

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

ORIGINAL

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

CASE NO. 14808

APPLICATION OF LEGACY RESERVES OPERATING, LP,
FOR APPROVAL OF A SALT WATER DISPOSAL WELL,
EDDY COUNTY, NEW MEXICO.

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

DOCKET NO. 13-12

BEFORE: RICHARD EZEANYIM, Hearing Officer
DAVID K. BROOKS, Legal Examiner

APRIL 26, 2012

2:02 PM

Santa Fe, New Mexico

This matter came on for hearing before the
New Mexico Oil Conservation Division, RICHARD EZEANYIM,
Hearing Examiner, and DAVID K. BROOKS, Legal Examiner,
on THURSDAY, APRIL 26, 2012, at the New Mexico Energy,
Minerals and Natural Resources Department, 1220 South
Street Francis Drive, Room 102, Santa Fe, New Mexico.

REPORTED BY: Lisa Reinicke
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A P P E A R A N C E S

For Legacy Reserves Operating, LP:

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By: Adam Rankin

For the Mineral Owners, Section 29:

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By: Ernest L. Padilla

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DONALD PATRICK DARDEN

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CERTIFICATE OF COMPLETION OF HEARING

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1 MR. EXAMINER: Okay. At this point we call
2 the next case, and the next case is case number 14808.
3 This is the application of Legacy Reserves Operating,
4 LP, for approval of a salt water disposal well, Eddy
5 County, New Mexico.

6 Call for appearances.

7 MR. RANKIN: Thank you, Mr. Examiner. Adam
8 Rankin with Holland & Hart in Santa Fe on behalf of the
9 applicant Legacy Reserves Operating, LP. I have two
10 witnesses today.

11 MR. EXAMINER: Any other appearances?

12 MR. PADILLA: Mr. Examiner, Ernest L.
13 Padilla for the mineral owners underlying section 29,
14 the area in consideration.

15 MR. EXAMINER: Any witnesses?

16 MR. PADILLA: No witnesses.

17 MR. EXAMINER: Any other appearances? Now
18 the witnesses, have you all been --

19 MR. RANKIN: They have not been sworn yet.

20 MR. EXAMINER: Okay. Stand up, state your
21 name, and be sworn in.

22 MR. SCHANTZ: My name is Fred Schantz.

23 MR. DARDEN: Donald Patrick Darden.

24 [Whereupon the witnesses were duly sworn.]

25 MR. EXAMINER: Go ahead.

1 MR. RANKIN: Thank you, Mr. Examiner. I
2 call my first witness, Mr. Fred Schantz.

3 FRED SCHANTZ

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

6 DIRECT EXAMINATION

7 BY MR. RANKIN:

8 Q. Mr. Schantz, how are you today?

9 A. Doing well.

10 Q. Good. For the record, Mr. Schantz, could you
11 please state your full name?

12 A. Yeah, my name is Fred Schantz.

13 Q. And where are you from and by whom are you
14 employed?

15 A. I'm from Midland, Texas, and I'm employed by
16 Legacy Reserves Operating, LP.

17 Q. And what is your current position with Legacy
18 Reserves?

19 A. I'm the land manager.

20 Q. And have you previously testified before the
21 Division and had your credentials as an expert in
22 petroleum land matters accepted for the record?

23 A. Yes, I have.

24 Q. Mr. Schantz, can you please state whether or not
25 you're familiar with the application in this case?

1 A. Yes, I am.

2 Q. And have you prepared some exhibits for
3 presentation in the matter?

4 A. Yes, I have.

5 MR. RANKIN: Mr. Examiner, I'd like to
6 tender Mr. Schantz as an expert in petroleum land
7 matters.

8 MR. EXAMINER: Any objection?

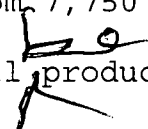
9 MR. PADILLA: No objection.

10 MR. EXAMINER: Mr. Schantz is so qualified.

11 MR. RANKIN: Thank you, Mr. Examiner.

12 Q. (By Mr. Rankin) Mr. Schantz, can you please turn
13 to -- before we do that, can you please state briefly
14 what it is that Legacy Reserves is requesting with this
15 application?

16 A. Certainly. We're seeking an authorization to use
17 the Andrew Arnquist Estate Number 2 well, API number
18 30-015-21942, located 330 feet from the north line and
19 330 feet from the east line or unit A, section 29,
20 township 18 south, range 26 east, Eddy County,
21 New Mexico to inject up to 5,000 barrels of produced
22 water per day at a maximum pressure of 1400 PSI or
23 whatever the OCD will permit into the canyon formation
24 through perforations from 7,750 feet to 8100 feet. And
25 the injection fluids will produce water generated from



1 all line lease activities.

2 Q. Mr. Schantz, what's the status of the land on
3 which this injection well is to be located, this
4 proposed injection well is located?

5 A. These are considered fee lands.

6 Q. Can you explain briefly for the Examiners why it
7 is this case is now before them on a hearing?

8 A. Yes, I can. Legacy originally filed for
9 administrative approval but the Division received an
10 objection from land owners represented by Betty
11 Arnquist. Division rules require that applications for
12 authorizations to inject go to a hearing when there is
13 an objection.

14 Q. Now, it's true that the pre-hearing filed in this
15 case indicated that there was not really a per se
16 contest of your application; is that correct?

17 A. Yes, sir, that is correct.

18 Q. Mr. Schantz, can you please turn to what has been
19 marked as Exhibit 1, Legacy Reserves Exhibit Number 1 in
20 your packet. And can you please review for the
21 Examiners what it is that this map shows?

22 A. Certainly. This is an overview land map showing
23 the Arnquist well that the application is for. It shows
24 all wells and leases within a two-mile radius and a half
25 mile area review radius.

1 Q. And the legend shows in green is the active
2 wells; is that correct?

3 A. Yes. And the pink is plugged and the orange is
4 dry holes and blue represents recent completions.

5 Q. Now, Mr. Schantz, to whom did you send notice of
6 this application?

7 A. We sent notice to Cimarex Energy, Nadel & Gussman
8 Permian, Yates Petroleum, Agave Energy Company, Myco
9 Industries, Inc., ABO Petroleum Corporation, and OXY
10 Y-1. We also sent notice to the surface owner, who is
11 the Arnquist estate. So the Arnquists were noticed as
12 well.

13 Q. So all those operators were leasehold operators
14 who were located within the half mile area of review
15 surrounding the location of the injection wells?

16 A. Yes, sir, that is correct.

17 Q. Turning to Exhibit Number 2, this is an affidavit
18 prepared by your attorney, is that correct, that
19 indicates that notice was provided in accordance with
20 Division rules?

21 A. Yes, sir, that is correct.

22 Q. And on the following page is a sample of the
23 letter that was sent to all affected parties?

24 A. Yes, that is correct.

25 Q. Indicating the application. And on the following

1 page is an Exhibit A to that letter indicating all the
2 parties that were noticed; is that correct?

3 A. Yes, that is correct.

4 Q. And following that page are all the green cards
5 indicating that each of the individual's actually
6 received the notice; is that correct?

7 A. Yes, that is correct.

8 Q. And at the last page of that exhibit is a copy of
9 the legal ad that was published in the Artesia Daily
10 Press notifying the public of this hearing; is that
11 correct?

12 A. Yes, that is correct.

13 Q. Now, Mr. Schantz, were Exhibits 1 through 3
14 either prepared by you or under your supervision?

15 A. Yes, they were.

16 MR. RANKIN: And, Mr. Examiner, I'd like to
17 move to admit Exhibits 1 through 3.

18 MR. EXAMINER: Any objection?

19 MR. PADILLA: No objection.

20 MR. EXAMINER: Exhibits 1 through 3 are
21 admitted.

22 [Exhibits 1 through 3 admitted.]

23 MR. RANKIN: Mr. Examiner, I pass the
24 witness. No further questions.

25 MR. EXAMINER: Okay. Mr. Padilla?

1 MR. PADILLA: I don't have any questions.

2 MR. EXAMINER: Mr. Brooks?

3 EXAMINER BROOKS: No questions.

4 MR. RANKIN: I dismiss my first witness and
5 I will call my second.

6 MR. EXAMINER: Not yet.

7 MR. RANKIN: Oh, do you have questions? I'm
8 sorry.

9 MR. EXAMINER: The questions I have for you
10 is that are you going to use the lease water flow?

11 MR. RANKIN: Mr. Examiner, it's being
12 applied for as a disposal well.

13 MR. EXAMINER: I know. But what is it
14 disposing?

15 MR. RANKIN: It's disposing of only -- well,
16 I'll have Mr. Schantz answer.

17 MR. SCHANTZ: It's produced water from the
18 lease only.

19 MR. EXAMINER: Not commercial?

20 MR. SCHANTZ: Not commercial.

21 MR. EXAMINER: And where is that water, what
22 lease is it coming from, from the same Cisco Canyon or
23 from somewhere else?

24 MR. SCHANTZ: Okay. Well, I would say that
25 our next witness will get into that a lot more. He's

1 the engineer.

2 MR. EXAMINER: Oh, okay.

3 MR. SCHANTZ: I can answer that, but I think
4 he would be the better person to answer all those
5 questions.

6 MR. EXAMINER: I just wanted to get -- yeah,
7 okay, I think I will ask him some questions. If you can
8 answer them then you can be recalled.

9 MR. SCHANTZ: Yeah, he would be the best
10 person.

11 MR. EXAMINER: Okay, call your next witness.

12 MR. RANKIN: Okay. Thank you, Mr. Examiner.
13 I call my next witness, Mr. Donald Patrick Darden,
14 petroleum engineer for Legacy Reserves.

15 DONALD PATRICK DARDEN
16 after having been first duly sworn under oath,
17 was questioned and testified as follows:

18 DIRECT EXAMINATION

19 BY MR. RANKIN:

20 Q. Mr. Darden, for the record can you please state
21 your full name?

22 A. My name is Donald Patrick Darden.

23 Q. Mr. Darden, where do you live and by whom are you
24 employed?

25 A. I live in Midland, Texas, employed by Legacy

1 Reserves Operating, LP.

2 Q. And what is your current position with Legacy
3 Reserves?

4 A. I'm a senior engineer.

5 Q. And have you previously testified before the Oil
6 Conservation Division and had your credentials as a
7 senior petroleum engineer accepted?

8 A. I have not.

9 Q. And can you please briefly review for the
10 Examiners your education and work experience in the
11 field?

12 A. Yes, I will. I received a Bachelor of Science in
13 petroleum engineering from Texas Tech University in
14 1983. I have 29 years of experience mainly concentrated
15 in the Permian Basin. Those 29 years have been with
16 employment by Bass Enterprises, Tiberon Oil Corporation,
17 Cocino Oil Corporation, OXY USA, Cross Timber/XTO
18 Energy, and most currently Legacy Reserves. And I am
19 registered as a professional engineer in the state of
20 Texas.

21 Q. Thank you, Mr. Darden. Now, you're familiar with
22 the application that was filed in this case; is that
23 correct?

24 A. Yes, I am.

25 Q. Have you made an engineering study of the area?

1 A. Yes, I have.

2 Q. For Legacy Reserves have you prepared exhibits
3 for presentation in this case?

4 A. Yes, sir.

5 Q. Now, you've also reviewed the application for
6 authorization to inject that's been filed with this
7 case, is that correct, the form C108?

8 A. Yes, I have.

9 Q. Can you confirm the accuracy of the information
10 contained in it?

11 A. Yes, I can.

12 MR. RANKIN: Mr. Examiner, I would tender
13 Mr. Darden as an expert in petroleum engineering
14 matters.

15 MR. EXAMINER: Any objection?

16 MR. PADILLA: No objection.

17 MR. EXAMINER: Mr. Darden is so qualified.

18 MR. RANKIN: Thank you.

19 Q. (By Mr. Rankin) Mr. Darden, you said that you
20 had prepared a form C108, application for authorization
21 for the purposes of the salt water disposal; is that
22 correct?

23 A. Yes. I've either prepared or supervised
24 preparation of that C108.

25 Q. And that's in Exhibit Number 4, is that correct,

1 in the exhibit packet?

2 A. It is, yes, sir.

3 Q. And that's your signature at the bottom of the
4 page, correct?

5 A. Yes, sir, it is.

6 Q. And this application contains all the information
7 required by the Division; is that correct?

8 A. Yes, it does.

9 Q. And if it doesn't then we're going to present it
10 today at the hearing, aren't we?

11 A. Exactly.

12 Q. Mr. Darden, can you please provide a brief
13 history of this well for the Hearing Examiners? Just
14 very brief.

15 A. I do want to say one thing. This is not an
16 expansion of an existing project. It is a new project.

17 But the Andrew Arnquist Number 2 well was drilled
18 in 1976 to a total depth of 3,000 feet. Seven-inch
19 23 pound casing was set at that depth as production
20 casing and cemented to surface with approximately 684
21 sacks of cement. The Yeso formation was perforated and
22 tested in November of '76.

23 And then in April of '77, they came up hole to
24 the San Andres zone and tested it. And starting in May
25 of '77 they commingled those together, produced those

1 two zones together. The well produced from 1976 to 1986
2 at which time it was found to be uneconomical and they
3 shut the well in until 1992 -- actually, shut it in in
4 February of 1986. It was TA'ed in 1982 and then plugged
5 in 2007.

6 Q. So it's been in that status ever since; is that
7 correct?

8 A. Yes, it has.

9 Q. Now, Mr. Darden, is there any production from the
10 target formation in this case? It's the canyon
11 formation; is that right? Is there any production in
12 the area from the canyon formation?

13 A. There is no production -- from our review there
14 is no production in the canyon formation in this area.

15 Q. And there are a few wells that do penetrate; is
16 that correct?

17 A. Yes, there are.

18 Q. And produce?

19 A. If you look at tab 1 in Exhibit 4, this lists all
20 the wells that are in the area of review, of which at
21 the top is the Andrew Arnquist Number 2. This table
22 shows you TDs and other pertinent information, API
23 numbers. There are two wells that penetrate this zone.
24 They are the FOB Noel Number 1 operated by Yates
25 Petroleum and the Len Mayer Number 1 operated Yates

1 Petroleum.

2 Q. And we'll talk more about those later.

3 A. Exactly.

4 Q. Now turning to tab number 2 of Exhibit Number 4,
5 that is the well in the data sheet; is that correct?

6 A. Yes, it is.

7 Q. Can you please briefly review for the Examiners
8 what the information about the Andrew Arnquist Number 2
9 that is contained here?

10 A. Yes, I'd like to. What Legacy proposes to do is
11 to go in and drill out the two cement plugs and the cast
12 iron plug below the second plug. There's a surface plug
13 and then there's a plug above the San Andres zone, a
14 cement, which also has a cast iron below the cement
15 above those two zones.

16 We propose to drill those out to TD, squeeze both
17 the Yeso and San Andres, drill them out, test them for
18 integrity. Then we're going to drill a new hole under
19 the production casing at about 3,000 feet to about 8200
20 feet through the zone of interest for us in the canyon.
21 Then we will run five and a half inch casing back to
22 surface and cement back to surface.

23 Q. And as you do that, Mr. Darden, is it true that
24 you'll look at the canyon zone to determine whether or
25 not it may be productive just to double check?

1 A. Exactly. What we'll do is upon -- we also -- let
2 me back up. We will log the well and get a good set of
3 logs on it, a triple combo. And we will determine what
4 is the best porous zone in the canyon to inject into.
5 And then we will perforate, do an acid ball out job.
6 And we will swap test the well for any commercial
7 quantities of oil and/or gas. We don't anticipate it,
8 and we'll see later why.

9 Q. Is there any plan for stimulating the well?

10 A. Yes. We will acidize the well and swab test it.

11 Q. Now, turning back to Legacy Exhibit Number 1, can
12 you briefly review for the Examiner in more detail the
13 information contained in this map?

14 A. Yes. You know, Fred talked about this map a
15 minute ago, and let me just kind of go over it in a
16 little bit more detail. The bigger circle is the
17 two-mile radius. The smaller circle is the half mile
18 radius which is the area of review. And Fred did talk
19 about certain things on this but I'll expand on it a
20 little bit more. The active wells are in green. The
21 pink wells are plugged wells of which three of those are
22 on this lease; the Andrew Arnquist Number 2, the Andrew
23 Arnquist Number 3, and the Andrew Arnquist Number 4.

24 The orange wells are dry holes and the blue,
25 light blue wells, are recent completions.

1 Q. On your map, Mr. Darden, you identify the
2 proposed injection well as being in the half mile
3 radius?

4 A. Exactly. It's got the little arrow pointing to
5 it. That is the well of interest. The majority of
6 these wells in this area are shallow wells, which means
7 they're in the Yeso or the San Andres.

8 Q. And all the others are in the Pin Strawn Morrow?

9 A. Exactly. All the other wells that are deeper are
10 in the Pin Morrow Strawn formation.

11 Q. And this area is fairly active; is that correct,
12 Mr. Darden?

13 A. Yes, it is.

14 Q. Can you turn to Exhibit Number 6 at this time?

15 MR. EXAMINER: Just a moment. Mr. Darden,
16 go back to that area of review. And then I see the
17 arrow where your well of interest is. I can't see
18 color. I'm color blind.

19 MR. DARDEN: Okay.

20 MR. EXAMINER: Forgive me. This color, is
21 that the dry hole?

22 MR. DARDEN: Which one?

23 MR. EXAMINER: Those two wells, the wells of
24 interest, are they dry holes by the color? You know,
25 going to that section.

1 MR. RANKIN: In the northeast corner?

2 MR. EXAMINER: See the arrow.

3 MR. DARDEN: Okay. One below it and one to
4 the right?

5 MR. EXAMINER: Yes.

6 MR. DARDEN: Okay, those are plugged wells.
7 They were also in the Yeso before they -- all three of
8 these wells were plugged at the same time, the number 2,
9 the number 3, and the number 4.

10 MR. EXAMINER: They were all plugged?

11 MR. DARDEN: Yes.

12 MR. EXAMINER: And then did they produce
13 anything?

14 MR. DARDEN: They did, very minimal.

15 MR. EXAMINER: From the canyon?

16 MR. DARDEN: From the Yeso.

17 MR. EXAMINER: Okay, from the Yeso. Did you
18 say shallow?

19 MR. DARDEN: Shallow wells.

20 MR. EXAMINER: Okay.

21 MR. DARDEN: What had happened out here is,
22 and I'm going to show you in a minute, there has been
23 just an explosion in development out here with either
24 new frac fluid, high volumes, high rates, multi-stage
25 fracs in this Yeso. They're brought on some really good

1 wells or horizontal drilling, which you've heard a lot
2 about this morning. And I'll show you a map here in a
3 minute on that.

4 MR. RANKIN: Let's go ahead and turn to
5 that. On Exhibit Number 6, Mr. Examiner, is a map that
6 shows sort of the permitted well activity around the
7 production well.

8 Q. (By Mr. Rankin) And, Mr. Darden, could you just
9 walk the Examiners through what this map shows very
10 briefly.

11 A. Yes, I can. And this map didn't turn out as good
12 as I wanted it to. I'm sorry it didn't. But you can
13 see the arrow pointing to the Andrew Arnquist Number 2.

14 MR. EXAMINER: What page are you on?

15 MR. DARDEN: I'm sorry?

16 MR. EXAMINER: What page are you on?

17 MR. DARDEN: It's Exhibit Number 6.

18 MR. RANKIN: It's not that tab 6,
19 Mr. Examiner. It's the big white number 6.

20 MR. EXAMINER: Oh, okay.

21 MR. DARDEN: What you have on this map is
22 you have a green arrow pointing to the well, which
23 you'll need to -- I think you've got it sideways or
24 actually it should be up and down.

25 MR. EXAMINER: Oh, okay.

1 MR. DARDEN: Section 29, you can't really
2 see that very well because the section line didn't
3 transport over or copy over very well, but you see the
4 number 2, it has got the three little dots right there
5 is where the number 2 is.

6 MR. EXAMINER: Yeah.

7 MR. DARDEN: What I want you to see on this
8 is that all these horizontal wells with the Ps are
9 permitted horizontal wells. And you can see we've got
10 them to the north and east of us. We've got them just
11 directly to the north of us. We have them to the south
12 and east and south and west. And if you take all these
13 little uncolored circles, just the circles that aren't
14 colored in, those are all permitted vertical wells.

15 Now, if you actually go back to this two-mile
16 radius map, which is Exhibit 1, I want to show you some
17 of the wells that have been developed. The blue dots,
18 if you can't see those let me know and I'll tell you
19 what section they're in. Can you see the blue dots?

20 MR. EXAMINER: Yes, I see them.

21 MR. DARDEN: Okay. If you go up to the
22 north and east of it in section 16 there's a blue dot.
23 That's a Yeso horizontal. And then if you look at all
24 the blue dots just to the south of us, you have one,
25 two, three, four, five, six, seven, eight wells that

1 have already been in those permitted wells I showed you
2 a little while ago. They have actually been completed.
3 They're just a little bit behind on getting production
4 out on the state website.

5 So you've got a lot of activity going on in this
6 area right now. And what Legacy wants to do is they
7 want to go in and they wish to develop this acreage.
8 And in order to do that we need a disposal well because
9 the Yeso makes considerable amounts of water.

10 MR. EXAMINER: Okay.

11 Q. (By Mr. Rankin) Now, Mr. Darden, all the wells
12 that are located within the half mile area of review,
13 and actually you've included all wells within the
14 two-mile radius, are included in a spreadsheet at
15 Exhibit Number 7; is that right?

16 A. Yes. That is just for your backup. It shows all
17 the wells on the two-mile radius map, Exhibit 1.

18 MR. RANKIN: So for your information,
19 Mr. Examiner, all the wells in the two-mile radius are
20 included in that spreadsheet.

21 MR. EXAMINER: Okay.

22 Q. (By Mr. Rankin) Now, going back to the C108,
23 Mr. Darden, this application contains all the
24 information required; is that correct?

25 A. Yes, it does.

1 Q. And is that the information on the wells that
2 actually penetrates the injection formation?

3 A. Exactly.

4 Q. And that's located at tab number 1.

5 A. Uh-huh.

6 Q. And you mentioned before that there are only two
7 wells that penetrate the target formation?

8 A. Yes, there are.

9 Q. So let's take a look at those wells more closely,
10 if you would.

11 A. Okay. The two wells that penetrate the deeper
12 horizons, as I mentioned earlier, is the FOB Noel Number
13 1 and the Len Mayer Number 1, both operated Yates
14 Petroleum. Now, if you'll turn to tab 5, which is then
15 under Exhibit 4, this shows the wellbore diagram. Okay.
16 Are you there?

17 MR. EXAMINER: Yep.

18 MR. DARDEN: Let me discuss the Len Mayer
19 Number 1 first, and I'm going to start from the bottom
20 of the well and come up and explain to you what has been
21 done on this well, TD'ed at 9157. That's the deeper
22 horizon. It's in the Pin Morrow They set five and a
23 half inch casing at 9,225 feet. And the top of the
24 cement in that original completion was 6,540 feet, and
25 that was determined by temperature survey. They

1 perforated the Pin Morrow from 9,009 feet to 9172 feet.

2 I'm sorry. Are you on the Len Mayer?

3 MR. EXAMINER: Yes.

4 MR. DARDEN: Okay. Subsequently they came
5 back and they cut casing at 6550 feet and they set a
6 plug across that casing stub, a 35 set plug from 6500 to
7 6600 feet. And then they set two open-hole plugs after
8 they pulled that casing, that were 35 sacks; one at 5830
9 to 5930, another one from 4456 to 4556, a 100-foot plug.
10 And they set one across the shoe in the intermediate
11 casing at 3,000 to 3100 feet.

12 They came back and perforated the Yeso zone from
13 2435 to 2688, and have subsequently plugged back from
14 that, set a cast iron bridge plug at 2350, capped with
15 the 35 sacks of cement, currently producing out of the
16 San Andres from 1596 to 1660. When they ran -- after
17 they had cut and pulled their casing they reran -- later
18 reentered the well and reran five and a half inch in
19 that well. And they cemented it back up to surface at
20 366 feet. It's on the right side of that wellbore.

21 And the eight and five-eighths was set at -- the
22 surface casing was set at 1255 feet and it circulated
23 through. So what they've done is they've gone in and
24 pulled casing and reran casing to a higher depth and
25 ended up cementing back up to surface. And they've got

1 the proper plug set in place here.

2 Q. (By Mr. Rankin) And looking at the Ethel V. Noel
3 at tab 5, you didn't run through that yet, did you?

4 A. I have not, but I will. Let me run through that.
5 I wanted to go through this one first. It was a little
6 bit more complicated on what they've done because
7 they've reentered it and plugged it. They plugged it
8 back after they reentered it.

9 The Ethel V. Noel Number 1 drilled to a total
10 depth of 9157. They set seven inch at 9155. And the
11 top of the cement was determined at 7295 temperature
12 survey. This well is currently producing out of the
13 Pin Morrow at 8892 to 9100 feet. As I mentioned, the
14 top of the cement is at 7295. The intermediate casing
15 or surface casing was 95A set at 2010. It was
16 circulated, and they do that at 8209-25 on that.

17 So both these wells cover -- the deeper producing
18 zones have enough cement to protect that from any fluid
19 migration into the zone. From the zone that we propose
20 to inject into that is a little bit higher than that.
21 And also the surface casing is covered enough to cover
22 the pot of the water.

23 Q. Now, Mr. Darden, obviously you have the data
24 available on the wells within the area review and
25 satisfied yourself that there is no remedial work that

1 needs to be done in order to protect against injection
2 through the Arnquist Estate Number 2 well?

3 A. Yes, I have. I have. And as I just showed on
4 the wellbore diagrams the wells that penetrate the
5 target zone have adequate cement coverage across that
6 zone. And because of the cement job planned on, the
7 Andrew Arnquist Number 2 we should have coverage across
8 the fresh water zones. And the surface casing is set at
9 400 feet and cemented to surface. And both the
10 offsetting wells that we discussed on the Yates wells,
11 the Len Mayer Number 1 and the Ethel V. Noel Number 1
12 have sufficient surface casing and cement to protect
13 from any potable fresh water zones.

14 Q. Now, as indicated on tab number 1 in Exhibit 4,
15 there are no plugs in the abandoned wells that penetrate
16 the proposed interjection intervals, are there?

17 A. There are not. Exactly.

18 MR. EXAMINER: This well on tab 5, I wanted
19 to talk about this well on 5.

20 MR. DARDEN: Which one?

21 MR. RANKIN: The FOB Mayer.

22 MR. DARDEN: Is that the one you're asking
23 about, sir?

24 MR. EXAMINER: Yes. That one is producing
25 from the San Andres.

1 MR. DARDEN: Let me get there. The Ethel V.
2 Noel?

3 MR. EXAMINER: Yeah, tab number 5.

4 MR. DARDEN: Okay, tab 5. Okay.

5 MR. EXAMINER: What is that well doing?

6 MR. DARDEN: What is that well doing? It's
7 producing out of the Pin Morrow down here at 8892 to
8 9100 feet.

9 MR. EXAMINER: Oh, okay.

10 Q. (By Mr. Rankin) Mr. Darden, what injection
11 volumes is Legacy Reserves proposing?

12 A. We propose to inject up to 5,000 barrels of water
13 per day.

14 Q. And the source of that injection fluid?

15 A. It will be Yeso produced water off of the Andrew
16 Arnquist lease only. We currently do not have any
17 injection water because we have not developed that. But
18 that's why we want to get our disposal system in place
19 is to be able to get rid of that water because of the
20 expense of trucking and hauling disposed water.

21 MR. EXAMINER: You need a 5,000 capacity?

22 MR. DARDEN: We feel like we eventually will
23 once we get up to full development out there.

24 MR. EXAMINER: And can you produce that much
25 water from the Yeso?

1 MR. DARDEN: We feel like we could. If you
2 took the spacing, the fill spacing, and developed that
3 fully, you know, it has to be economical for us to do
4 first of all, so I'm not saying we will do that. But
5 you've got a possibility of 16 wells and if they make
6 300 barrels of water each or 250 you're going to be
7 pretty close.

8 MR. EXAMINER: Okay. Yeah, it doesn't
9 really matter because we don't give a limit of how much
10 you can eject. But why I'm asking the question is that
11 if you don't get up to 5,000 what is the likelihood that
12 they are going to be commercially accepting from other
13 zones to put in there. Right now you say it's only for
14 the Yeso. I want to make sure it's the Yeso and see how
15 it complies with the canyon. Because they're going to
16 be injecting into the canyon, right?

17 MR. DARDEN: Yes, sir. Yes, sir.

18 MR. EXAMINER: And have you done the water
19 analysis?

20 MR. DARDEN: Yeah, we can get into that.

21 MR. RANKIN: That's our next point. Is it
22 okay if we move into that, Mr. Hearing Officer?

23 MR. EXAMINER: Sure.

24 Q. (By Mr. Rankin) So just to be clear, Mr. Darden,
25 no fresh water will be injected in the source of the

1 Yeso, correct?

2 A. That is exactly right.

3 Q. You've got a Yeso formation water analysis, which
4 is included in Exhibit 8; is that right?

5 A. It is Exhibit 8, yes.

6 Q. Can you just briefly run through what this shows?

7 A. What I have here on this Exhibit Number 8, the
8 Yeso water sample analysis, this is actually from the
9 well that we are going to reenter. And this sample was
10 taken from the Yeso formation, so the water is going to
11 be very similar to the frac here in that area. And the
12 specific gravity is about a 1.2 gravity pH at 6.6.
13 Calcium is about 6,000 parts per million. Magnesium is
14 300. The chlorides are 111,000. The sulphates are 2300
15 and the bicarbonates are approximately 500. And there's
16 nil soluble iron.

17 Q. Now, turning to tab number 7 on Exhibit 4, this
18 is a water analysis of the receding formation, is that
19 correct, of the canyon?

20 A. Yes, it is.

21 Q. And do you anticipate, based on the analyses,
22 whether there will be any compatibility issues between
23 the formations?

24 A. We do not anticipate any compatibility issues at
25 all.

1 Q. And part of that is because you know there is a
2 bunch of wells already injecting Yeso water into the
3 canyon formation; is that right?

4 A. Yes, there is.

5 Q. And if you turn to Exhibit 9, will you please
6 briefly explain to the Examiners what this shows?

7 A. Yes. Let him get to Exhibit Number 9 really
8 quick.

9 MR. EXAMINER: Okay.

10 MR. DARDEN: Are you there?

11 MR. EXAMINER: Yes.

12 MR. DARDEN: Okay. Exhibit Number 9 should
13 be entitled at the bottom right Canyon Zone SWD Wells.
14 That should be canyon.

15 MR. EXAMINER: Canyon Zone SWD Wells, yeah.

16 A. Okay. What I want you to see here is, is you can
17 see with the purple arrow our proposed SWD site,
18 Arnquist Number 2. And our proposed zone is 7750 to
19 8100, approximately 5,000 barrels per day up to that
20 much. If you look at all the orange wells, there's five
21 of them that I have colored here. These are all canyon
22 disposal wells. And I know that the Secrest Et Al
23 Number 1 was just permitted and it was approved and
24 permitted. It will be injecting Yeso water.

25 The Fannie Number 1, I'm pretty sure, is probably

1 injecting Yeso water. I can't confirm that but I'm
2 pretty sure it is. I do know that the Ann SWD Number 1
3 is, it is injecting Yeso water. The Santa Fe Land SWD
4 Number 1, I'm pretty sure it is too, but I cannot
5 confirm that. But I do know the Lakewood AQE State SWD
6 Number 1 is injecting Yeso water.

7 Q. (By Mr. Rankin) Mr. Darden, will this proposed
8 injection system be opened or closed?

9 A. It will be a closed system.

10 Q. And what injection pressure system is in the
11 proposal?

12 A. We'd like to do 1400 pounds.

13 Q. And that's based on your calculation of .2 pound
14 per foot to the top of injection interval?

15 A. Yes, at 7550, which is our requested upper per
16 perf. We'll know better when we get our logs. If you
17 take that times .2 you get 1510 PSI. So the 1400 is
18 well below that.

19 Q. So that's within the standard default pressure
20 limitation that was imposed; is that correct?

21 A. Exactly.

22 Q. If a higher pressure is required will Legacy
23 conduct an OCD separate test?

24 A. Yes, we will. We will.

25 Q. Now, how will Legacy monitor the well to ensure

1 the integrity of the wellbore?

2 A. Well, as with most disposal wells and injection
3 wells, we will put an inert fluid in the backside and
4 we'll monitor that backside with a pressure gauge.

5 Q. Moving to fresh water in the area, Mr. Darden,
6 are there any fresh water zones in the area that you're
7 aware of?

8 A. Yes. The Ogallala Aquifer of Eddy County,
9 New Mexico. It's located approximately 120 to 250 feet
10 from the surface. And potable water is confined to that
11 space approximately in that area. The base of the
12 Oluvia Materia Shona log appears to be approximately
13 200 feet in that area or less.

14 Q. As you've already discussed, all the wells in the
15 area are properly cemented at the surface; is that
16 correct?

17 A. Exactly. We discussed the surface casings. And
18 the casing, surface casing in cement is all the surface.
19 And the production strings on other wells are covered
20 enough that you should not have any fluid migration.

21 Q. And the stratigraphy and the geology of the area
22 further confine the injection zones?

23 A. Exactly. The lithology of the zones between the
24 proposed injection zone, which is the canyon and the
25 Ogallala, are predominantly dolomite sandstone and

1 shale. The interbedded members are both porous and
2 non-porous but they are effectively separated by very
3 low vertical permeability and porosity. They're shale
4 beds and carbonates. The majority of these beds are
5 tight and form excellent fluid barriers for fresh water.
6 The canyon zone is overlaid and underlain by binding
7 shales and sandstones in the ABO and the thin limestones
8 and shales respectively.

9 Q. Now, having conducted your study of the geology
10 in the area, is it your opinion that this injection will
11 pose any threat to groundwater?

12 A. It will not pose any threat. The distance from
13 the canyon zone up to that water zone is about
14 7550 feet.

15 Q. So you have not encountered any geographical
16 conduits or any issues relating to the geology that
17 would prevent --

18 A. Exactly. None that I know of.

19 Q. Mr. Darden, looking at Exhibit Number 10, have
20 you discovered any fresh water wells in the area?

21 A. Yes, I have. Exhibit 10, which is I believe the
22 last exhibit we have, is a map that shows the fresh
23 water wells in that area. Once again, if you look at
24 the center of that circle you see the Andrew Arnquist
25 Number 2 well, the proposed injection well. And then

1 what I've done is I've notated all the wells in this
2 area that I found on the state engineer's website that
3 show the fresh water wells in this area.

4 And what I've done here, the top number is the TD
5 of that well, the next number is the water depth and the
6 finish date. And where we took our water sample, we do
7 have our fresh water sample, and it is on the northwest
8 of the -- it's in the southeast of the northwest of
9 section 28 is where that is.

10 Q. And if you turn the page, is that correct, is
11 that the water sample that you've since been able to
12 acquire after having filed the C108?

13 A. Yes, it is. And just to talk about it, it's got
14 a pH of 7.74, calcium is about 61, magnesium at 20, and
15 chloride is at 36, sulphate is at 61, and bicarbonates
16 at less than 190.

17 Q. And considering all the geological data that's
18 required by the Division, has all that been reflected
19 under the form and under item number 8?

20 A. Yes.

21 Q. And indicated at tab 8 of Exhibit 4?

22 A. Yes, exactly. The proposed canyon interval is
23 interbed shale and limestone. The proper geological
24 name is the Cisco Canyon from 7100 feet to 8200 feet.
25 And the fresh water formation in area is Ogallala, which

1 ranges in thickness from 100 to 160 feet of which we
2 just talked about that water analysis too.

3 Q. So you indicated that's the Cisco Canyon, but
4 really its fairly restricted to the canyon?

5 A. Yeah, where we're going to be looking at is the
6 canyon, yes.

7 Q. Now, have you examined all the available geologic
8 and engineering data on this reservoir, and as a result
9 have you found any other hydrologic connections between
10 the injection interval and any underground sources of
11 fresh water?

12 A. I have examined it, and we find no evidence of
13 that at all.

14 Q. Now, how soon does Legacy anticipate commencing
15 disposal operations?

16 A. We would like to get the approval as soon as
17 possible to actually dispose of so we can work on the
18 well in the same time that we're actually drilling some
19 wells so that we'll be ready to dispose of in a timely
20 manner. So immediately.

21 Q. You'll be ready to go?

22 A. Yes.

23 Q. Now, Mr. Darden, were Exhibit Numbers 4 through
24 10 prepared by you under your supervision?

25 A. Yes, they were.

1 MR. RANKIN: Mr. Examiner, I'd like to move
2 the admission of Exhibits 4 through 10.

3 MR. EXAMINER: Any objection?

4 MR. PADILLA: No objection.

5 MR. EXAMINER: Exhibits 4 through 10 will be
6 admitted.

7 [Exhibits 4 through 10 admitted.]

8 MR. RANKIN: Mr. Examiner, I have no more
9 questions for the witness. I pass the witness.

10 MR. EXAMINER: Mr. Padilla?

11 MR. PADILLA: Yes.

12 CROSS-EXAMINATION

13 BY MR. PADILLA:

14 Q. Mr. Darden, I have a couple of questions.
15 Explain to me -- I know you've explained it in direct
16 testimony, but what is the specific source for the
17 injected water?

18 A. It will be from the Yeso zone, and that water
19 will -- as soon as we start developing we will have that
20 water. We don't have any Yeso water right now. We have
21 no water really. There's only one other well on the
22 lease, and it's a Pin Morrow well, a flowing gas well,
23 so it's not making much water. It's not really making
24 any water. But the source of the water will be the Yeso
25 zone.

1 Q. And how many wells are you proposing to drill in
2 the north half section of 29?

3 A. Well, what we proposed to do is we proposed to
4 reenter the Number 2 well and deepen it and make it into
5 the injection well, disposal well. On this year's
6 budget we're going to drill two Yeso wells and complete
7 them. And we want to watch them for a while to see how
8 they do. And upon them being economical, we will come
9 up with a development plan that could be up to as many
10 as 16 total wells on that north half, vertical wells or
11 there's room for four lateral wells that are the full
12 length of that section there.

13 Q. What additional surface facilities do you
14 contemplate in connection with the salt water disposal?

15 A. Well, we'll need a patch site for the disposal
16 well. We'll need some tankage, to put in some tankage
17 and the power to that. Normal surface usage is going to
18 be roads, pad sites, pipelines going to a central
19 production facility, any type of surface use that is
20 normal with the operating oil and gas properties.

21 Q. What kind of water do you anticipate or the
22 amount of water that you anticipate from each of the
23 Yeso wells on a monthly basis?

24 A. On a monthly basis?

25 Q. Yes.

1 A. I'll give you daily. It's 250 barrels a day,
2 which is 6,000 a month, I guess.

3 Q. And fully completed on vertical wells, you're
4 going to have 16 wells or four horizontals?

5 A. We could have 16 or four horizontals.

6 Q. If you drill horizontal wells, would you complete
7 them on stand up or lay down 40s east to west?

8 A. They would be lay downs. We can't do stand ups
9 unless we -- we have been contacted by offset operators
10 in doing that, but that's already being developed.

11 Q. And the spacing right now for Yeso wells is 40
12 acres?

13 A. Yes.

14 Q. Are in-fill wells allowed under the Yeso pool
15 rules or for the pool rules for the Yeso?

16 A. I am not sure. I cannot answer that question.

17 Q. But if you drill the horizontals you probably
18 don't need to do in-fill wells?

19 A. No, we would not. And we could do a combination
20 of the two. We could do some vertical wells and some
21 laterals. We're just going to have to decide what's
22 best and see what's going on, you know, best development
23 practices and best results of that.

24 Q. If you're successful on the first two wells, what
25 kind of expansion program do you anticipate in terms of,

1 let's just say, the next three years?

2 A. I say we'd probably do -- we'd probably do up to
3 five to six wells a year.

4 Q. And that's going to be for oil production?

5 A. It's all oil production. There's gas with it,
6 but it's oil wells.

7 Q. What do you anticipate the ratio between water
8 and oil in terms of barrels of oil versus water
9 production on a daily basis?

10 A. You're probably going to have -- what's going to
11 happen is when you flow back after these large fracs
12 you're going to have a lot of water, and it's going to
13 be mainly just water for a while, probably 15 to 16
14 days. And once you get a majority of your load back
15 you're going to see your oil come in, oil cut come in.
16 And I think you get to about a one to one when you're
17 settled out. And then at some point in time your oil is
18 going to decline probably to where you're two to one
19 over water; two barrels of water to one barrel of oil.

20 Q. Now, you stated that you were going to double
21 check the canyon formation by essentially guaranteeing
22 that it's not going to be productive of oil and gas; is
23 that right?

24 A. Commercially productive. It's going to be
25 commercial for us to consider that now. And the map

1 that I showed, showed that it's probably not in that
2 area. But we will test it. We will perforate it,
3 acidize it, and swab it, and see if there is any sign of
4 oil and gas production.

5 Q. What would happen if there was a sign that it
6 would be commercially productive in the Cisco Canyon?

7 A. We would probably put it on pump.

8 Q. And what would happen to the injection after
9 that?

10 A. We would have to come up with another source. We
11 could possibly reenter another well. But if it is
12 productive in the canyon then it's probably going to be
13 productive in those two other wells. And it's going to
14 be very isolated if it is productive because we're
15 surrounded by -- you saw the disposal well we're
16 surrounded by in the canyon.

17 Q. Right.

18 A. And then the only other deep wells out there are
19 in the Pin, Strawn, and Morrow. So we do not anticipate
20 it being productive.

21 Q. In your Exhibit Number 1, were there any wells
22 shown on that exhibit that are productive in the Cisco
23 Canyon or in the canyon?

24 A. There are not.

25 Q. And that's a two-mile?

1 A. That's a two-mile radius. The larger circle.

2 Q. Do you know whether there's any Cisco Canyon
3 production anywhere near the --

4 A. Fringes?

5 Q. -- limits of the two-mile circle?

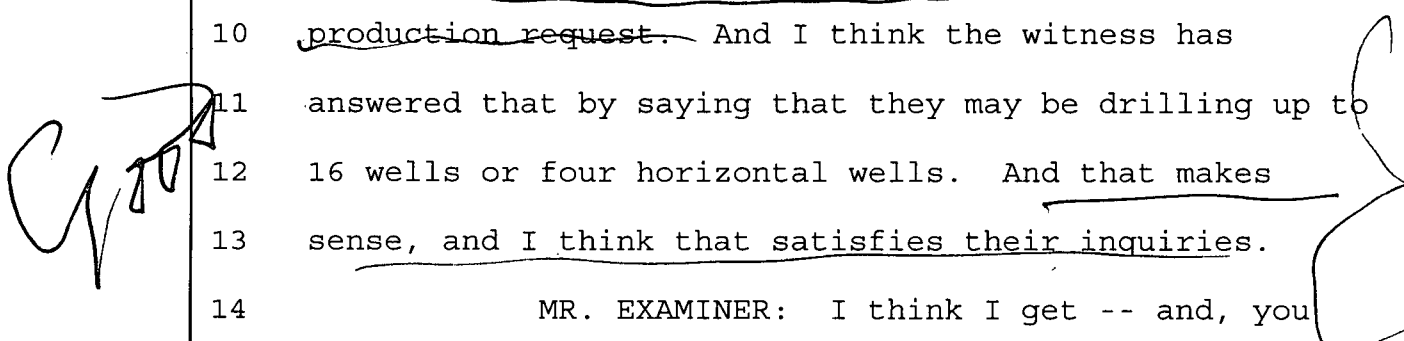
6 A. I don't feel like there is because if you'll look
7 at that -- I think it's exhibit -- it's actually Exhibit
8 Number 7. This lists all the wells in that two-mile
9 radius, but it actually also lists the wells that are in
10 that same section if you're outside of that circle. So
11 it shows in the immediate area around there too that
12 there's not.

13 MR. PADILLA: Mr. Examiner, I believe that's
14 all the questions I have.

15 MR. EXAMINER: Okay, thank you. I think
16 before I leave I need to understand something. It's
17 unfortunate that you don't have a witness, but I am
18 going to ask you. You started on a line of questions
19 about if you are trying to complete that injection of
20 the well, you encounter some oil reserves. Those are
21 the questions you asked him.

22 But the first line of questioning where you were
23 asking about the oil and water production in the Yeso
24 formation, has it any relevance to what we're trying to
25 do here? Why were you asking those questions?

1 MR. PADILLA: Mr. Examiner, I represent the
2 mineral owners in the north half of section 29, and they
3 simply want to have answers. And I think the witness
4 has explained them very well. What they have seen is
5 that there is very little water production from the
6 existing producing well. In fact, no water production
7 is shown on that deep gas well. And their inquiries are
8 simply where are you going to get the -- how are you
9 going to satisfy the \$5,000 or the 5,000 barrel
10 ~~production request.~~ And I think the witness has
11 answered that by saying that they may be drilling up to
12 16 wells or four horizontal wells. And that makes
13 sense, and I think that satisfies their inquiries.



14 MR. EXAMINER: I think I get -- and, you
15 know, I tried to ask him about this, that you have 5,000
16 and how many wells are you going to drill. And I think
17 his answer is appropriate because I don't impose limits
18 on how many barrels you can inject. I cannot impose
19 limits on the amount. They can say 10,000, I'm not
20 going to measure.

21 However, it's good to ask if you want to inject,
22 where are you going to get all the water. I don't
23 believe the operator, after the salt water disposal will
24 start accepting commercial disposal. Maybe that is why
25 your client is asking where they will get the water.

1 MR. PADILLA: Well, that's why I didn't ask
2 any questions because of your questions on the
3 commercial aspect. That's another inquiry that they
4 had, and I'm satisfied that they are going to drill
5 wells and that they need the capacity for getting rid of
6 the salt water.

7 MR. EXAMINER: Okay, very good. Based on
8 what was said, do you want to redirect?

9 MR. RANKIN: Thank you, Mr. Examiner. I
10 have no further questions.

11 EXAMINER BROOKS: No questions.

12 MR. EXAMINER: Good. Now, one thing I
13 wanted to make clear is -- what's your name again?

14 MR. DARDEN: Pat, Pat Darden.

15 MR. EXAMINER: Darden, yeah. I may start
16 with your comment about the 5,000 barrels that you want
17 to inject. That's just an assumption. It's not that
18 you know that's what you'll be doing?

19 MR. DARDEN: No. It's just taking math, 16
20 times the figure that you --

21 MR. EXAMINER: Okay, very good. And then
22 the injection pressure doesn't really matter as long as
23 you are within 0.2 PSI. If you are forced into
24 perforated, it's going to be 7750, you might get the
25 higher pressure than what you're asking because that's

1 really the basis. You might say, look, I'm asking for
2 1400, I can give you 1550 if your full operation is
3 7750. So that would give you -- then what does that
4 give you? Well, that will give you what you are asking
5 about if you are going to exceed the injection. I won't
6 just give you 12 -- because the C108 said 1200 and you
7 mentioned 1400. That would be below I can give you. I
8 can give you the maximum amount of what we give you now.

9 MR. DARDEN: Okay.

10 MR. EXAMINER: You can do your separate
11 tests and come back. So when you see it, I think the
12 number is incorrect. So that will be your benchmark.

13 MR. DARDEN: The .2 PSI per foot, is that
14 what you're talking about?

15 MR. EXAMINER: Yes.

16 MR. DARDEN: Okay.

17 MR. EXAMINER: So when you see that, that
18 will be your benchmark.

19 MR. DARDEN: And then we have to do a
20 separate test to examine it?

21 MR. EXAMINER: Exactly. You mentioned the
22 water as soon as possible. I don't understand. What is
23 that?

24 MR. DARDEN: The what? I'm sorry.

25 MR. EXAMINER: As soon as possible.

1 MR. DARDEN: Well, we just want to go ahead
2 and get approval so we can start work on this well.
3 We're waiting to get approval. It's going to cost a lot
4 of money to drill 5,000 extra feet, 5200 feet to run
5 casing, to run cement, log it. It's going to be
6 considerable, and then to put in tanks. You know, it's
7 going to be considerable. So we would like to have
8 approval up front to do this.

9 You know, and I showed you the map of the
10 development out there. It's crazy. I mean, it's
11 going -- we just want to get on it as soon as we can and
12 develop it and get some economics that meet our hurtles
13 and our economic rates that we feel comfortable with to
14 go forward with full development.

15 MR. EXAMINER: Yeah, like I said, everybody
16 is as soon as possible. What is the timeframe? That's
17 what I'm asking you.

18 MR. DARDEN: Okay. I'm going to say
19 probably we would like to have a drilling rig move in
20 July 1st, 30 days. We'll probably need to be able to do
21 something probably August 15th through September 1st.

22 MR. EXAMINER: Is when you can start
23 drilling?

24 MR. DARDEN: No, no. That's to inject water
25 into it. Okay, I'm sorry. Yes, we'll have a drilling

1 rig move in the 1st of July, okay, and then we'll do all
2 the necessary remedial work and deepen and run it. So
3 we'll be ready to move a rig in July 1st probably to
4 start injecting August 15th to September 1st.

5 MR. EXAMINER: What is the fresh water here?
6 What is the depth?

7 MR. DARDEN: I think it's 120 to 200 feet.
8 And I really don't know how much fresh water is left out
9 there because I think that was drained back in the '30s
10 and '40s. It was a big farming community and a lot of
11 that is dried up out there.

12 MR. EXAMINER: Any more redirect?

13 MR. RANKIN: No further questions.

14 MR. EXAMINER: You may be excused.

15 Case number 14808 will be taken under advisement.

16 [Case 14808 taken under advisement.]

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I do hereby certify that the foregoing is
a complete record of the proceedings in
the Examiner hearing of Case No. 14808
heard by me on 8/26/12.
[Signature] Examiner
Oil Conservation Division

REPORTER'S CERTIFICATE

1
2
3 I, Lisa Reinicke, New Mexico Provisional
4 Reporter, License #P-405, working under the direction
5 and direct supervision of Paul Baca, New Mexico CCR
6 License #112, Official Court Reporter for the US
7 District Court, District of New Mexico, do hereby
8 certify that I reported the foregoing proceedings in
9 stenographic shorthand and that the foregoing pages are
10 a true and correct transcript of those proceedings and
11 was reduced to printed form under my direct supervision.

12 I FURTHER CERTIFY that I am neither employed by
13 nor related to any of the parties or attorneys in this
14 case and that I have no interest whatsoever in the final
15 disposition of this case in any court.

16

17

18

19



20

Lisa R. Reinicke,
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