q. You used Devon's typical expenses for this --

A. I did that. And then also for the oil production rate -- I know earlier testimony said that we used, you know, four barrel a day. I used that number for the last public posted production data that they had for the entire year. And I did, yes, I did; I divided by 365 days. That was the only data that would have been available. And the same goes with the water production rate.

Q. I want to make a comparison here. What monthly operating expense did you utilize for this well using Devon's data?

A. That would cover the cost of the electricity and the lease operator.

Q. And what was that monthly?

A. $1,000 a month.

Q. And that breaks down to about what a day?

A. $30 a day.

Q. Okay. Were you here for testimony from Mr. Maxey where they did some kind of analysis?

A. Yeah. He made mention that it would cost -- the oil would have to sell for $364 a barrel. When I ran that number real quick on just four barrel a day or whatever else, that well has an operating cost of $1,564 a day based on $364 oil.

So that is what apparently they feel this well is costing them.

Q. That's how much per day?

A. $1,564 a day if they say the oil would have to be $364 a barrel at four barrels a day.

Q. We don't have their operating costs --

A. No, sir, we don't.

Q. Okay. In your opinion, based on your quick analysis here, is it premature to convert this producing well to now a disposal well into the Queen?

A. In my opinion, yes.

Q. Is another potential option here to place this well in a temporary abandoned status?

A. That is a very viable option.

Q. Finally, I want to go to the last subject, and that is there is some discussion here about the impact that the water flow had on Devon's well and that they were drilling -- was it the Third Bone Spring?

A. Yes. The Sargas 28 Fed Com 3H.

Q. Let's go to Exhibit No. -- first off, before we get to that, are you aware that the company believes that the Queen formation is a viable target in this area?

A. Yes, I do.

Q. Okay. In your opinion, if we now start flooding the Queen with 5,000 barrels of water per day, which is what they are requesting in this application, is that going to waste the reserves that remain within the Queen formation underneath this --

A. It absolutely would. It would disturb the oil saturations. And we would not be able to make a quantifiable economic decision based on that if there is water migrating through that formation.

Q. So that would have impact on the Queen formation, right?

A. That is correct.

Q. Now, will this flooding also that they propose, will it impact the company's ability to develop the deeper zone, such as the Bone Spring formation?

A. I feel it would.

Q. And they provided and discussed an incident where Devon had difficulty through saturated zones when they were drilling that Third Bone Spring well, correct?

A. That is correct.
Q. And if you turn to what has been marked as Devon Exhibit No. 13.
A. Yes.
Q. Does this reflect the additional costs that Devon incurred in having to drill through a water-saturated zone to develop the Bone Spring formation?
A. Yes, it does.
Q. And this occurred with the vertical portion of the well in section 29?
A. That is correct.
Q. Not in section 28?
A. That is correct.
Q. Can you explain to us what happened and what additional cost was incurred?
A. Well, they went ahead, and while drilling that interval -- it was at a deeper depth, as was established by the other side. They took a flow of water, and we had to mud up and continue trying to balance out to handle that water flow, and then we had to go ahead and drill beyond the formation where we were taking a kick so we could adequately set our intermediate casing at a proposed depth and then be able to cement it and shut that water flow off.
Q. First off, did that present a risk of losing the

well?

A. Absolutely. Anytime you take a kick, you have the danger of losing a well.

Q. And then what additional cost did the company incur having to drill through this deeper saturated zone?

A. We showed that we had a day's loss trying to combat this water flow, an additional four days of drilling and mudding up, things along that nature.

Now the redacted portions are items that really were not correlative to the actual incident itself. But going down through there, you can see how much the additional cost of mud was and everything else.

The final total bill, just to handle that additional flow of water, was $425,000, roughly.

Q. Putting aside the impact that the proposed disposal well would have, you know, developing Devon's reserves in the Queen formation --

A. Yes.

Q. -- put that aside.

A. Uh-huh.

Q. If LG&S's well's approved here and they commence flooding the Queen directly adjacent to Devon's acreage is that going to cause additional drilling risk for the company in their efforts to develop deeper zones in

section 28?

A. Yes, it does.

Q. And is it going to impose on the company additional drilling costs that it would otherwise not incur in developing those deeper zones?

A. Well, as evidenced here, it cost us an additional $424,000. So working in the independent world, a gentleman I worked for many years up in Ohio, he said if you did find additional reserves to justify the additional costs, you didn't drill the wells.

So we would have to find an additional amount of reserves to counteract that $424,000.

Q. So not only does it prevent the company from developing the Queen formation, but is there a potential that it could cause the company to spend the money that it would otherwise utilize to develop the deeper Bone Springs elsewhere?

A. Yes. It would weigh very heavily on the economics of the well.

Q. In your opinion, Mr. Smith, is this wellbore that LG&S utilized for disposal, is it suitable for disposal purposes?

A. No.

Q. In your opinion, is it premature to abandon the Queen formation and commence using that formation for

disposal purposes?

A. Yes, it is.

Q. In your opinion, will the proposed disposal well impair not only Devon's correlative rights in the Queen formation but also the lower productive zones?

A. Yes, it would.

Q. Were Devon Exhibits 1 through 13 prepared by you or compiled under your direction and supervision?

A. Yes, they were.

MR. FELDEWERT: Mr. Examiner, I move the admission into evidence of Devon Exhibits --

EXAMINER GOETZE: Before we do that, did we visit Exhibit 12?

MR. FELDEWERT: Thank you. I meant to say that. Let me rephrase it.

I would move the admission into evidence of Devon Exhibits 9 through 11. I am not going to move into evidence Exhibit 12.

EXAMINER GOETZE: You got to rip that out now.

MR. FELDEWERT: I think it's just the Division records.

EXAMINER GOETZE: That's okay.

MR. FELDEWERT: So I guess if you want to take a look at it, but it doesn't serve any purpose that

I can see here today.

I would like to move for admission into the record Exhibit 13. And then Devon Exhibit 14 was a previous version of an exhibit that they had presented to us and was authenticated by Mr. Maxey.

And, Mr. Examiner, Devon Exhibit 15 was the Hinkle Federal No. 19 records from the Division's website. So I would move the admission into evidence Exhibits 9 through 11 and 13 through 15.

EXAMINER GOETZE: Mr. Padilla.

MR. PADILLA: No objection.

EXAMINER GOETZE: Very well. Exhibits 9, 10, 11, 13, 14, and 15 are so entered in the record.

(Devon Energy Production Company, LP, Exhibits 9, 10, 11, 13, 14, and 15 were offered and admitted.)

EXAMINER GOETZE: Okay. Your witness, Mr. Padilla.

CROSS-EXAMINATION

BY MR. PADILLA:

Q. Mr. Smith, let's turn to Exhibit No. 11.

A. Yes, sir.

Q. Let's just take the lower portion of the exhibit, starting with month number 1.

A. Yes.

Q. What kind of figure would you have as far as it would show production of half a barrel a day?

A. Sir, I don't -- this model was not built to input individual monthly production. This is just a very simple analysis model to determine whether a well is economically viable for additional work.

I had no other production data to go on to enter into this model.

Q. Let's just go ahead and see if you agree with me or not. If I substitute four barrels with a half a barrel a day and multiply and use the $30 per barrel figure, my revenue --

A. Absolutely. You would be losing money.

Q. Given your own costs here?

A. Yes. But I did not have any of that data represented to me. The only thing I could go on is what you folks have reported to the NMOCD. And that we trust in good faith is correct data.

So a well that shows it is producing four barrels a day on average indeed does not represent that you are producing a half barrel a day.

Q. And the net revenue interest that you used here is 7 and a half --

A. Yes. I just figure a typical seven-eights lease.

Q. You don't know whether there are any overrides or --

A. No, sir. I do not research that.

Q. For all you know, this could be a 75 net revenue lease?

A. That is entirely possible. Again, I am working on what is public data that is available, sir.

Q. Now, the discount rate, I don't understand it. Did you compute total reserves underlying this --

A. This is not meant to compute actual reserves. This is just more or less an economic timeline showing a well declining at a 10 percent decline rate per year at a discounted cash rate of 10 percent. This is what you would wind up with.

Q. Now, you went and you testified concerning the well's schematic involving the well in your application?

A. In your application, sir.

Q. Yes. And you analogized to a well somewhere in Ohio; is that right?

A. In Ohio, Pennsylvania, West Virginia, I have worked on saltwater disposals wells. And most often, whenever you had a short string of surface casing, it did not adequately protect the surface, the freshwaters of the state, of the Commonwealth of Pennsylvania, the

state of Ohio, or West Virginia. Normally, we're told to remedy that situation.

Q. Have you ever worked on saltwater disposal in New Mexico?

A. I have just started doing work on saltwater disposal wells, yes, sir. And every one that I have done --

Q. My question was whether you have actually, prior to this application, worked on any saltwater disposal wells.

A. Right. And I told you, I have put all kinds of saltwater disposal wells together in the Appalachian Basin.

Q. In New Mexico.

A. Yes, sir, I have. I am currently working on two right now.

Q. Before this application was filed?

A. Yes. Yes, I was before this application was filed.

Q. Did you -- did you actually go on the well and determine whether or not it was -- do any testing on this well?

A. Sir, this is not my well. I have no permission to go do that.

Q. Did you ask for information concerning this

well?

A. Sir, I was just going with what is publically available. This is what the permit relies on. So I have to go with whatever is requested in the permit application.

Q. And you are going just by vintage of the casing, making an assumption based on --

A. I have worked on wells that were drilled in 1895 clear on up to wells that are brandnew wells. So, yes. And it appears that older wells have problems with casing.

Q. In general?

A. In general, yes.

Q. But you have no specific information on this well?

A. No, sir, I don't.

Q. Did you conduct any studies as to conduction rates or pressures that might be used in this well and whether or not that would work?

A. Again, I have no information from any injection tests. Your engineer has already stated that no injectivity tests were done. So, no, that was of public record for me to actually make any kind of engineering analysis for this.

Q. So you are just simply going on the assumption of

your prior experience in Ohio or Pennsylvania with regard to the condition of this well today?

A. I'm going based on, yes, the condition and the vintage of this well -- yes, that is correct -- and my past experience.

Q. Have you worked on any proposals to drill wells in the Queen in section 28?

A. That is not my job responsibility, sir.

Q. You are the team leader?

A. I am the team leader of production engineers and a mentor for the production engineers. But, in Devon, the production engineering department does not have input on the actual permitting process for new drills.

Q. In preparing for this hearing, did you conduct any studies and work with the other witnesses that appeared here today in terms of the viability of injection in this area?

A. Zach and I have had discussions regarding this, more or less in a broad brush discussion of the viability of developing it, yes.

Q. Now, you have concerns about erosion and things of that that nature?

A. Yes.

Q. Do you have any concerns about the number of

injection wells that are in section 28?

A. I have some concerns, but my biggest concern is placing an injection well within 330 feet of a high pressure gas production well.

Q. Do you have any concerns with a well that has -- for which over two million barrels of water have been injected as far as corrosion is concerned?

A. I would have those concerns.

Q. Do you have any concerns with a well that has produced or has -- where injection has -- this is a saltwater disposal well in the north half of section 33 that has taken over seven million barrels of water.

A. Okay.

Q. Do you have concerns about that?

A. I have concerns anywhere where water is produced into an injection well with a possibility of possibly impacting oil reserves that are owned by the Devon Energy Corporation. And there is a potential for that impacting on our reserves in the Queen formation.

Q. You testified that you are a man of all seasons as far as engineering is concerned. And my question is do you have any -- have you conducted any reservoir studies that would indicate that this is a viable zone?

A. My current job is not reservoir engineering, sir. My current job is a production engineer. My reservoir

engineering experience is more or less with reserve analysis and, then, also, natural gas well testing.

So I defer to offer any reservoir engineering analysis for this.

Q. And in getting ready for this hearing today, did you conduct any reservoir analysis to --

A. Again, sir --

Q. -- work with someone concerning reservoir analysis to conclude or reach a conclusion that the Queen formation is productive in section 28?

A. I did not. That is not normally the way that Devon operates. The geology department goes ahead and proposes the potential. Then they work with an asset and execution reservoir engineer.

Q. You are contending here today that section 28 in the Queen, at least in the lands that are owned by Devon, that this has potential for oil production?

A. That is correct.

Q. And you're telling me that you did not do any kind of reservoir analysis to determine the accuracy of what you're saying?

A. Of that statement -- but you folks have not entered into any evidence that there would not be a negative impact.

Q. We are not the ones who are saying we are going

to drill the Queen. Devon is the one saying you're going to drill the Queen --

A. That it's possible, yes, sir.

Q. And you haven't brought anything to say that you have done any reservoir analysis on the Queen?

A. No, I have not.

MR. PADILLA: That's all the questions, I have, Mr. Examiner.

EXAMINER GOETZE: Very good. At this time, is that your last witness?

MR. FELDEWERT: Yes, sir.

EXAMINER GOETZE: Has there been any kind of thought on rebuttal?

MR. PADILLA: Yes. Very quickly. I'll recall Dr. Powers.

EXAMINER GOETZE: If you don't mind, we will have Dr. Powers come up and you may present your rebuttal.

THE WITNESS: Are there any questions from you guys? I didn't mean to drag this out.

EXAMINER GOETZE: Go ahead.

EXAMINER JONES: One last question.

EXAMINATION BY EXAMINER JONES

EXAMINER JONES: The Morrow well, what's the casing design and cement condition of that well; does it

have an intermediate through the -- probably 4,000 feet deep or so?

THE WITNESS: It has the intermediate clear on down through. I would suppose -- I'm not an expert on the geology -- but on down through the Grayburg formation to handle that saltwater flow that we encountered and its four-and-a-half-inch production casing as well.

EXAMINER JONES: Okay.

EXAMINER GOETZE: Mr. Dawson.

EXAMINATION BY EXAMINER DAWSON

EXAMINER DAWSON: Do you know how much that Morrow well is currently producing?

THE WITNESS: Last time I checked it, several weeks ago, it was 50,000 a day.

EXAMINER JONES: 50 MCF a day?

THE WITNESS: Yes, sir.

EXAMINER DAWSON: I don't have any further questions. Thank you.

EXAMINER GOETZE: You know my statement on this. So we're done with this witness. Thank you very much.

REBUTTAL

DENNIS W. POWERS

having been previously duly sworn, was further examined

and further testified as follows:

DIRECT EXAMINATION

BY MR. PADILLA:

Q. Dr. Powers, I want to direct your attention to Devon Exhibit No. 7.

A. Okay.

Q. I asked Mr. Poland questions concerning his contouring and basically how could he go from four to eight to twelve in his contours.

Do you have an opinion as to the accuracy of this contouring here?

A. Yes, I do.

Q. What is that opinion?

A. I have some difficulty with justifying some of the contours on the basis of the data that are presented. The initial focus could be on the 12-foot contour, for example, which is supported by a 13-foot datum in the southeast of the southeast of section 21, but has no other data that I can see that would support a 12-foot contour.

In particular, if you look at the data towards the center, we have an 8 and a 7 just by the 28. On the other side, we have a 6 and a 5 that look as though we are moving into a low point or a thin point. But a 12 is inserted in between here.

There is a 10. But a 10 does not require a 12. So I would have some difficulty in supporting having a 12-foot contour in here.

The 8-foot contour is supported on the west. And I don't see anything on the south here that supports an 8-foot contour. So I am not sure how to justify drawing those contours in there other than the 13, which is far removed. And driving a 12- and an 8-foot between those others is not a normal practice.

Q. What is the normal practice?

A. Well, you would take into account these data here and look at the trends, if there are trends that are important enough to contour, and take those into account.

So I could easily see why the 12-foot contour is there, up around the 13, but I can't connect it down to the south.

Q. Where is the 13?

A. It is in the southeast quarter of the southeast quarter of section 21.

Q. So based on your testimony is Mr. Poland using some kind of creative license for lack of a description?

MR. FELDEWERT: Object to the form of the question. Let's let the witness testify.

EXAMINER GOETZE: Let's get a discussion of accuracy based on what he believes is the basis of this interpretation.

Q. Let me ask this this way. Is there any well control in the south half of section 28 that would justify 12?

A. Not that I see.

Q. Where would you close it?

A. I would close it pretty close to the 13 value.

Q. So it would be an isolated pod at the top?

A. At this point, it's an isolated datum.

Q. Sorry?

A. It's an isolated datum. So it would require an isolated contour. I would not draw -- I would not drive that 12-foot contour between values of seven and five or six.

Q. So if you had to draw this, how would you draw it?

A. I would have a small area around the 13. That would be a 12. I would -- I don't know how to do the 8 up to the north particularly well.

There is a 9. There is an 8, a 10, and an 8 down in the southwest quarter. Those could be made into an 8 plus a -- if you were going to do a ten, you could do a ten there, too. On the east side, I don't see any data

other than the 13 that supports either an 8 or a 12.

Q. So given your testimony, what does this mean; What conclusion can you draw from this drawing?

A. I draw the conclusion that, first of all, the dry holes, I think as Mr. Poland testified, were not -- didn't provide data that he felt he could use in here.

And so I agree with that, and I would draw these with respect to the data, and I would not draw those contours through there.

MR. PADILLA: Nothing further.

EXAMINER GOETZE: Mr. Feldewert.

CROSS-EXAMINATON

BY MR. FELDEWERT:

Q. Mr. Powers, you reference the data point 13 up there in the southeast of the southeast of 21, right?

A. Yes.

Q. And then you also referenced, I think you referenced that data point of 10 in the --

A. In the southwest.

Q. In the southwest quarter of 28?

A. That's correct.

Q. So is your debate here how far down you would extend the 12?

A. It's not common practice to drive a contour like the 12 value across a saddle, so to speak, where we

have 9, 4, 7 on the west side and we have 5 on the east side.

Q. But somewhere between the 13 data point and the 10 data point, there is going to be a 12, right?

A. Yes.

Q. And that would be right on Devon's acreage?

A. It could be as close as right in section 21, which is Devon's acreage, but not the part we are talking about.

Q. And we just don't know where on Devon's acreage that --

A. No, we don't know.

Q. And you've had months to prepare for this hearing, correct?

A. Yes.

Q. And you have done no analysis whatsoever with respect to the quality of the Queen formation under Devon's acreage in section 28?

A. No.

MR. FELDEWERT: I don't have any more questions.

EXAMINER GOETZE: Mr. Jones.

EXAMINER JONES: No questions.

EXAMINER GOETZE: Mr. Dawson.

EXAMINER DAWSON: I have no questions.

EXAMINER GOETZE: Is that it for rebuttal witnesses?

MR. PADILLA: That's it.

EXAMINER GOETZE: All right. Do you have closing statements, gentlemen?

CLOSING STATEMENTS

MR. PADILLA: Yes. Very briefly.

There has been a lot of speculation on the part of Devon here as to whether or not there's any kind of potential production in their acreage in 27 in the Queen formation.

They contend that they may want to come back up and look at this. But the evidence doesn't support any drilling, whether horizontal or vertical or anything, just the dry holes alone in section 28 in the Queen and the number of wells that have been plugged and abandoned and are depleted.

The Endurance case that I did certainly suggests that that would have been a saltwater disposal well. There is no objection to that, even as an injection well.

The only reason that case -- like the findings in the order say, is that it started out as an injection well, but because it was injecting into the producing formation, we had to turn it in to pressure

maintenance, which I think is really the subterfuge for saltwater disposal before the Division.

Now, there seems to be no objection to the -- or there hasn't been any objection to the major commercial saltwater disposal in the north half of section 33. And, basically, I don't care what you call it, this whole Queen/Grayburg has already been saturated by water with an injection commencing in the 1970s and even before.

So in terms of corrosion or what you are going to encounter in the Queen here, it's just a lot of water in there. And to say that this well, that the proposed well is going to somehow affect the drilling, that may be true.

But on the other hand, when you look at the number of injection wells here, and, particularly as shown on Exhibit No. 5, our Exhibit No. 5, you have a whole -- I mean it's just incredible how many injection wells there are.

To say that this application should be denied on the basis of incompatibility of the waters and that sort of thing, it really begs the question when all this injection and recycling of water has occurred in this area.

Another thing that's very apparent here is

that in section 28 we have four dry holes and/or plugged and abandoned wells. The economics for the two LG&S wells, you know, are serious losing propositions. And the model that has been submitted by Devon is clearly inaccurate when you don't use the actual production, current production, and current oil price.

Mr. Smith admitted that it was based on Devon's own costs. You are going to have -- it's a losing proposition when you consider when you change the oil price from 55 to 30 and you change the production of that well from four barrels per day to 30. That gives you a revenue of $15 a day. And you don't have correct net revenue interest or at least we don't know whether that model uses correct net revenue interest. A title report would have disclosed what kind of net revenue interest. And that should have been included in there to determine this is correct.

But, overall, this is really a depleted area. This is the prime area for drilling the -- or for injection. It's just totally depleted. And I tried to make a point this morning -- and, perhaps, I did not ask the question in the right way, but I don't see a difference between -- in this area a difference between an injection well for saltwater disposal and an injection well for pressure maintenance.

The fact is that you're flooding this area one way or the other. And to say that correlative rights in the Devon acreage is going to be impaired, I think is not accurate. I don't see how you can impair correlative rights when there is no oil.

The Oil Conservation Division I think in other cases has recognized that we are going to drill through sometimes pressured areas, and that's just a fact of life in southeast New Mexico.

You are going to encounter water. You are going to have to deal with it. In this case I think probably, in Devon's situation, they could not point today from where they got some effect from water.

My conclusion to that is that there's a whole bunch of injection wells right in that area and that the zone is pressurized.

And whether it's in the Grayburg or the Queen, we really don't know, because that's the way the pool classification has been determined by the Division or assigned by the Division.

But simply stated, when you look at the injection rates and the cumulative injection that has occurred in section 28, it's just a bunch of water that's in there. And that could be in the Grayburg, it could be in the Queen. But, primarily, it's full of

water.

And the saltwater disposal well is not going to change anything significantly here to where Devon is going to be materially affected.

I think they have to deal with the pressurized upper zones wherever you may be. And, obviously, from even their Exhibit 1, their objective here is the Bone Springs. Anybody in their right mind would concentrate on the Bone Springs with some caution now on the price of oil.

But to say that you are going to start horizontal drilling or vertical drilling in section 28 in the Queen, I think begs the question. It is an inaccurate statement. And it is not -- it's simply designed to object to this application.

We ask that the application be approved.

EXAMINER GOETZE: Okay. Thank you. Mr. Feldewert.

MR. FELDEWERT: Mr. Examiner, let's just put aside the age of the wellbore that they want to use. You can put aside, if you want to, the fact that they want to be 330 feet from the existing deep gas well.

If you just go to their application, they don't have any casing through the freshwater zone, period. And they want to inject through that casing

when there is no casing through the freshwater zone.

They've given you no compatibility analysis of the injector fluids that they want to use. They have just completely ignored that aspect of the application. They've completely ignored it.

When you look at the Queen here that they want to inject into, why is Devon here? Why have they spent all of this time and money, why have they come out here now three times to present this case if they didn't think that the Queen underlying their acreage is potentially productive?

And all you have to do to understand why is to look at LG&S's Exhibit No. 5 -- I think you had it out in front of you there, Mr. Dawson -- or Devon's Exhibit No. 4, their bubble map.

As Mr. Poland put it, simply stated, Devon has undeveloped Queen acreage, a substantial amount of undeveloped Queen acreage right in the middle of this prolific oil field. Yes, this is an old oil field. Yes, all the surrounding acreage has been subject to years of primary production and then years of water flood production. Not Devon's acreage. And it sits right there in the middle.

So your duty is to prevent waste and protect correlative rights. And waste is not defined by today's

oil prices, it's not defined by what LG&S thinks is economic to them at a particular point in time, and it's not defined by what Devon or any other company is currently producing under their acreage or what they are currently targeting.

You have to look long term. That's your job. And as you said in this order, here is the question, is there a viable potential for occurrences of hydrocarbon resources underneath Devon's acreage in this area. That's your test.

We know this is a producing formation. No debate about that. And when you apply that legal standard to their application and to the evidence that they presented here today, they don't meet that -- we meet that, there is a viable potential.

They haven't been able to show you that there is a very low potential in this area. That would support further investigation and possible development.

In this application, this order, you denied in the Bell Canyon only because both parties confirmed there was low potential in this area to support further investigation, and -- and I quote here -- "possible development." That is why you denied it.

We don't have that here. We got just the

opposite. We have demonstrated to you that there is more than a viable potential here of production in the Queen. That is why Devon spent all this time and money to come up here.

And there is no basis now suddenly to condemn the Queen to water flood operations in this area simply because LG&S comes before you and says, You know what, we don't think it's economic anymore for us at today's prices, and, by the way, Devon hasn't yet developed their Queen acres.

That's not how you look at this. You look at their acreage undeveloped in the middle of the field. Is there, based on the evidence presented, a viable potential for occurrences of hydrocarbons in the Queen? And the answer to that is yes.

So that requires a denial of their application. So their application doesn't do what it needs to do. They don't have casing through the pressure water zone, they didn't give you all the information they are supposed to give you that shows the compatibility of the waters, and, oh, by the way, they want to inject into a formation, the Queen, and pollute Devon's acreage that has more than a viable potential for hydrocarbon resources.

So this has to be denied.

EXAMINER GOETZE: All right.

Well, thank you ladies and gentlemen for spending a long time to have this case heard. And with that, we will go ahead and take case 15345 under advisement.

EXAMINER JONES: This hearing is adjourned.

(Time noted 5:33 p.m.)

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 15345 heard by me on February 4 2016.

, Examiner
Oil Conservation Division

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

REPORTER'S CERTIFICATE

I, ELLEN H. ALLANIC, New Mexico Reporter CCR No. 100, DO HEREBY CERTIFY that on Thursday, February 4, 2016, the proceedings in the above-captioned matter were taken before me, that I did report in stenographic shorthand the proceedings set forth herein, and the foregoing pages are a true and correct transcription to the best of my ability and control.

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

Ellen Allanic

ELLEN H. ALLANIC, CSR
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