

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:

ORIGINAL

APPLICATION OF MEWBOURNE OIL COMPANY CASE NO. 15519
TO REVOKE THE INJECTION AUTHORITY
GRANTED UNDER SWD-744 FOR THE
WILLOW LAKE WELL NO. 1 OPERATED
BY PYOTE WELL SERVICE, LLC,
EDDY COUNTY, NEW MEXICO.

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

September 29, 2016

Santa Fe, New Mexico

BEFORE: MICHAEL McMILLAN, CHIEF EXAMINER
WILLIAM V. JONES, TECHNICAL EXAMINER
DAVID K. BROOKS, LEGAL EXAMINER

This matter came on for hearing before the
New Mexico Oil Conservation Division, Michael McMillan,
Chief Examiner, William V. Jones, Technical Examiner,
and David K. Brooks, Legal Examiner, on Thursday,
September 29, 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.

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PARTIES OXY USA AND OCCIDENTAL PERMIAN, LP:

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SOLUTIONS, LLC and PYOTE SWD-2; PYOTE WELL SERVICE, LLC:

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Also Present: Mr. Wayne Tanner, Deputy Federal Receiver

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1 (1:19 p.m.)

2 EXAMINER McMILLAN: We are now going to,
3 actually, the last page of the docket, Case Number
4 15519, application of Mewbourne Oil Company to revoke
5 the injection authority granted under SWD-744 for the
6 Willow Lake Well Number 1 operated by Pyote Well
7 Service, LLC, Eddy County, New Mexico.

8 Call for appearances.

9 MR. FELDEWERT: May it please the
10 Examiners, Michael Feldewert, from the Santa Fe office
11 of Holland & Hart, appearing on behalf of the Applicant,
12 and I have two witnesses here today.

13 EXAMINER McMILLAN: Any other appearances?

14 MR. HALL: Mr. Examiner, Scott Hall,
15 Montgomery & Andrews, appearing on behalf of David
16 Baker, Receiver, for the benefit of Pyote Water
17 Solutions, LLC and Pyote SWD-2.

18 With me is Brian Antweil from Katten Muchin
19 Rosenman law firm in Houston.

20 Also, I'd like to introduce Mr. Wayne
21 Tanner. He is the deputy federal receiver for the
22 purpose the benefit of Pyote.

23 And I'm going it refer to my client as
24 Pyote throughout the day. I'll have one witness.

25 EXAMINER McMILLAN: Okay.

1 MR. BRUCE: Mr. Examiner, Jim Bruce
2 representing Kaiser-Francis Oil Company. I have no
3 witnesses.

4 MR. FELDEWERT: And, Mr. Examiners, Michael
5 Feldewert, Santa Fe office of Holland & Hart, appearing
6 on behalf of OXY USA and Occidental Permian Limited
7 Partnership.

8 EXAMINER BROOKS: Okay. I have a question
9 basically on Mr. Hall's appearance. When I reviewed the
10 papers in this case with regard to the motion for
11 continuance, I noticed the discrepancy that you did not
12 do as to Pyote's -- what's the name of the operator?
13 Pyote Well Service, LLC?

14 EXAMINER JONES: Pyote Water Solutions,
15 Pyote --

16 EXAMINER BROOKS: That's who he appeared
17 for, but who is the operator of record?

18 MR. FELDEWERT: Mr. Examiner, I have the
19 change-of-operator form here from Mesquite.

20 EXAMINER BROOKS: Yeah. That was in the
21 file, but I wanted to know who is the named operator.

22 MR. FELDEWERT: Pyote Well Service, LLC.

23 EXAMINER BROOKS: That's what I thought,
24 but I wanted to be sure it was right.

25 Now, I noticed in the Receiver's order that

1 you believe that -- has been filed and the Receiver
2 appointed Pyote, LLC, but you have not indicated that
3 you're appearing on behalf of --

4 MR. HALL: Mr. Antweil can further explain
5 this, but Well Service is basically the contract
6 operator and takes direction from Pyote Water Solutions
7 and Pyote SWD-2. They are the owners.

8 EXAMINER BROOKS: Okay. Very good. I
9 appreciate that clarification.

10 You may proceed.

11 EXAMINER McMILLAN: Please proceed.

12 MR. FELDEWERT: Mr. Examiner, I do not have
13 an opening statement. Like I said, I do have two
14 witnesses here today on behalf of Mewbourne.

15 The only thing I need to say at the
16 beginning is that OXY USA and Occidental Permian, LP
17 appeared in this case and asked me to express to you
18 that they fully support the application that's been
19 filed by Mewbourne here.

20 EXAMINER McMILLAN: Okay.

21 MR. BRUCE: And, Mr. Examiner, about the
22 only thing I will have to state is that Kaiser-Francis
23 wholly supports Mewbourne Oil Company in this case.

24 EXAMINER McMILLAN: Okay. If the two
25 witnesses would please stand up and be sworn in at this

1 time.

2 (Mr. Lodge, Mr. Harrington and Mr. Johnston
3 sworn.)

4 MR. FELDEWERT: Give me a minute here,
5 Mr. Examiner. I apologize. I forgot to pass out the
6 exhibits. I do have a case number.

7 EXAMINER JONES: Mr. Hall, is there any
8 other attorney representing these three entities that
9 you --

10 MR. HALL: Mr. Antweil.

11 EXAMINER JONES: We have two attorneys
12 here --

13 MR. HALL: Correct.

14 EXAMINER JONES: -- and two attorneys here.

15 JASON LODGE,
16 after having been previously sworn under oath, was
17 questioned and testified as follows:

18 DIRECT EXAMINATION

19 BY MR. FELDEWERT:

20 Q. Would you please state your name, identify by
21 whom you're employed and in what capacity?

22 A. Jason Lodge. I work for Mewbourne Oil Company
23 as a petroleum geologist.

24 Q. Mr. Lodge, how long have you been with
25 Mewbourne?

1 A. Just about seven years.

2 Q. And I believe you've testified previously
3 before the Division as an expert in geology?

4 A. That's correct.

5 Q. Including today?

6 A. That's correct.

7 Q. Are you familiar with the application filed in
8 this case?

9 A. That's correct.

10 Q. And are you generally familiar with the
11 disposal well that's at issue?

12 A. Yes.

13 Q. And have you conducted a geologic study of the
14 Bone Spring Formation in the subject area?

15 A. Yes, I have.

16 MR. FELDEWERT: Mr. Examiner, once again,
17 I'd tender Mr. Lodge as an expert witness in petroleum
18 geology.

19 MR. HALL: No objection.

20 EXAMINER McMILLAN: Jim, no objection?

21 MR. BRUCE: I have no objection. I better
22 not.

23 Q. (BY MR. FELDEWERT) To set the case here today,
24 would you turn to what's been marked as Mewbourne
25 Exhibit Number 1?

1 A. Yes.

2 Q. And this is a disposal order from the Division
3 records of the SWD-744. Have you reviewed this
4 previously?

5 A. Yes, I have.

6 Q. Okay. And if I look through this order -- for
7 example, I'm looking at the bottom portion under "It is
8 therefore ordered" -- it indicates that in 1999, this
9 well was approved for disposal into the Bone Spring
10 Formation, correct?

11 A. That's correct.

12 Q. And it says, at the second-to-the-last line,
13 approximately 7,184 feet to approximately 8,850 feet.
14 Do you see that?

15 A. Yes.

16 Q. If I did my math right, that's over 1,600 feet
17 of permitted injection zone?

18 A. That's correct.

19 Q. Within the Bone Spring?

20 A. Yes, sir.

21 Q. In 1999, when this was approved, was there any
22 horizontal development in the Bone Spring Formation in
23 the area?

24 A. No.

25 Q. Okay. If I turn to page 2 of this order and I

1 go down towards the bottom again, and there is a
2 paragraph provided further. It says there in the last
3 line that "the Division may, after notice and hearing,
4 terminate the injection authority granted herein." Do
5 you see that?

6 A. Yes, I do.

7 Q. Is that why Mewbourne's here today?

8 A. Yes.

9 Q. To seek termination of the injection authority
10 granted under this order issued back in 1999?

11 A. Yes, that's correct.

12 Q. If I turn to what's now been marked as
13 Mewbourne Exhibit Number 2, is this a type log of the
14 permitted disposal well?

15 A. Yes, sir.

16 MR. FELDEWERT: Mr. Examiners, we have a
17 smaller version in front, and behind it is a much larger
18 version, if you need to look in any detail.

19 Q. (BY MR. FELDEWERT) But let me ask you,
20 Mr. Lodge, have you identified on this exhibit the
21 permitted disposal interval under that 1999 order?

22 A. Yes, I have. It's the blue box on the
23 left-hand side of the well, and this is the Willow Lake
24 SWD well. This is the well in question. So it shows
25 the top interval at 7,184 all the way down to 8,850.

1 Q. Now, have you been able to ascertain,
2 Mr. Lodge, from the Division records where the
3 perforations actually exist for this well within this
4 1,600-foot disposal interval?

5 A. No, I have not.

6 Q. And what else do you reflect on here with
7 respect to the Bone Spring Formation?

8 A. Just the 1st Bone Spring Sand on the top of
9 this is -- is on the -- the very top of my 1st Bone
10 Spring is an orange color. That's why I picked the top
11 of the 1st Bone Spring Sand. It ends at the 1st Bone
12 Spring carbonate. It's within the permitted disposal
13 interval.

14 As you go down to the middle of the type
15 log, my 2nd Bone Spring Sand is -- the top of that is
16 the orange-dashed line and ends at the bottom of my 3rd
17 Bone Spring carbonate, again within the permitted
18 disposal interval.

19 And then lastly, the Harkey Sand, which is
20 just above the 3rd Sand and below the 2nd Sand, is also
21 included in the permitted disposal interval.

22 Q. Okay. Now, you show that within the permitted
23 disposal intervals there are three different Bone Spring
24 Sand?

25 A. Yes, that's correct.

1 Q. And jumping ahead a little bit, are each of
2 these sands, in your opinion, potentially productive of
3 hydrocarbons?

4 A. Yes.

5 Q. And if I now, with that in mind, go to what has
6 been marked as Mewbourne Exhibit Number 3, do you
7 recognize this as the application filed by Griffin
8 Petroleum back in 1999 that resulted in the disposal
9 order?

10 A. Yes, I do.

11 Q. If I look at page -- unfortunately, these
12 should be paginated at the bottom.

13 If I look at page 7 of Exhibit Number 3 and
14 I look at the proposed wellbore diagram, again it just
15 broadly shows the disposal interval right over 1,600
16 feet?

17 A. That's correct.

18 Q. But it doesn't identify the exact perforation
19 points?

20 A. No, it does not.

21 Q. And if I then turn back to page 5 of this
22 application and I look at what was represented by
23 Griffin back in 1999, in paragraph five of page 5, it
24 represents that there is no upper zone commercially
25 productive of oil and gas, correct?

1 A. That's correct.

2 Q. And then it says at this time back in 1999, the
3 next lower productive horizon is the Atoka line at
4 11,410 feet. Do you see that?

5 A. Yes, that's correct.

6 Q. And they state that that's uneconomic to
7 produce?

8 A. Correct.

9 Q. Then if I go to page 2 -- on page 2, Roman
10 numeral VII, paragraph five, Griffin Petroleum
11 represents to the Division back in 1999 that water
12 injection will be into a zone not productive of oil and
13 gas. Do you see that?

14 A. Yes.

15 Q. Okay. And then it says that the Pardue well,
16 one mile to the west, produces out of the Upper Bone
17 Spring Sand horizon, 800 feet higher than the proposed
18 injection interval. What were they talking about?
19 Where would that be?

20 A. That 800-foot higher would correspond to the
21 Avalon Shale, so not included in our permit disposal
22 interval.

23 Q. All right. Now, things are different today,
24 correct?

25 A. Yes.

1 Q. We have horizontal development?

2 A. Yes, sir.

3 Q. Okay. Within the Bone Spring?

4 A. Yes.

5 Q. All right. If I turn to what's been marked as
6 Mewbourne Exhibit Number 4, does this identify for the
7 Examiners the Bone Spring development occurring in this
8 general area?

9 A. Yes, it does.

10 Q. Okay. And have you identified on this map the
11 current location of the disposal well?

12 A. Yes, I have.

13 Q. And how is that identified?

14 A. It's identified by a blue diamond and the name
15 "Willow Lake #1" underneath it, in Section 22, 24 South
16 of 28 East.

17 Q. What do all these other colors and lines mean?
18 Would you please walk us through this?

19 A. Yes. So on this exhibit, I only focused on the
20 three Bone Spring sands that we believe are affected.
21 So if you go to the top right of my exhibit, the 1st
22 Bone Spring Sand is colored in orange. The 2nd Bone
23 Spring Sand production is colored in a darker green
24 color, and the Harkey Sand production is colored in a
25 lighter green color.

1 Also below that, I've also notated, using
2 the same colors, the horizontal activity. So I colored
3 the horizontal wellbore based on where those wells were
4 targeted in the 1st Sand, 2nd Sand or the Harkey Sand.
5 The yellow color notates Mewbourne-operated acreage, and
6 then I also have oil cums, gas cums and water cums
7 posted next to each of the producing wells.

8 Q. Okay. So if we focus, like you said, on the
9 three Bone Spring sands within their permitted injection
10 zone, if I look at this particular exhibit, I see a
11 number of 1st Bone Spring Sand developments to the east
12 of this disposal well.

13 A. Yes, that's correct, to the north and east.

14 Q. And have you reviewed the records? Is this
15 development expanding to the west, towards the SWD?

16 A. Yes, I believe it is.

17 Q. Okay. And then we see some both circles and
18 lines for the Harkey Sand?

19 A. Yes.

20 Q. Can you just briefly -- quickly identify where
21 you see the Harkey Sand development?

22 A. Sure. There are only two Harkey Sand
23 horizontals on this map. They are furthest to the west,
24 within a mile and a half, Harkey Sand lateral there, and
25 then down to the south of that, there is another Harkey

1 Sand horizontal well. And there are multiple Harkey
2 Sand vertical tests and producers scattered throughout
3 this entire area.

4 Q. And then when I focus on the 2nd Bone Spring,
5 that seems to be the area that has the most development
6 currently within the township where the disposal well is
7 located, right?

8 A. Yes, that's correct.

9 Q. And you show a field to the south of the Willow
10 Lake well?

11 A. Yes.

12 Q. And then another developing field to the north?

13 A. Yes.

14 Q. And then some offsetting wells both to the west
15 and to the northeast, correct?

16 A. Yes, that's correct.

17 Q. All right. Was any of this horizontal
18 development -- did any of that -- was any of that
19 occurring back in 1999 when this injection well was
20 approved?

21 A. No.

22 Q. If I then -- I mentioned that the Bone Spring
23 play out here is expanding, correct?

24 A. Yes.

25 Q. If I turn to what's been marked as Mewbourne

1 Exhibit Number 5, does this reflect for the Examiners
2 not only the existing horizontal wells but the permitted
3 horizontal wells from the Division records?

4 A. Yes, it does.

5 Q. Okay. And is the color scheme basically the
6 same?

7 A. Yes, it is.

8 Q. So how do you depict the permitted wells?

9 A. The permitted wells are the dashed lines,
10 again, color-coded the same way as to what their
11 permitted target will be. These are all approved
12 permits.

13 Q. And we see quite an expansion -- or planned
14 expansion of the 2nd Bone Spring Sand within the
15 township in and around where the Willow Lake well is
16 located, correct?

17 A. Yes, we do.

18 Q. Okay. Have you conducted an examination of
19 each of these productive Bone Spring sands in this area?

20 A. Yes, I have.

21 Q. Okay. And as part of your examination, have
22 you ascertained whether these productive Bone Spring
23 sands that we see represented by the development,
24 whether they exist in and around the area where the
25 Willow Lake Disposal is located?

1 A. Yes, I have.

2 Q. And what conclusions have you made?

3 A. That all three sands, the 1st Bone Spring Sand,
4 the 2nd Bone Spring Sand and the Harkey Sand, do exist
5 in and around the disposal interval -- or the disposal
6 well. Excuse me.

7 Q. Okay. All right. Then let's focus on the
8 Harkey Sand first.

9 A. Okay.

10 Q. If I -- first off, that's a sand within their
11 permitted disposal interval, right?

12 A. Yes, it is.

13 Q. And if I turn to what's been marked as
14 Mewbourne Exhibit Number six, is this a structure map
15 that you put together for the Harkey Sand?

16 A. Yes, it is. So this map is -- the red lines
17 trending north-south are on top of the Harkey Sand, so I
18 picked that consistent pick in the area. This is
19 showing that our structure is dipping to the east,
20 pretty consistent throughout the area. There is no
21 major evidence of faulting, pinch-outs or anything of
22 that nature geologically that we would think would
23 hamper horizontal development in the future.

24 Q. Okay. And then you show some wells that you
25 utilized for a cross section?

1 A. I do. So that's the A to A prime starting in
2 the southwestern portion of the map and then going all
3 the way to the northeastern of the map.

4 Q. And you've been able to include the disposal
5 wells in the cross section, correct?

6 A. Yes, I did.

7 Q. How did you choose or why did you choose the
8 other wells that you have chosen here?

9 A. I chose the well furthest to the southwest
10 because it's in and around the horizontal development
11 that's going on in the area, in the Harkey Sand. I also
12 picked the other two wells around the Willow Lake SWD
13 well because those are Harkey Sand tests directly
14 offsetting the Willow Lake section. And then I moved
15 all the way to the north to pick another producer just
16 to make sure we're covering the entire area.

17 Q. And in your opinion as an expert in petroleum
18 geology, are the wells that you've chosen representative
19 of the area?

20 A. Yes.

21 Q. Okay. And if I turn to what's been marked as
22 Mewbourne Exhibit Number 7, is this the cross section
23 that corresponds with the A to A prime line shown on the
24 prior exhibit?

25 A. Yes, it is.

1 MR. FELDEWERT: Mr. Examiners, again, we
2 have a smaller version in front and then a much larger
3 version behind it, if you feel the need to look at it.

4 Q. (BY MR. FELDEWERT) Mr. Lodge, would you please
5 explain how you put this together and then explain to us
6 the various colors that are shown on here?

7 A. Sure. Again, this corresponds to A to A prime
8 on the previous exhibit starting at the southwest with
9 the 35J well and then going all the way to the north
10 with the 36J well.

11 The blue color indicated on the 22C well,
12 which is the Willow Lake SWD, is, again, identifying the
13 permitted disposal interval, and it's showing it clearly
14 crosses the Harkey Sand interval.

15 If you look at the other four wells, you'll
16 see a red box -- or multiple red boxes within there.
17 Those are indicative of the perfs, the perf interval.
18 So these are all completed -- the other four wells minus
19 the SWD well have all been tested and produced out of
20 the Harkey Sand.

21 Q. And with respect to the Harkey Sand across this
22 area what do you observe about its consistency?

23 A. It's considerably -- there are some thickness
24 changes here that are obvious. The 35J well is quite a
25 bit thicker. That's most likely why they started

1 horizontal development there. But as you look, the 28H
2 thins a little bit, but it is consistent throughout the
3 area for the other wells. And all of those wells,
4 again, did test and produce out of the Harkey Sand.

5 Q. So if I look at the thinning as we go to the
6 right, I see wells that produced out of that thinning
7 sand?

8 A. Yes.

9 Q. And if I'm understanding you, Mr. Lodge, those
10 were vertical wells?

11 A. They were, yes.

12 Q. And would you expect the productivity of these
13 sands to be improved with the advent of horizontal
14 wells?

15 A. Yes, I would.

16 Q. And in your opinion, the productive Harkey
17 sands that we see in this area, do they extend through
18 the nine-section area surrounding the Willow Lake
19 disposal well?

20 A. Yes, they do. You can see the 28H well is a
21 producer, and I included it on here even though it's a
22 poor producer. It only cumed 2,000 barrels of oil and
23 6 million cubic feet of gas. Whereas, the 26C well,
24 which, again, is a direct offset to the Willow Lake SWD
25 disposal, completed and fracked in the same zone and has

1 cumed 43,000 barrels of oil and 74 million cubic feet of
2 gas.

3 Q. As a vertical well?

4 A. As a vertical well.

5 Q. Okay. Let's focus on the second productive
6 sand encompassed by the disposal interval, and that is
7 the, as I understand, 1st Bone Spring Sand; is that
8 right?

9 A. Yes.

10 Q. And if you turn to Mewbourne Exhibit Number 8,
11 is this a similar structure map that you put together
12 for the 1st Bone Spring Sand producers?

13 A. Yes, it is. Again, it's similar to the last
14 Harkey Sand exhibit, except here I picked the top of the
15 1st Sand, again a consistent pick in the area. You see
16 similar structural relationships here striking
17 north-south, dipping slightly to the east.

18 Again, I only included the 1st Bone Spring
19 Sand production on here, so you can see the development
20 of the 1st Bone Spring horizontally to the east and
21 northeast and then a few sporadic producers around the
22 area as well.

23 Q. And do you observe any faults or pinch-outs or
24 geologic impediments to the development of the 1st Bone
25 Spring Sand horizontal wells?

1 A. No, I do not.

2 Q. Now, one of the things you mentioned previously
3 was that for your cross section A to A prime, you chose
4 wells that had good logs; is that right?

5 A. I did.

6 Q. In some circumstances, you would choose
7 vertical well logs near horizontal wells?

8 A. Yes.

9 Q. And is that because you didn't have a good log
10 in a horizontal well?

11 A. That's correct. I believe that that offset log
12 would be indicative of what the formation should look
13 like.

14 Q. So before we turn to the cross section, for
15 example, on Exhibit Number 8 and I look at the well that
16 you chose on the right-hand side labeled "A prime" --

17 A. Yes.

18 Q. -- that's a vertical well, right?

19 A. Yes.

20 Q. But it's right in the middle of the productive
21 horizontal well field?

22 A. Yes, that's correct.

23 Q. Okay. In your opinion, are the wells that you
24 have chosen here, represented on Exhibit Number 8, are
25 they -- are they the type of wells that allow you to

1 draw conclusions about the nature of the sand in the
2 area?

3 A. Yes.

4 Q. And are they representative of the area, in
5 your expert opinion?

6 A. Yes, I think so.

7 Q. If I then turn to what's been marked as
8 Mewbourne Exhibit Number 9, is this again the cross
9 section for the 1st Bone Spring Sand that corresponds
10 with the prior exhibit?

11 A. Yes, it is.

12 Q. And once again, have you utilized, for the
13 Examiners, the disposal well?

14 A. Yes, I have.

15 Q. Okay. And I see similar colors here, but why
16 don't you walk us through this again, please?

17 A. Sure. So, again, if you focus on the Willow
18 Lake SWD well, the 22C well, you can see the beginning
19 of the disposal interval is the blue box to the left of
20 the well, including just below the top of the 1st Sand
21 and throughout the entire rest of that interval.

22 My top of 1st Sand is my orange pick. The
23 two pink picks below that are just subdivisions within
24 that sand, still 1st Bone Spring Sand. And then the
25 bottom of the 1st Bone Spring Sand I pick is the 2nd

1 Bone Spring carbonate, the blue pick on the bottom.

2 Q. Okay. And what do you observe about the 1st
3 Bone Spring sands as you move across this area?

4 A. Consistent, again, throughout the area. You
5 can see there are some changes and there is some
6 thinning and thickening going on, but overall, the sands
7 are there. They're represented in the Willow Lake SWD.
8 They do exist. And then -- again, I didn't mention it,
9 but the red boxes are the perf intervals. You can see
10 on the 16B and the 20E well. Those are producing wells,
11 also.

12 Q. Okay. If I keep my finger here and I flip back
13 to Exhibit Number 8, you made mention of that prolific
14 field in the 1st Bone Spring to the east and the
15 northeast of the Willow Lake well?

16 A. Yes.

17 Q. In your expert opinion, do the productive sands
18 that are being developed in that area extend equally
19 across the nine-section area where the Willow Lake
20 disposal well is?

21 A. Yes, they are there.

22 Q. Finally then, I want to focus on the third
23 productive Bone Spring Sand within the disposal
24 interval, and that is, I guess, the 2nd Bone Spring
25 Sand.

1 A. That's correct.

2 Q. Okay. If I turn to Mewbourne Exhibit Number
3 10, again we see a structure map. Is this for the 2nd
4 Bone Spring Sand?

5 A. Yes, it is.

6 Q. Would you walk us through this, please?

7 A. Sure. Again, similar to the last two, my red
8 structure lines, very similar, turning to the
9 north-south, dipping gently to the east, no major
10 faulting or impediments or anything that I think we
11 wouldn't be able to develop this horizontally because
12 it's been proven and developed horizontally.

13 Again, these are only 2nd Bone Spring Sand
14 producers that I have on here, notated by the green
15 color. And then I've also included the permits on there
16 as well so you can see the development in the area,
17 especially in this sand.

18 And, again, on the last two as well, I have
19 an A to A prime starting in the southwestern portion of
20 the map and then finishing in the eastern portion of the
21 map around that development.

22 Q. All right. So let's talk about that a little
23 bit.

24 A. Okay.

25 Q. If I start with the cross-section map down

1 there, A -- okay?

2 A. Yes. Uh-huh.

3 Q. -- have you found a log down there that's
4 adjacent to or in the middle of this productive field?

5 A. Yes. I thought it was good modern log that
6 would be representative to the 2nd Bone Spring Sand
7 there.

8 Q. And then if I then move across that
9 cross-section line, you found a log from a vertical well
10 directly adjacent to an exiting horizontal well in the
11 2nd Bone Spring Sand, one section to the west of the
12 Willow Lake well, right?

13 A. Yes, I do.

14 Q. And then as I move across, you're able to find
15 a log near two existing lay-down horizontal wells in the
16 Bone Spring Sand -- in the 2nd Bone Spring Sand?

17 A. Yes.

18 Q. And those are just to the northeast of the
19 disposal well?

20 A. Yes, that's correct.

21 Q. Then you moved across and were able to find a
22 vertical well in and around to the log near that
23 prolific field to the east?

24 A. Yes.

25 Q. Again, the wells that you have chosen, in your

1 expert opinion, are they representative of the area?

2 A. Yes, I believe they are.

3 Q. All right. Now let's go to that cross-section
4 map, A to A prime, which is marked as Mewbourne Exhibit
5 Number 11.

6 A. Yes.

7 Q. Would you please walk us -- again, you used the
8 Willow Lake log, right?

9 A. I did.

10 Q. Give us some orientation here with that blue
11 line?

12 A. Sure. Uh-huh.

13 Q. Okay. Why don't you orient us from there?

14 A. Okay. So the Willow Lake SWD well, it will
15 again have that permitted disposal interval, and it will
16 notate it with the blue box, including the entire 2nd
17 Bone Spring Sand interval.

18 In the 2nd Bone Spring Sand, I picked the
19 2nd Bone Spring Sand, again, with that orange-dashed
20 line. The two orange lines below that are, again,
21 interval subdivisions of the 2nd Bone Spring Sand that
22 we identified throughout the area. And then, again, the
23 two green lines below that we call the 2nd Bone Spring
24 sea sand, which is the main target interval in the 2nd
25 Sand, not only in this area but throughout Eddy County,

1 New Mexico.

2 Q. So within the 2nd Bone Spring Sand, there is a
3 sea sand?

4 A. That's correct.

5 Q. And that's a primary target for people
6 initially developing this 2nd Bone Spring Sand?

7 A. Yes. And to be clear, that is an internal
8 nomenclature. Mewbourne calls it the 2nd Bone Spring
9 sea sand.

10 Q. Okay. I see a little red arrow. What is that?

11 A. The red arrow there is, again, notating where
12 the landing point target would be for the 2nd Bone
13 Spring Sand. And it's specifically the OXY Stent well,
14 which is directly offsetting Willow Lake SWD to the
15 west. And so it shows exactly where that well targeted
16 in the 2nd Bone Spring.

17 Q. So that's the well in Section 10-1 shown on
18 Exhibit Number 10?

19 A. Yes, that's correct.

20 Q. That existing horizontal well?

21 A. That horizontal well.

22 Q. And you call it the OXY Stent well. Is it
23 operated by OXY?

24 A. Yes.

25 Q. And what do you observe about the 2nd Bone

1 Spring Sand in your cross section?

2 A. It's consistent throughout the area. Again,
3 you have some changing in thicknesses, but, again,
4 that's consistent all throughout the county. Most
5 importantly, you see the sands do exist in the Willow
6 Lake SWD. They are there. They look similar. There
7 might be some differences in porosities and
8 resistivities, but in general, similar-looking sands in
9 the area.

10 Q. So if I go back to your structure map of the
11 2nd Bone Spring Sand, which is Exhibit Number 10, in
12 your expert opinion, the sands that are being developed
13 by all of these green lines that we see on this exhibit,
14 do those sands exist across Section 22 where the Willow
15 Lake well is located?

16 A. Yes, they do.

17 Q. If I stay here -- and you mentioned the OXY
18 Stent well adjacent to Section 21, right?

19 A. Uh-huh.

20 Q. Do you show that as being completed in the 2nd
21 Bone Spring Sand?

22 A. Yes, that's correct.

23 Q. And then there is another well just to the west
24 of that and it's completed in the 2nd Bone Spring Sand,
25 correct?

1 A. Yes, that's correct.

2 Q. Has Mewbourne brought an engineer today that
3 has examined the performance of this OXY Stent well as
4 compared to the other horizontal wells that we see in
5 the 2nd Bone Spring in this area?

6 A. Yes, we have.

7 Q. And are you generally familiar with this study?

8 A. Yes.

9 Q. And what has he found?

10 A. That the OXY Stent well by far is
11 underperforming in comparison to all other 2nd Bone
12 Spring Sand producers in the area.

13 EXAMINER BROOKS: Excuse me. Which well is
14 that?

15 MR. FELDEWERT: It's the well in Section
16 21, so to the west of the blue triangle.

17 EXAMINER BROOKS: Okay. Is that the
18 horizontal well in Section 21?

19 MR. FELDEWERT: Yes.

20 EXAMINER BROOKS: Okay. Thank you.

21 Q. (BY MR. FELDEWERT) Now, I want to ask an
22 opinion from you. Okay?

23 A. Sure.

24 Q. Let's say the Willow Lake well wasn't there.

25 A. Yes.

1 Q. Let's say it hadn't been permitted in 1999. If
2 that well was not there, would you expect the OXY Stent
3 well to have production performance similar to the other
4 wells that are completed in the 2nd Bone Spring Sand in
5 this area?

6 A. Yes, I would.

7 Q. And, in particular, the 2nd Bone Spring sea
8 sand?

9 A. That's correct.

10 Q. Because that well is completed in the 2nd Bone
11 Spring sea sand?

12 A. It is.

13 Q. As are the other wells?

14 A. That's correct.

15 Q. And is the 2nd Bone Spring Sand around the
16 Stent well, is it similar in composition to the sands
17 around the other successful wells in the 2nd Bone Spring
18 in this area?

19 A. Yes, it is.

20 Q. Do you see any geologic abnormalities in and
21 around the OXY Stent well?

22 A. No, I don't.

23 Q. And would you -- if you were looking at this
24 and advising the company, would you expect the Stent
25 well in Section 21, completed in that 2nd Bone Spring

1 Sand, to have similar results as you see from other Bone
2 Spring Sand wells in this area?

3 A. Yes, I would.

4 Q. But that's not the case, right?

5 A. That is not the case.

6 Q. Okay. If I then turn back to the type log
7 here, which is Exhibit Number 2, you show three
8 productive Bone Spring Sand within the completed
9 interval.

10 A. Yes.

11 Q. Okay. And in your opinion, has the advent of
12 horizontal drilling made these Bone Spring intervals
13 viable targets for oil and gas development in Section 22
14 where that SWD is located?

15 A. Yes.

16 Q. And in your expert opinion, does the geology in
17 the existing horizontal development in the Bone Spring
18 Formation indicate that today -- today that there is a
19 viable potential of viable hydrocarbon resources in this
20 permitted injection zone?

21 A. Yes.

22 Q. In your expert opinion, is there at least a
23 probability that recoverable oil and gas reserves exist
24 in the permitted disposal zone in Section 22 and the
25 surrounding sections?

1 A. Yes.

2 Q. Go to OXY Exhibit Number 1, and I want to go to
3 page 2.

4 MR. HALL: Of OXY? Mewbourne.

5 MR. FELDEWERT: I'm sorry. Mewbourne
6 Exhibit Number 1.

7 Thank you.

8 Q. (BY MR. FELDEWERT) And I want to go down to
9 page 2, down there at "Provided Further." And we've
10 reviewed this previously.

11 A. Yes.

12 Q. In your opinion, is termination of the
13 injection authority granted under this 1999 order
14 necessary today to prevent waste and to protect
15 correlative rights?

16 A. Yes.

17 Q. Mr. Lodge, were Mewbourne Exhibits 1 through 11
18 prepared by you or compiled under your direction and
19 supervision?

20 A. Yes, they were.

21 MR. FELDEWERT: Mr. Examiner, I move the
22 admission into evidence of Mewbourne Exhibits 1 through
23 11.

24 MR. HALL: No objection.

25 MR. BRUCE: No objection.

1 EXAMINER McMILLAN: Exhibits 1 through 11
2 may now be accepted as part of the record.

3 (Mewbourne Oil Company Exhibit Numbers 1
4 through 11 are offered and admitted into
5 evidence.)

6 EXAMINER McMILLAN: Cross-examination?

7 CROSS-EXAMINATION

8 BY MR. HALL:

9 Q. Let me refer back to your Exhibit 2, please,
10 Mr. Lodge.

11 A. Sure.

12 Q. Do you have that in front of you?

13 A. Yes, I do.

14 Q. You testified the blue bar there constitutes
15 the injection interval; is that correct?

16 A. That's correct.

17 Q. And you do not show the perforations on this
18 exhibit where the water may be going?

19 A. No. We do not have those.

20 Q. And if you refer to Exhibit 3 at page 5, are
21 the perforations indicated there?

22 A. They are, but those are -- again, this is the
23 C-108, so this is what they said they were going to do.
24 We were never provided with what they actually did.

25 Q. All right. Without having that actual

1 information on perforations, are you able to make a
2 determination where that water may be going?

3 A. All that we know is that the proposed disposal
4 interval includes all three of those things.

5 Q. So the answer to my question is no?

6 A. Sure. Yes.

7 Q. And you agree that it's no?

8 A. I agree with you.

9 Q. If you look at the last page on the C-108 --

10 A. Yes.

11 Q. -- and tell me if you can't answer this
12 question. But how did Mewbourne determine who to send
13 notice to of this proceeding?

14 A. I'm not familiar with that.

15 Q. Okay. Would your next witness be familiar with
16 that?

17 A. I believe so, yes.

18 Q. All right. Turn again to your Exhibit Number
19 4. It's the Mewbourne acreage map, correct?

20 A. Yes.

21 Q. So the closest acreage Mewbourne has to the
22 disposal is a mile away, more or less?

23 A. Roughly.

24 Q. Section 27?

25 A. Sure.

1 Q. Do you have any outside operating working
2 interest in any of the sections immediately surrounding
3 the disposal well?

4 A. No, we do not.

5 Q. You're not a working interest owner in the OXY
6 Stent well.

7 A. No, we are not.

8 Q. If you look at the Matador Tiger well in
9 Sections --

10 A. 14?

11 Q. -- 13 and 14 --

12 A. Yes.

13 Q. -- do you have an ownership interest in that?

14 A. We do not.

15 Q. Were the logs from the Tiger well available to
16 you?

17 A. They were not, no.

18 Q. Did you attempt to try to pull them from the
19 OCD's well log filings?

20 A. It's a horizontal well, but I would say -- and
21 I included it in my cross section -- there is a direct
22 offset to the Tiger well. It is a modern open-hole log
23 that would be more representative, in my view, unless
24 they open-holed a log of the entire interval, which I
25 don't think they did.

1 Q. All right. And your earlier analysis of the
2 supposed water intrusion problem did focus on the Stent
3 well; did it not?

4 A. Yes, it did.

5 Q. But that well is not shown on your cross
6 section?

7 A. It is shown on my 1st Bone Spring Sand cross
8 section. Just to clarify, the reason it's not on my 2nd
9 Bone Spring Sand cross section is we do not have
10 open-hole logs through the 2nd Bone Spring Sand
11 interval. We had open-hole logs through the first --
12 they open-hole logged through the 1st Bone Spring Sand
13 to their kick-off point.

14 Q. All right.

15 A. And then we did not log the remaining with
16 open-hole logs.

17 Q. If we look at your Exhibit 6, that's your
18 structure map for the Harkey?

19 A. Yes.

20 Q. And is it correct that all the development in
21 the Harkey so far has been by way of vertical wells?

22 A. No. There is horizontal development to the
23 west. Directly offsetting my A in the southwest, there
24 are two horizontal wells notated there in the light
25 green.

1 Q. Five miles away; is that right?

2 A. Yes.

3 Q. Again, we'll look at your Exhibit 8, your
4 structure map for the 2nd Bone Spring. I'm sorry.
5 That's the 1st Bone Spring?

6 A. 1st, yes.

7 Q. Accurate to say that development in the 1st
8 Bone Spring is fairly far to the north and east?

9 A. It is a ways horizontally to the north and
10 east.

11 Q. There is no 1st Bone Spring in the immediate
12 vicinity of the Willow Lake?

13 A. Other than the two -- the couple of vertical
14 tests roughly a mile away or so.

15 Q. In both the wells that you're showing on the
16 cross section for the 1st Bone Spring, your Exhibit 9,
17 are a number of those wells plugged?

18 A. Yes.

19 Q. And were those wells plugged before the issues
20 with respect to injection in the Willow Lake arose?

21 A. Yes.

22 Q. And we turn to your Exhibit 10. It's your
23 structure map for the top of the 2nd Bone Spring?

24 A. Yes.

25 Q. And you've identified your cross section. And

1 then if we refer to the cross section itself -- well,
2 let's go back to Exhibit 10.

3 A. Okay.

4 Q. Again, you're not utilizing the well logs for
5 the Matador Tiger well in 13 and 14; is that right?

6 A. I did not have those logs.

7 Q. And rather than using the logs for the OXY
8 Stent well in Section 21, you chose to use an offset to
9 that?

10 A. Yes, that's correct.

11 Q. And why is that, again?

12 A. Again, because I think it's a modern open-hole
13 log that is a good representative of what it would look
14 like. I did not have modern open-hole logs through the
15 2nd Bone Spring Sand for that well.

16 Q. Was there something wrong with the log from the
17 Stent well?

18 A. Again, there just were not -- it's my
19 understanding they did not run open-hole logs through
20 the 2nd Sand.

21 Q. And it was your testimony earlier that given
22 the proximity -- other than the proximity of the Stent
23 well to the disposal operation, it should be performing
24 like other 2nd Bone Spring area wells?

25 A. Yes, that's correct.

1 Q. And is the -- if we look at your cross section
2 for the 2nd Bone Spring, can you tell us where the
3 perforations for the Stent well would be represented by
4 virtue of reference to the -- if we refer to the log you
5 have for the Forrest Pardue well in Section 21 --

6 A. 21C?

7 Q. Yeah.

8 A. Yes.

9 Q. -- can you explain to the Hearing Examiners
10 where the perforations for the Willow Lake injector
11 would appear on that log?

12 A. Again, we only have the permitted disposal
13 interval. We don't have the actual perforations.

14 Q. All right. Is it generally true that they
15 would be located above -- above and below the 2nd Bone
16 Spring?

17 A. I don't know the answer to that without looking
18 to the other exhibits.

19 Q. Would that be helpful to your analysis to know?

20 A. It would have been helpful to the analysis to
21 get the actual perfs.

22 Q. Did you attempt to get those?

23 A. I did not personally, but our engineer did.

24 Q. All right. So if we took the perforations
25 shown on the C-108 -- we do have those --

1 A. Uh-huh.

2 Q. -- would you agree with me there is no
3 injection into the 2nd Bone Spring Sand?

4 A. Again, I don't have the actual perforations, so
5 I can't say that. I can't testify to that.

6 Q. You can't testify one way or another; is that
7 right?

8 A. That's right.

9 Q. Now, what is wrong with the production from the
10 Stent well?

11 A. It's a higher water-cut well.

12 Q. And is it -- is this a water cut in line with
13 other area Bone Spring wells?

14 A. I defer that to our engineer. He is going to
15 have testimony on that.

16 Q. Well, you rendered an opinion, so let me ask
17 you this.

18 A. Sure.

19 Q. Is it your opinion that the water cut that's
20 being exhibited by production from the Stent well is
21 attributable exclusively to injections into the Willow
22 Lake well?

23 A. That is my opinion, yes.

24 Q. Okay. And is it your opinion that the water
25 production being exhibited by the Stent well is caused

1 by injection operations to the preclusion of all other
2 causes?

3 A. Can you restate that for me? I'm sorry.

4 Q. There is no -- is it possible that there is any
5 other cause for the water production that you're seeing
6 in the Stent well?

7 A. In my opinion, it's because of the Willow Lake
8 SWD.

9 Q. All right. My question is: Are there any
10 other causes for that water production?

11 A. None that I'm aware of.

12 Q. All right. Tell me how you eliminated the
13 other possible causes.

14 A. Due to the testimony that my engineer will be
15 putting on, it's convincing to me that that was why.

16 Q. So you have not -- in your analysis, you have
17 not eliminated other possible causes?

18 A. No.

19 Q. What are some of the other possible causes?

20 A. I'm not aware of any.

21 Q. Is there not naturally occurring water in the
22 2nd Bone Spring?

23 A. Sure.

24 Q. Is that a possible cause?

25 A. I don't think that it would be that different

1 of a water producer in the area. We're talking about
2 multiple horizontal Bone Spring sands, so that would be
3 an absolute anomaly.

4 Q. Tell me if you cannot answer this. You are
5 aware, are you not, that Mewbourne is disposing of its
6 water into the Willow Lake well?

7 A. I am not aware of that.

8 Q. Do you know that OXY is disposing of water into
9 the Willow Lake well?

10 A. I was aware of that, yes.

11 Q. Do you know whether it's being trucked or
12 piped?

13 A. I do not know that.

14 Q. Do you know of any other disposal customers
15 utilizing the Willow Lake well?

16 A. I do not, no.

17 Q. Where would Mewbourne propose to take its
18 produced water if Mewbourne's application is granted and
19 the Willow Lake is taken away?

20 A. Sure. We have -- we are actively drilling SWD
21 wells in the area. We have some SWDs to the south. We
22 are not injecting into the Bone Spring Formation on
23 those. We are not injecting into producing formations.
24 We are injecting into the Devonian on those.

25 Q. And what distance away are those other --

1 A. I'll defer that to my engineer. He's done some
2 studies on that.

3 Q. All right. You don't know anything about the
4 incremental trucking costs involved in moving water to
5 those other injectors?

6 A. That would be an engineering question.

7 Q. What is the depth of the Devonian at the Willow
8 Lake location?

9 A. It would be roughly 15,000 to 16,000 feet.

10 Q. All right. From your analysis of the Willow
11 Lake specifically, the lithology in there, are there any
12 other injection intervals that would be acceptable to
13 Mewbourne other than the Devonian?

14 A. The Devonian is the only one I would be
15 comfortable with.

16 Q. How much does a Devonian disposal well cost?

17 A. That would be an engineering question.

18 Q. Okay. Do you have any idea?

19 A. I don't know the answer to that.

20 MR. HALL: Nothing further of this witness.

21 MR. BRUCE: Mr. Examiner, I swore I
22 wouldn't speak, but perhaps I misrepresented myself. I
23 just have a couple of questions for clarification.

24 (Laughter.)

25

CROSS-EXAMINATION

1
2 BY MR. BRUCE:

3 Q. Mr. Lodge, looking at your Exhibits 6 and 7, as
4 proposed, they involve the Harkey Sand, correct?

5 A. Yes.

6 Q. And then your subsequent exhibits, 8 and 9,
7 involve the 1st Bone Spring?

8 A. Correct.

9 Q. And there are a number of horizontal Harkey
10 Sand of the horizontal 1st Bone Spring sands out there?

11 A. In the area, yes.

12 Q. Looking at the cross sections, it appears that
13 all of the Harkey Sand wells and all of the 1st Bone
14 Spring Sand vertical wells, they were drilled -- they
15 were drilled apparently in the '80s, early '90s, early
16 to mid-'90s?

17 A. That's accurate, yes.

18 Q. So before the Griffin well was approved?

19 A. Yes.

20 Q. And in looking at your Exhibits 6 and 8, there
21 are wells out there that produce 30- to 45,000 barrels
22 of oil, the vertical wells?

23 A. That's correct, yes.

24 Q. So if you go back to Exhibit 3, page 2, where
25 the application says, "Injection into a zone not

1 productive of oil or gas," that is incorrect?

2 A. Right.

3 Q. They might not have been economic or for the
4 most part economic, but it was productive?

5 A. And I'm not sure if they fall within the
6 boundary of the study area that was needed for the
7 C-108. I can't answer that.

8 Q. But there was -- there were productive wells at
9 the time this application was filed?

10 A. Yes, there were.

11 Q. Thank you.

12 EXAMINER JONES: Both of you have a chance
13 to --

14 MR. ANTWEIL: I don't have any questions.

15 MR. HALL: I do have brief follow-up based
16 on one of Mr. Bruce's questions.

17 EXAMINER BROOKS: I would question, since
18 the Receiver is receiver for all the entities, that they
19 could have more than one attorney question the witness.
20 I understand that you might argue that one represents
21 the Receiver and entity and the other one represents --
22 that's the kind of argument I've heard from some
23 lawyers.

24 MR. HALL: The questions are coming from
25 me.

1 EXAMINER BROOKS: Don't worry about -- I
2 would consider it acceptable.

3 MR. ANTWEIL: I didn't intend to ask any
4 questions.

5 MR. HALL: If I might ask a question.

6 EXAMINER BROOKS: Well, you have been doing
7 it so far, and you've been doing an excellent job, so
8 we'll just let you continue.

9 (Laughter.)

10 MR. HALL: Thank you.

11 RECROSS EXAMINATION

12 BY MR. HALL:

13 Q. We talked briefly about the study area for the
14 C-108, Exhibit 3.

15 A. Yes.

16 Q. What's the area of review for that study?

17 A. I believe it's a two-mile area.

18 Q. Two-mile or half-mile?

19 A. Well, let me see. It's right here on the first
20 page, number five. You have to identify all wells
21 within two miles of any proposed injection well and then
22 with a one-half mile radius, so a circle around each
23 proposed injection well. So I'm not sure what you call
24 the study area. I think the study area is probably the
25 two miles, but it is that half mile as well.

1 Q. All right. For productivity only; is that
2 right?

3 A. Yes.

4 MR. HALL: All right. Nothing further.

5 EXAMINER BROOKS: And let me salvage
6 myself, having said that. Let me add I didn't mean to
7 impugn present company. I was thinking about the lawyer
8 who was formally -- who now works for the producer.

9 MR. HALL: For the record, I've been tagged
10 some by two lawyers at the same time here.

11 CROSS-EXAMINATION

12 BY EXAMINER McMILLAN:

13 Q. Have you done any produced water samples from
14 the OXY Stent?

15 A. I have not. You'll hear some testimony on that
16 from our engineer.

17 Q. I believe it is -- okay. It's going back to 8
18 and 9.

19 A. Okay.

20 Q. And I'm essentially looking at the A prime
21 well.

22 A. Okay.

23 Q. Where is the perforated interval in that well?

24 A. It is not a producing vertical well.

25 Q. In relative terms, where is the producing

1 interval?

2 A. It would be what I call the pink sand. So if
3 you look at the 20E well just next to it, you can see
4 the red perfed interval right there just above the top
5 of the 1st Bone Spring Sand. So it would be a similar
6 productive interval.

7 Q. Which would be what's marked as 4595? That's
8 about where the perforated interval is?

9 A. Just below that, yes, sir.

10 Q. Just below that.

11 Is that -- so is that perforated interval
12 relative with the approved interval of the Willow Lake
13 SWD?

14 A. Yes, it is. And you can see I carry that
15 through with my two pink maps.

16 Q. I understand that, but I'm asking about the
17 perforated interval.

18 A. That is the perforated interval. It's within
19 that. So I was using those to show that it is
20 correlative across the area, that that sand is.

21 EXAMINER McMILLAN: Go ahead.

22 CROSS-EXAMINATION

23 BY EXAMINER JONES:

24 Q. I guess -- so we're going to hear about the
25 waters from the next witness --

1 A. Uh-huh.

2 Q. -- and oil cuts and things like that --

3 A. Yes, sir.

4 Q. -- and drilling hazards and volumes and rates?

5 And I guess permeability falls under your
6 realm, though, doesn't it?

7 A. Sure.

8 Q. The extremely big gross perforated interval in
9 the Willow Lake well -- so you're -- basically, we're
10 kind of assuming it's going into those sands because
11 of --

12 A. They're more permeable than the tighter
13 limestones above and below.

14 Q. What kind of volume -- or magnitudes of
15 permeability are we talking about?

16 A. I don't have an exact number for you on that.

17 Q. But you have some porosity numbers, don't you,
18 in the sands?

19 A. Yes, we do.

20 Q. And the sands and permeabilities have kind of a
21 relationship between porosity and permeability?

22 A. Uh-huh. So, in general, just to the 2nd Bone
23 Spring Sand, we can -- we utilize density porosity in
24 the sands. If you look at the offset to the OXY Stent
25 well, in that target interval, which is in the Bone

1 Spring, the sea sands -- it's cleaned up a little and on
2 the gamma and that's the target -- you've got density
3 porosity at 12 to 11 percent, tracking on about 10
4 percent.

5 Q. Okay. So -- but if the porosity's -- the perms
6 in the shales -- I don't know what you would call that
7 rock that you're targeting in the horizontals.

8 A. Sandstone.

9 Q. You call it a sandstone?

10 A. It is, yeah. You could call it a siltstone. I
11 would not call it a shale, but it's -- in general,
12 everybody calls it a sandstone.

13 Q. So you're actually going to drill in the Harkey
14 or in that sand down in the 1st Bone Spring, the
15 horizontals?

16 A. There is potential for that, yes.

17 Q. Okay. So is there a relationship between
18 vertical perm and the horizontal perm out here? And
19 what would it be if you --

20 A. I don't know the answer to that.

21 Q. If those horizontal wells weren't -- are they
22 intersecting a lot of natural fractures on their own
23 like in the old days did it, be productive, or are they
24 strictly restricted to only fractures from the
25 horizontal -- from the -- on the horizontals from the

1 artificial frac jobs?

2 A. It's hard for me to be that absolute about it,
3 but I think it would trend more that it's producing
4 because of the frac jobs.

5 Q. Okay. And the frac jobs are connecting with
6 rocks above and below and beside the horizontal well?

7 A. Yes.

8 Q. So about how far out would you expect --

9 A. I defer that to our engineer. I think he'll
10 have a better idea for that.

11 Q. No more questions.

12 EXAMINER McMILLAN: I'm not done with you.

13 EXAMINER BROOKS: Yeah. I have a question,
14 too, but I'll wait until you get done.

15 RECROSS EXAMINATION

16 BY EXAMINER McMILLAN:

17 Q. Have you done a well log analysis at Willow
18 Lake?

19 A. What do you mean by well log analysis?

20 Q. The RWs.

21 A. I have not.

22 Q. Who did?

23 A. No one.

24 Q. No one did?

25 A. No.

1 Q. Okay. Have you done a log analysis of the
2 open-hole logs close to the producing -- close to the
3 producing horizontal wells?

4 A. No. It was just to clarify -- it was our
5 belief that the testimony that I put forward would be
6 enough to show that those sands are consistent across
7 the area.

8 Q. So you haven't done it?

9 A. No.

10 RECROSS EXAMINATION

11 BY EXAMINER JONES:

12 Q. But the Willow Lake had Bone Spring perfs
13 before -- wasn't it tested in the Bone Spring before it
14 was turned into a disposal well, the Bone Spring?

15 A. No. It was an Atoka completion, and then they
16 came up and converted.

17 Q. Okay. So those perfs on the C-108 are just
18 proposed perfs?

19 A. That's correct. Yes, sir.

20 CROSS-EXAMINATION

21 BY EXAMINER BROOKS:

22 Q. This is just for my general education. I've
23 heard a lot of testimony in many cases about the 1st
24 Bone Spring, 2nd Bone Spring and 3rd Bone Spring. I
25 have not heard anything about the Harkey Sand before.

1 A. Okay.

2 Q. Where does it fit into this?

3 A. So the Harkey Sand exists just above the 3rd
4 Bone Spring Sand and below the 2nd Bone Spring Sand. So
5 it's --

6 Q. So it's separated with both? It's not in
7 communication, at least in this area?

8 A. That's correct. It's separated by the
9 limestone. So technically -- you mean the 3rd Bone
10 Spring carbonate?

11 Q. Yes.

12 A. So it is an individual sand that exists
13 throughout the Basin and is mappable throughout the
14 Basin.

15 Q. Thank you.

16 RECROSS EXAMINATION

17 BY EXAMINER JONES:

18 Q. And it has a little bit of washout on the
19 caliper?

20 A. It does sometimes. And sometimes you get
21 overbank or levee deposits. It gets a little shalier in
22 areas. But depositionally it is similar to the Bone
23 Spring Sand.

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REDIRECT EXAMINATION

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BY MR. FELDEWERT:

Q. Mr. Lodge, would you turn to Mewbourne Exhibit Number 1? And under this order -- this is the current order that's in effect -- they're approved for disposal anywhere from 7,184 feet to approximately 8,850 feet?

A. That's correct.

Q. This order doesn't identify any specific restrictions on it, does it?

A. No.

Q. It doesn't identify any specific perms?

A. Does not.

Q. And in your review of the Division records, you don't know when they perfed the well?

A. That's correct.

Q. So we have to look at this as the disposal interval, correct?

A. Yes.

Q. In looking at this approved interval, okay, based on your testimony, this approved interval encompasses at least three productive Bone Spring sands?

A. Yes.

Q. And now thinking about the Division orders that were issued previously -- and I know you don't know anything about it. Okay? But I do.

1 A. Okay.

2 Q. -- they have articulated certain standards.

3 Okay? Within this approved disposal interval, okay, is
4 there a viable potential for occurrences of hydrocarbon
5 resources in Section 22 where this disposal well is
6 located?

7 (Cell phone ringing.)

8 A. Yes.

9 Q. And in your expert opinion, is there a
10 probability that recoverable oil and gas reserves exist
11 in this approved interval?

12 A. Yes.

13 Q. That's all I have.

14 MR. HALL: Nothing further.

15 EXAMINER JONES: Thank you.

16 EXAMINER McMILLAN: We're taking a break
17 until 2:35.

18 (Recess 2:24 p.m. to 2:38 p.m.)

19 EXAMINER McMILLAN: I'd like to call this
20 hearing back to order, more specifically Case Number
21 15519.

22 MR. FELDEWERT: I'll proceed with our next
23 witness.

24 TIM HARRINGTON,
25 after having been previously sworn under oath, was

1 questioned and testified as follows:

2 DIRECT EXAMINATION

3 BY MR. FELDEWERT:

4 Q. Would you please state your name, identify by
5 whom you're employed and in what capacity?

6 A. My name is Tim Harrington. I work for
7 Mewbourne Oil Company, and I am the reservoir engineer.

8 Q. And how long have you worked as a reservoir
9 engineer?

10 A. I have a total of 38 years of industry
11 experience. I worked as a geologist for 11 years. Then
12 I went back to school and got my petroleum engineering
13 degree, and then I worked 25 years as a petroleum
14 engineer for ConocoPhillips. And I've worked the last
15 year and a half for Mewbourne.

16 Q. Have your responsibilities during that 38-year
17 career included the Permian Basin?

18 A. Yes. I've made three tours of duty working the
19 Delaware Basin. I worked the Delaware Basin twice for
20 ConocoPhillips -- or Phillips, ConocoPhillips, and then
21 now I'm working acid again for Mewbourne.

22 Q. So you worked for Phillips before they became
23 Conoco?

24 A. Yes.

25 Q. Okay. Have you previously testified before

1 this Division as an expert in petroleum engineering?

2 A. I've never testified before the NMOCDC, but I
3 have been an expert witness at the Texas Railroad
4 Commission and the Oklahoma Corporation Commission.

5 Q. On oil and gas engineering matters?

6 A. Yes.

7 Q. And you consider yourself a reservoir engineer?

8 A. Yes.

9 Q. And that's what you've been doing at least in
10 the year and a half with Mewbourne?

11 A. Yes.

12 Q. Are you a member of any -- let me -- you
13 mentioned your educational background. What is that?

14 A. I have a BS in geologic sciences from Southern
15 Methodist University, and then in 1990, I got my
16 petroleum engineering degree from University of Tulsa.

17 Q. Are you a member of any professional
18 affiliations?

19 A. Society of Petroleum Engineers.

20 Q. A professional affiliation?

21 A. Yeah, SPE.

22 Q. How long have you been a member of the Society
23 of Petroleum Engineers?

24 A. Over 25 years.

25 Q. Okay. Are you familiar with the application

1 filed in this matter?

2 A. Yes.

3 Q. Are you familiar with the disposal well at
4 issue?

5 A. Yes.

6 Q. And have you conducted a study of the impact
7 that this well is having on the subject area?

8 A. Yes.

9 MR. FELDEWERT: I tender Mr. Harrington as
10 an expert witness in petroleum engineering.

11 MR. HALL: No objection.

12 MR. BRUCE: No objection.

13 EXAMINER McMILLAN: So qualified.

14 Q. (BY MR. FELDEWERT) In preparation for this
15 hearing, Mr. Harrington, did you determine the amount of
16 water that has been disposed into the Bone Spring
17 Formation through this well since 1999?

18 A. Yes, I did.

19 Q. If I turn to what's been marked as Mewbourne
20 Exhibit Number 12, is this a graph you put together from
21 Division records?

22 A. Yes, it is.

23 Q. And explain to us what you show here?

24 A. This is injection rate versus time graph of the
25 Willow Lake Saltwater Disposal. Cumulative over time,

1 over 8.7 million barrels of water has been injected into
2 the Bone Spring. The y-axis on the left inside of this
3 graph is the disposal rate plotted in barrels of water
4 per day. Plus, I've also plotted the injection pressure
5 as submitted to the Commission, and also -- I have also
6 -- the black solid line going across is the maximum
7 permitted pressure under the order.

8 On the right-hand side, there is a dashed
9 blue curve. That's the cumulative amount of water
10 injected into the well over time, which, as I said, is
11 about 8.7 million barrels.

12 Q. So now if I look at -- you said the dark blue
13 line is the permitted injection pressure?

14 A. The dark black line.

15 Q. The dark black line. Thank you. Under the
16 order that we previously reviewed?

17 A. Yes.

18 Q. And then the dashed black lines are the
19 injection pressures reported to the Division?

20 A. Yes.

21 Q. And if I'm understanding this correctly, it
22 shows a gentle increase in injection pressure, correct,
23 for a period of time?

24 A. Yes.

25 Q. And then it suddenly stops?

1 A. Yes.

2 Q. All right. And then it shows, basically, since
3 2005, that the injection pressure was constant until,
4 what, November, December 2012?

5 A. Correct.

6 Q. And then we don't have any information?

7 A. Correct.

8 Q. All right. When did Mesquite take over
9 operations of this well?

10 A. Mesquite took over operations at the -- there
11 is a small break in the information there between, like,
12 November 2004 and May 2005. According to the Commission
13 records, that's when Mesquite became the operator of the
14 well.

15 Q. And according to your review of the records,
16 Mesquite didn't report for a period of time, and then it
17 looks like they just reported a constant injection
18 pressure for a period of time?

19 A. Yes.

20 Q. When did Pyote take over this well?

21 A. At the end of the injection pressure data.

22 Q. So around what?

23 A. 2012.

24 Q. 2013?

25 A. Yeah, 2012.

1 Q. If I look at the Division records, there is a
2 change-of-operator form filed in April of 2013. Is that
3 about right?

4 A. Yes, that's correct.

5 Q. And based on your graph, there has been no
6 reported injection pressure by Pyote since it took over
7 this well?

8 A. Correct.

9 Q. And based on your study, does it appear that
10 either prior operator, Mesquite or Pyote, reported an
11 actual injection pressure to the Division?

12 A. I would expect when the injection pressures are
13 over 1,000 pounds, in like November, December 2004 and
14 you see a dramatic decrease in the injection pressure,
15 that's probably due to the addition of perforations into
16 a well, or they've gone in and fracture simulated the
17 well, or there is some change in the downhole tubulars.
18 Maybe they put a larger diameter tubing. It's not
19 normal to have that reduction in pressure unless
20 something has been done to the well.

21 In checking the Commission records, there
22 is no -- no sundry report submitted during that time
23 that would indicate something had been done to the well.

24 Q. And would you expect, as Mesquite represented,
25 that the injection pressure would be constant if you had

1 increasing rates?

2 A. That doesn't make sense to me.

3 Q. And we don't know what happened when Pyote took
4 over?

5 A. No. We have no idea what the injection
6 pressure is.

7 Q. Okay. Now, Mr. Lodge just testified that the
8 horizontal development, the permitted injection zone,
9 has recoverable reserves within it?

10 A. Yes, it does.

11 Q. In addition to that evidence, have you found
12 evidence that the Willow Lake disposal well has actually
13 impacted the development to the Bone Spring sands around
14 this well?

15 A. Yes.

16 Q. If I turn to what's been marked as Mewbourne
17 Exhibit Number 13, does this assist in explaining the
18 analysis that you have done in preparation for this
19 hearing?

20 A. Yes. This map outlines the study area and the
21 wells included in the study area.

22 Q. And is that the red box?

23 A. Yes, it is.

24 Q. Okay. And then you show the disposal well in
25 the middle, correct?

1 A. Right, the blue diamond.

2 Q. What are the red diamonds? What does that
3 depict?

4 A. The red diamonds are the wells that were
5 included in the study. They're all completed in the 2nd
6 Bone Spring Sand, and they're also noted with the green
7 lateral color. There is -- let me make note of one well
8 in Section 12 that was not actually -- it's in the study
9 area, but the data was not included. This was a very
10 new well that Mewbourne had drilled, and there was
11 insufficient production at the time to include it in the
12 analysis. And at the time, it had not recovered its
13 frac load water yet, so we felt like the data was
14 insufficient to include it in the study.

15 Q. Okay. How many wells have you included in your
16 studies as shown by these --

17 A. 19.

18 Q. Okay. And does that include the two wells in
19 Sections 13 and 14, the laydown wells?

20 A. Yes. There were two wells drilled off the same
21 surface location.

22 Q. Okay. So that particular diamond would
23 represent two wells?

24 A. Yes.

25 Q. And then your study also included the

1 offsetting Stent well to the west?

2 A. Yes.

3 Q. And an additional well to the west of the OXY
4 Stent well over there in Section 20, right?

5 A. Yes. I think that's the High Brass well.

6 Q. Okay. All right. What is the A to A prime
7 black-dashed line? What have you done there?

8 A. It's a cross section that I've put together,
9 and it's a follow-up to a slide that will be shown later
10 where I compared the historical water-to-oil ratios of
11 the six wells included in that cross section.

12 Q. Okay. And this is based on actual information?

13 A. Yes. This is based on actual information.

14 Q. And what is the significance of the blue and
15 yellow circles?

16 A. Okay. We've pulled all the information from
17 the Commission records, and the red number above the
18 little pie circles is the cumulative oil cut of each
19 well in that area.

20 Q. Is that on a percentage basis?

21 A. Yes.

22 Q. And then is that -- what's the difference
23 between yellow and blue?

24 A. Well, the blue is the water cut, and the yellow
25 is the oil cut.

1 Q. Okay. And then did you average that oil cut at
2 the bottom of this exhibit for your 19 wells?

3 A. Yes, I did.

4 Q. And that average came out to 25 percent?

5 A. Oil cut was 25 percent, correct.

6 Q. And what's the oil cut in the OXY Stent well
7 just adjacent to the Willow Lake in Section 21?

8 A. The cumulative oil cut is only 8 percent.

9 Q. And if I move just one section to the west, for
10 that Brass well in Section 20, what's the average cut
11 oil cut for that?

12 A. 34 percent.

13 Q. Is it all completed in the same Bone Spring
14 Sand?

15 A. Yes, it is.

16 Q. All right. We're going to address that A to A
17 prime study in a minute, correct?

18 A. Correct.

19 Q. So let's first then -- before we do that, have
20 you done an examination -- using those 19 wells, have
21 you looked at their oil production in the 2nd Bone
22 Spring Sand?

23 A. Yes, I have.

24 Q. And have you done -- are you able to show how
25 that compares to the offsetting OXY Stent well?

1 A. Yes, I have.

2 Q. Let's turn to what's been marked as Exhibit
3 Number 15.

4 EXAMINER BROOKS: Did you say 15?

5 MR. FELDEWERT: 14.

6 Q. (BY MR. FELDEWERT) And is this particular graph
7 with a lot of lines on it -- first off, on the
8 right-hand side, you have a list of the API numbers?

9 A. Yes. That's the last five digits of the API
10 number for every well.

11 Q. And you studied it?

12 A. Yes, the 19 wells.

13 Q. And which of these lines represent the OXY
14 Stent well?

15 A. It's the red line at the bottom. It's noted
16 here with the arrow in the middle -- or the bottom of
17 the graph.

18 Q. And that would correspond with API Number
19 41221?

20 A. Correct.

21 Q. All right. And I see, then, a grouping of
22 lines above that, and through that, there is a dashed
23 black line. Do you see that?

24 A. Yes.

25 Q. What does that represent?

1 A. Normally, when a reservoir engineer moves into
2 an area, they try to come up with a type curve -- oil
3 type curve for that particular area, and normally
4 they'll group wells and then either -- each engineer has
5 different ways, but quite often, they'll just come up
6 with an average curve and then try to fit that with a
7 decline curve analysis to predict what the well will
8 ultimately make. This black curve is the average of all
9 the wells at the top of the graph.

10 Q. Okay. Now, as I look at that OXY Stent well,
11 it's substantially below the average line and really the
12 grouping of the other wells in your study area in the
13 2nd Bone Spring Sand?

14 A. Yes.

15 Q. I also see a break in that line. Do you see
16 that?

17 A. Yes.

18 Q. What was going on there?

19 A. My understanding from a conversation between
20 OXY and Pyote, that the well had some -- had a tubing
21 leak or some type of downhole problem, and the well did
22 not produce for a three- or four-month period.

23 Q. Okay. And once they were able to fix -- OXY
24 fix that problem and the well came back online, looking
25 at this graph, in your opinion, did it resume the

1 production curve that you would expect in examining the
2 prior data?

3 A. Yes. It looks like it came right back on
4 decline curve.

5 Q. So no impact from the problem?

6 A. No.

7 Q. It just went back to its normal curve?

8 A. Yes. That's my opinion.

9 Q. And we see some other wells that had -- right?

10 A. Yes.

11 Q. Light blue line, I see a dip. Would you expect
12 that those represent similar-type issues? For whatever
13 reason, the well had some issues?

14 A. Yes. A lot of them, it looks like the
15 production's down for one month, and then immediately
16 the next month, it's back up on the decline curve. Or
17 it could also be due to, you know, pipeline -- pipeline
18 issues as far as, you know, natural gas. There was the
19 plant explosion.

20 Q. When you look at this as an expert in reservoir
21 engineering, what do you see here with respect to the
22 Stent well as compared to all the other wells?

23 A. The Stent well is far underperforming all the
24 other 19 wells in the study area.

25 Q. Okay. If I turn to what's been marked as

1 Mewbourne Exhibit Number 15, does this help highlight
2 the abnormality associated with the Stent wells --

3 A. Yes, it does.

4 Q. -- that offsets the SWD?

5 A. Yes.

6 Q. What are you showing here on this Exhibit
7 Number 15?

8 A. Quite often when an engineer moves into an
9 area, they create some cum probability charts.
10 Depending on which company you're working for, they like
11 to run risk economics, like come up with a P90 forecast,
12 a P50, and plot -- cum probability plots like this are
13 very helpful. Basically what I'm plotting here is the
14 peak monthly oil production of the 19 wells in the study
15 area, and the Stent well doesn't even fall on the curve.
16 It's very abnormal.

17 Q. Okay. Now, this shows production -- oil
18 production?

19 A. The peak monthly.

20 Q. Okay. Did you also take a look at the amount
21 of water that the Stent well produces and how it
22 compares to other wells in the area?

23 A. Yes, I did.

24 Q. If I turn to what's been marked as Mewbourne
25 Exhibit Number 16, is that a similar P50 graph?

1 A. Yeah, or cum probability.

2 The only difference between this graph and
3 the other one is I'm plotting the cumulative
4 water-to-oil ratio of 19 wells in the study area. And,
5 you know, in previous testimony, the average for this
6 grouping of wells was 3.3 barrels of water per barrels
7 of oil, and the Stent well is abnormal and it's greater
8 than ten.

9 Q. So just in reference to 3.3, that's shown on
10 Exhibit Number 13 on your study area, right?

11 A. Yes. It's also shown on this graph, in the box
12 on the left-hand side of the graph.

13 Q. Okay. All right. With that much deviation,
14 what does that tell you as a reservoir engineer?

15 A. It tells me there is energy coming from
16 somewhere else that's impacting the water -- water cut
17 in this well.

18 Q. Okay. Now, when I -- one of the things you
19 mentioned when we were looking at Exhibit 13 is you had
20 that A to A prime, right?

21 A. Yes.

22 Q. In which you started to the left and moved to
23 the right?

24 A. Yes.

25 Q. And you included in that analysis the OXY Stent

1 well, right?

2 A. Yes.

3 Q. And you also included that well to the west of
4 the OXY Stent well in Section 20?

5 A. Correct.

6 Q. And you included in that analysis the wells
7 shown in the south half of 14 and south half of 13,
8 right?

9 A. Yes.

10 Q. And these are the wells that you examined,
11 what, the oil-to-water ratio over time?

12 A. Right.

13 Q. Now, if I turn to Mewbourne Exhibit Number 17,
14 does this correspond, then, to that A to A prime
15 analysis within your study area?

16 A. Yes. These are the -- this is the water-to-oil
17 ratio of the six wells that were included in the cross
18 section.

19 Q. Okay. And what do you observe here? What are
20 you showing?

21 A. Okay. First let me say the title at the top
22 goes -- the Bongo Fee well is the well furthest to the
23 west, and then the Janie Conner is furthest to the east,
24 so they're ordered in order from west to east. But the
25 main observation from this plot, if you put an

1 exponential fit through the OXY Stent water-to-oil
2 ratio, it's increasing versus time.

3 Q. And how does that compare to the other wells?

4 A. Most of the -- most of other wells, it's
5 relatively flat, or there's -- there is one additional
6 well in the study area, which is the Tiger well, which
7 is directly east of the Willow Lake disposal. In the
8 last two or three months, it's starting to show an
9 increase in water-to-oil ratio, and the oil cut has gone
10 from over 30 percent down to 15 percent.

11 Q. Okay. So let's stop right there. Let's get
12 oriented again. The blue line represents the OXY Stent
13 well?

14 A. Correct.

15 Q. Let's keep a finger here, and let's flip back
16 to Exhibit Number 13 that shows the wells you used in
17 your analysis. Okay?

18 A. Okay.

19 Q. We know where the OXY Stent well is in Section
20 21?

21 A. Right.

22 Q. Okay. There is that offsetting well to the
23 west, in Section 20, which you show as having an average
24 cut of 34 percent?

25 A. Yes.

1 Q. When you look at that well on your Exhibit
2 Number 17, is that represented by the green line?

3 A. Yes, it is.

4 Q. Okay. And that shows a steady water-to-oil
5 ratio, or what does it show?

6 A. It's showing a slight -- slight decline in
7 water-to-oil ratio versus time. It's ranging between
8 three and five, and it appears to be right in the
9 average for wells in the area.

10 Q. And the other well you use, and I think your
11 reference was the Tiger well --

12 A. Yes.

13 Q. -- is the well on Exhibit 13 that's in the
14 south half of the south half of Section 14?

15 A. Correct.

16 Q. And is that the well on Exhibit 17 that you
17 show that it appears to have an increasing water-to-oil
18 ratio?

19 A. Yes.

20 Q. The offsetting well to the northeast?

21 A. Correct.

22 Q. Okay. But that's a fairly new well?

23 A. Yes. I think it's been online for less than a
24 year.

25 Q. So our data on that is limited?

1 A. Yes.

2 Q. But based on your analysis of what we have,
3 you're seeing an increasing oil-to-water ratio?

4 A. Right. In my conversations with the Matador
5 engineer, she had recognized this fact, and she was --
6 they were going to look into the -- into the well.

7 Q. So if I'm understanding your analysis here, the
8 two wells completed in the 2nd Bone Spring Sand that are
9 nearest the disposal well are both showing increasing
10 water-to-oil ratios?

11 A. Yes.

12 Q. Whereas, the remaining wells in the study area
13 are constant or decreasing?

14 A. Correct.

15 Q. All right. Now, Mr. Lodge has testified that
16 this performance of the Stent well is not due to any
17 geologic reasons, correct?

18 A. Correct.

19 Q. Okay. I notice that the Stent well has a
20 stand-up orientation to it. Okay? And some other wells
21 in there perhaps have a lay-down. Is the orientation of
22 the well -- is that a potential reason for the
23 abnormality that we see?

24 A. For the production on the Stent well?

25 Q. Yes.

1 A. No.

2 Q. In fact, most of the horizontal wells in the
3 study area are stand-up; are they not?

4 A. Yes.

5 Q. What about the way the Stent well was
6 completed? Have you looked at that?

7 A. Yes, I have.

8 Q. And have you found anything dealing with the
9 completion of the Stent well that could account for the
10 abnormality that we see with the Stent well?

11 A. No, I haven't.

12 Q. If I turn to what's been marked as Mewbourne
13 Exhibit Number 18, is this your analysis of the
14 completion casing that shall be used by OXY in the Stent
15 well?

16 A. Yes, it is.

17 Q. Starting with the table at the top, would you
18 walk us through here and tell us what you show?

19 A. Okay. On the top part of the table, I'm
20 comparing the total proppant pumped on the stimulation
21 jobs, total fluid pumped and the completed lateral
22 length of the 18 wells versus the OXY Stent well. The
23 average proppant pumped in the non -- of the other 18
24 wells was 3.6 million pounds, and the total fluid
25 pumped, 65,000. The lateral length was 4,220 feet

1 versus the Stent well was about two-and-a-half million
2 pounds of proppant and 35,000 barrels. But the
3 completion -- total completed length is very similar.

4 Q. So it would be fair here, right, the Stent well
5 didn't have quite a robust -- as robust a frac job,
6 correct?

7 A. Correct.

8 Q. Did you stop your analysis there?

9 A. No, I didn't.

10 Q. What did you find?

11 A. I found three wells in the study area that had
12 stimulations that were actually smaller than the Stent
13 well and had very similar frac sizes. I actually even
14 looked at the completion fluids, and the completion
15 fluids were very similar.

16 Q. And these were all in the 2nd Bone Spring Sand,
17 in your study area?

18 A. Yes. They're all in the study area.

19 Q. How does the Stent well compare to those other
20 wells?

21 A. The graph at the bottom shows the well
22 performance, and it's a normalized production graph. Of
23 the three wells that were completed with actually
24 smaller frac jobs than the Stent are the three wells at
25 the top of this graph, and the Stent well is the red

1 curve at the bottom of the graph. Again, the Stent well
2 is far underperforming.

3 Q. Even with the larger frac job?

4 A. It's slightly larger, yes.

5 Q. All right. If I turn to Mewbourne Exhibit
6 Number 19, does this further highlight your analysis of
7 the completion techniques used in your study area?

8 A. Yes, it does.

9 Q. Okay. And tell us what you're showing here.

10 A. Okay. The top graph is -- on the y-axis is the
11 peak monthly oil production, and on the x-axis is the
12 size of the frac in millions of pounds of proppant.

13 Q. Okay. And the Stent well is shown in red?

14 A. In red, yes.

15 Q. What are the three triangles to the left of the
16 Stent well on both of these graphs?

17 A. Those are the three wells that were shown in
18 the previous rate-versus-time graph that actually had
19 smaller frac jobs but better well performance.

20 Q. Because they're higher on the graph?

21 A. Yes.

22 Q. And, in fact, if I'm reading this correctly,
23 one of the wells that had the smaller frac job looks
24 like it's the second best performing well out there?

25 A. Yes, it is.

1 Q. In your opinion, is the abnormality that we see
2 with the Stent well -- is that the cause -- is that --
3 was that caused by the completion techniques used for
4 the Stent well?

5 A. No.

6 Q. All right. So if this abnormality that we see
7 in the Stent well is not caused by geology and it's not
8 caused by the orientation and it's not caused by the
9 completion technique, what's left?

10 A. Impact from the offset injection into the Bone
11 Spring.

12 Q. Now, to further analyze that, did you perform a
13 study of the Bone Spring water, from the 2nd Bone
14 Spring, produced in the area and compared that to the
15 water that's produced from the Stent well?

16 A. Yes, I did.

17 Q. Okay. If I turn to what's been marked as
18 Exhibit Number 20, does this identify how you conducted
19 that analysis?

20 A. Yes, it does.

21 Q. Okay. It points out that you took samples from
22 six Mewbourne wells and two OXY-operated Bone Spring
23 producers?

24 A. Correct. One of the two being the OXY Stent
25 well.

1 Q. Okay. That's the 2nd Bone Spring producer?

2 A. Yeah. They're all 2nd. Yes.

3 Q. Apples to apples?

4 A. Yes.

5 Q. Okay. And then you point out that all the
6 samples were caught and analyzed by NALCO at their
7 laboratory?

8 A. Yes.

9 Q. Now, why is that important?

10 A. We wanted -- in the past, we've seen a lot of
11 variation taking -- we've actually run some blind taste
12 tests, where you've taken water and you take it to three
13 different labs, and there are variations in the quality
14 of the calibration of the equipment, maybe even the
15 sampling technique. So we thought it was important for
16 the purpose of science that all the samples were caught
17 by the same company and analyzed at the same lab.

18 Q. The other point is that no water -- and I think
19 you mentioned this earlier. No water samples were taken
20 from the recently completed wells?

21 A. Correct.

22 Q. Why is that important?

23 A. I actually looked at each -- each one of the
24 wells in the study area, taking the total amount of
25 fluid pumped in the wells, and I did confirm that the

1 total -- that the frac fluid had probably been -- at
2 least a volume greater than the amount of frac fluid
3 pumped in the well had been recovered.

4 If you -- there could be some
5 inconsistencies in the quality of the water if you're
6 sampling during this period prior to the recovery of the
7 frac, because a lot these wells are fracked with fresh
8 water or a different quality of water than that in the
9 formation. So you'll get some mixing coming back. So
10 to make sure that the samples were representative of
11 what we thought was formation water, we -- we left any
12 newly completed wells, like our Journey #12 well, which
13 was on production maybe a month or two -- it's -- it's
14 in the boundary of the study area, but we decided
15 purposely not to use that to ensure validity of the
16 data.

17 Q. Okay. Then if I go to what's been marked as
18 Mewbourne Exhibit 21, does this identify the area where
19 you were able to obtain samples?

20 A. Yes.

21 Q. And these were samples available to you from
22 the 2nd Bone Spring Formation?

23 A. Yes.

24 Q. Primarily because you were either the
25 operator --

1 A. Correct.

2 Q. -- or OXY was able to provide you with water
3 samples?

4 A. Correct.

5 Q. All right. And did you attempt to get water
6 samples from the Tiger well there in the south half of
7 the south half of 14?

8 A. I sent several emails to Matador, and they
9 never responded. And I also contacted COG who has the
10 well west, the High Brass well, in Section 20, and I did
11 not receive a response from them either.

12 Q. Okay. All right. But you were able to get --
13 looks like you were able to get water samples from the
14 2nd Bone Spring Sand, not only from the Stent well but
15 the wells to the north and the south?

16 A. And the southeast, yes.

17 Q. And the southeast?

18 A. Yes.

19 Q. Okay. All right. And the whole goal there is
20 to get native water from the 2nd Bone Spring Sand?

21 A. Correct.

22 Q. Then if I turn to what's been marked as
23 Mewbourne Exhibit Number 22, does this show the results
24 of your water study from the -- would it have been seven
25 wells?

1 A. Yes.

2 Q. So it does not include the Stent well?

3 A. This does not include the Stent.

4 Q. So you're looking at the native water. What
5 does a Stiff plot do?

6 A. Quite often during a standard API brine
7 analysis, there is -- at the bottom, there is a Stiff
8 plot. Basically you plot the concentration of all the
9 different ions. Like in this graph, Na, sodium, then
10 going calcium, magnesium, iron.

11 Q. So you're on the left-hand side?

12 A. On the left -- I'm on the, yeah, left y-axis.

13 Q. Fe is iron?

14 A. Iron.

15 Q. Okay. And then you have your --

16 A. Chlorides, bicarbonate and sulfates. The
17 carbonates were not measured on any of these samples.

18 Q. Okay. And you have here -- and does this -- I
19 mean, does this give you an analysis of that water?
20 What does it do for you?

21 A. I think this analysis gives me like -- I look
22 at it like DNA or a fingerprint of what the Bone Spring
23 water should look like in areas where we do not think
24 it's disturbed by the offsetting injection.

25 Q. Okay. And you were able to come up with a

1 seven-well average?

2 A. Yes, sir.

3 Q. And that would be your DNA for your --

4 A. Right.

5 Q. -- 2nd Bone Spring Sand?

6 A. Yes. Uh-huh.

7 Q. 2nd Bone Spring Sand?

8 A. 2nd Bone Spring Sand, yes.

9 Q. Okay. All right. Now, before we get away from
10 this, I see that there are some variations in your DNA
11 in the seven wells when we look at iron. Do you see
12 that?

13 A. Correct.

14 Q. Why is that?

15 A. Iron is optimally -- it's reflective of the
16 amount of downhole corrosion in the well based on
17 your -- you know, your tubulars and whether your well is
18 being treated, you know, with corrosion inhibitors. So
19 you can see quite a big variation in that in your
20 samples.

21 Q. Okay. But with respect to the other three
22 components --

23 A. They line up a lot better.

24 Q. Okay. So that seven -- the red-dashed line,
25 then, in your opinion, gives you the DNA of the native

1 2nd Bone Spring Sand water?

2 A. Yes.

3 Q. Okay. Then did you compare that with the water
4 from the Stent well?

5 A. Yes, I did.

6 Q. If I turn to what's been marked as Exhibit 23,
7 does this show your comparisons?

8 A. Yes, it does.

9 Q. Okay. I see that red line again. That's your
10 DNA line, right?

11 A. Correct.

12 Q. And then I see three data lines for the Stent
13 well. Why?

14 A. We had three different stamps taken on the
15 Stent well, and we wanted to see if there was any
16 variation in the water quality versus time. And this
17 shows that there's quite a bit of variation in the water
18 quality versus time, which would be expected because
19 there is no consistency in the water -- quality of the
20 water being disposed into the offsetting disposal well.
21 One time they could be hauling frac flowback water into
22 the well. Next time they could be hauling Wolfcamp
23 water or 2nd Bone Spring. There are some Delaware
24 producers. So there is never a consistency of the water
25 being disposed into the well, and I would expect that

1 you would see this from the produced water in the
2 offsetting well.

3 Q. If the two were --

4 A. If it were in communication.

5 Q. So if the Stent well is being influenced by the
6 water from the disposal well, you would expect to see
7 variations in the quality of the water from the Stent
8 well over time?

9 A. Yes.

10 Q. And if it was not being influenced by the
11 disposal well, would you see a variation in the water
12 from the Stent well over time?

13 A. I would think that it would overlay very
14 closely to the DNA or fingerprint from the other seven
15 wells.

16 Q. Because that DNA doesn't change.

17 A. It should be consistent or rather consistent.

18 Q. All right. And you see -- if I'm understanding
19 you here, you see variations in the water from the Stent
20 well over time?

21 A. Yes.

22 Q. And there is a sample from 2014?

23 A. Yes.

24 Q. And you've got a sample in July of 2016?

25 A. Yes.

1 Q. And then you've got a sample in September 2016?

2 A. Correct.

3 Q. And did you even see a variation in the
4 sample -- the last two samples that were only a couple
5 months apart?

6 A. Correct.

7 And I might -- I'll add that all these --
8 again, all these samples were caught by the same
9 company. They're all caught and analyzed by NALCO.

10 Q. Okay. So the first thing this shows is that
11 you have these variations from the water in the Stent
12 well, which is unusual unless it's being influenced by
13 the disposal well, correct?

14 A. Correct.

15 Q. The second thing that you see in this, how do
16 any of -- how do any of those samples compare to the DNA
17 of the native 2nd Bone Spring water?

18 A. They deviate from the DNA.

19 Q. When you say deviate, how much do they deviate?
20 It's hard for me to tell by looking at this graph.

21 A. Looking at the -- I did one extensive analysis
22 done on the chlorides, because when everyone talks about
23 water quality, they say, Well -- first thing they ask
24 is, Well, what are the chlorides in the water? And that
25 would be shown in the graph right after this. But there

1 is some significant -- like in the magnesium in some of
2 the samples, like the Stent example, 7/12/16, there is a
3 large deviation in the magnesium component. And there
4 is a lot more variation in this than the seven samples
5 that were caught on the so-called virgin water.

6 Q. So you said that you took a look at the
7 chlorides, which is in the upper, right-hand corner of
8 Exhibit 23?

9 A. Correct.

10 Q. Just by my naked eye, it doesn't show a lot of
11 deviation?

12 A. Correct.

13 Q. But in reality, there is a deviation?

14 A. Yes, there is.

15 Q. If I turn to Exhibit 24, does that help explain
16 the Stent of the deviation from the DNA of the 2nd Bone
17 Spring Sand water?

18 A. Yes, it does.

19 Q. Okay. Explain to us how this is shown in
20 Exhibit 24?

21 A. Okay. What I've done is I'm comparing the
22 water analysis on the seven samples that were used to
23 create the fingerprint for the expected Bone Spring
24 water. They're shown in the little blue diamonds on
25 this. The y-axis is the chlorides taken from the

1 sample. And then there is an orange triangle in the
2 middle. That is the average of the six samples. And
3 from that, we did some statistical analysis.

4 And then these little red bars at the top
5 is two standard deviations, which is considered the 95
6 percent confidence factor from the mean. And two of the
7 Stent samples fall without that 95 percent confidence
8 factor. And the third sample's almost right out of --
9 you know, it's right at the edge of the two standard
10 deviations. So this is showing the water -- the
11 chlorides in the water from the Stent, three samples, is
12 way outside of the two-sigma or two standard deviation.

13 Q. And is that a significant difference?

14 A. Yes.

15 Q. What conclusions did you draw in your analysis
16 of composition of the water that's produced from the OXY
17 Stent well today?

18 A. That the water being produced from the Stent
19 well is not representative of what would be expected
20 from the Bone Spring and it's being impacted from an
21 outside source.

22 Q. You don't know -- we don't know where the perms
23 are in the disposal well, correct?

24 A. Correct.

25 Q. All we know is the disposal zone?

1 A. In the C-108, there was -- there was a mention
2 of the proposed perforations, but when they submitted
3 the final completion report, all they showed was the
4 overall approved injection interval as the perforated
5 interval.

6 Q. Did you ask Pyote to provide you with a diagram
7 or a document that would --

8 A. Yes, I did.

9 Q. -- that would identify the perforations in
10 their disposal well?

11 A. Yes, I did.

12 Q. And what happened?

13 A. I was sent a copy of the completion report,
14 which gave me information that I already knew or -- I
15 called them in late January, since we were -- we were
16 possibly looking at using this well as a disposal well
17 for some of our upcoming wells, but when I started
18 looking more at the perforations, I said, I don't want
19 to -- I don't want to put water in a zone that I'm going
20 to be trying to drill for in a section a mile away. So
21 I tried to confirm the perforations in that well and
22 contacted Audra Burton out of their Carlsbad office.
23 She said, Sure, we have that information; I need to talk
24 to my field representative, and he'll get back with you.
25 He never called me back. And then two or three days

1 later I received an email from, I think, Billy Doucette,
2 who is their operations manager, and he just sent me a
3 copy of the completion report on that well.

4 Q. Which just showed the completed interval
5 anywhere within 1,600 feet?

6 A. Yes.

7 Q. So we didn't have evidence of the actual perms?

8 A. No.

9 Q. All right. Let's assume for the sake of
10 argument that there is not a perm right there in the 2nd
11 Bone Spring Sand. And let's assume that there are
12 perforations above the 2nd Bone Spring Sand or
13 perforations below the 2nd Bone Spring Sand. You're a
14 reservoir engineer. You know a little bit about that
15 Bone Spring Formation, right?

16 A. (Indicating.)

17 Q. Is it possible that even if you're injecting
18 above the 2nd Bone Spring Sand or the below the 2nd Bone
19 Spring Sand that that water's going to migrate into 2nd
20 Bone Spring Sand?

21 A. Yes.

22 Q. Okay. And in addition to all the evidence that
23 you have put together for today, did you uncover
24 additional evidence of a connection between the Stent
25 well and the disposal well?

1 A. Yes, I did.

2 Q. If I turn to what's been marked as Mewbourne
3 Exhibit 25 -- would you turn to that exhibit and explain
4 to us what you did here and what you found?

5 A. Yes. This is -- I've taken the average monthly
6 disposal rate on the Willow Lake disposal as shown as
7 the solid blue curve, and it's shown -- it goes on the
8 left y-axis in barrels of water per day. And then I
9 plotted the water-to-oil ratio on the Stent well during
10 that same time period, and it's shown on the right
11 y-axis.

12 Q. And what do you see when you compare the two
13 lines?

14 A. There is a pattern here that as the injection
15 rate on the disposal well is reduced, we see a drop in
16 the water-to-oil ratio in the Stent well.

17 Q. And if the -- if that's the case and if the
18 disposal well was shut in, would you expect to see a
19 decline in the water-to-oil ratio in the Stent well in
20 this analysis?

21 A. I would think it would go down to one
22 particular point and maybe -- I would expect -- yes, I
23 would expect some decline. I couldn't tell you how far
24 down it would go.

25 Q. Okay. But in your opinion, looking at this

1 information, are these two wells connected?

2 A. Yes.

3 Q. Or the production from these two wells is
4 connected?

5 A. Yes.

6 Q. Now, the Stent well is operated by OXY,
7 correct?

8 A. Correct.

9 Q. And I think they made note in their examination
10 of Mr. Lodge that OXY, at least under some contract for
11 some period of time, was apparently disposing into this
12 disposal well, correct?

13 A. Correct.

14 Q. And OXY's here today in support of the
15 application that's filed by you to shut this well in,
16 correct?

17 A. Correct.

18 Q. In your opinion as an expert in reservoir
19 engineering, has the OXY Stent well been adversely
20 impacted by water injected from the Willow Lake disposal
21 well?

22 A. Yes.

23 Q. And in your opinion as an expert in reservoir
24 engineering, is the Matador Tiger well in the south half
25 of Section 14 just to the northeast of that disposal

1 well showing signs it's being impacted by this
2 disposal well?

3 A. There are initial indications of the incline --
4 of the increasing water-to-oil ratio on that well. And
5 also talking with Matador, she seemed to be a little
6 concerned about it, that there appeared --

7 MR. HALL: I'm going to object at this
8 point to any hearsay.

9 THE WITNESS: Okay.

10 EXAMINER BROOKS: Do you want to respond to
11 that objection, Mr. Feldewert?

12 MR. FELDEWERT: Well, I don't think we need
13 to go there.

14 THE WITNESS: Okay.

15 Q. (BY MR. FELDEWERT) In your opinion as an expert
16 reservoir engineer, does it appear to you, based on the
17 data that we have, that that well is being impacted by
18 this disposal well?

19 A. We're seeing the initial stages of impact from
20 the offset injection.

21 Q. And in your opinion, will the productive Bone
22 Spring sands in Section 22 where this disposal well is
23 located -- are they going to be similarly impacted if
24 water injection continues through this well?

25 A. Yes.

1 Q. And in your opinion as an expert reservoir
2 engineer, will continued water injection from the Willow
3 Lake SWD result in the waste of recoverable oil?

4 A. Yes.

5 Q. Okay. You've read that 1999 order?

6 A. Yes, I have.

7 Q. You read the paragraph at the end where it says
8 the Division retains the authority to shut this well in
9 if it's impacting correlative rights or causing waste?

10 A. Yes.

11 Q. In your opinion, is the termination of this
12 injection authority granted under this 1999 order -- is
13 the termination of that authority necessary to prevent
14 waste and protect correlative rights?

15 A. Yes.

16 Q. Were Mewbourne Exhibits 12 through 25 prepared
17 by you or compiled under your direction and supervision?

18 A. Yes.

19 MR. FELDEWERT: Mr. Examiner, I'd move the
20 admission into evidence of Mewbourne Exhibits 12 through
21 25.

22 MR. HALL: No objection.

23 EXAMINER McMILLAN: Exhibits 12 through 25
24 may now be accepted as part of the record.

25 (Mewbourne Oil Company Exhibit Numbers 12

1 through 25 are offered and admitted into
2 evidence.)

3 MR. FELDEWERT: And that concludes my
4 examination of this witness.

5 EXAMINER McMILLAN: Cross-examination?

6 CROSS-EXAMINATION

7 BY MR. HALL:

8 Q. Mr. Harrington, let me ask you: You just
9 testified about reduced recoverability, but you've
10 offered no exhibits, no other substantiation that
11 ultimate recoveries will be reduced; isn't that correct?

12 A. No.

13 Q. You haven't performed any sort of economic
14 analysis to show accelerated abandonment of any well,
15 have you?

16 A. No, I haven't.

17 Q. You've opined here just now that the OXY Stent
18 21 well is being adversely affected by injection
19 operations to the exclusion of all other causes; is that
20 correct?

21 A. Yes.

22 Q. Tell me -- two-part question: What are the
23 other possible causes, and how did you exclude them?

24 A. We -- we feel that the information is from --
25 both the water analysis study, the comparison between

1 the water-oil ratio versus the injection well, and the
2 poor performance from the oil production from the Stent
3 well are sufficient -- are sufficient proof that we
4 believe it's being impacted by the offsetting well.

5 Q. All right. What other possible causes did you
6 consider?

7 A. We didn't look at anything else.

8 Q. Is that sound scientific method?

9 A. There was no other reason to believe anything
10 else was happening.

11 Q. You've indicated that average water-oil ratios
12 now are roughly 75 percent?

13 A. No; the water cuts.

14 Q. I'm sorry. Water cuts, 75 percent?

15 A. Correct; the cumulative water.

16 Q. And that has remained constant over time in
17 your area of study?

18 A. That's a cumulative number.

19 Q. But it has remained steady, correct?

20 A. There's been small variations over time.

21 Q. You indicated that you don't have information
22 about the actual location of the perforations in the
23 Willow Lake well.

24 Let me ask you: If injection -- let me ask
25 you this: Do you have any evidence that injection is

1 occurring outside of those proposed perforations?

2 A. Well, which -- I don't understand your
3 question.

4 Q. Is there any evidence that indicates to you
5 that injection is occurring through any intervals other
6 than the proposed perforated intervals in the C-108?

7 A. Yes. I believe there is -- as I was discussing
8 earlier, the first graph that we presented, it
9 appears -- there is no explanation why the injection
10 pressure on the well would decline by 500 pounds when
11 nothing had been done on the well. So there is the
12 possibility that new perforations were added or a
13 fracture stimulation was done on the well that was never
14 reported to this day.

15 Q. But you don't have any evidence that any of
16 that was done?

17 A. No.

18 Q. If actual injection operations were limited to
19 the perforations reported on the C-108, would that
20 satisfy Mewbourne?

21 A. No.

22 Q. If one or more sets of perforations were closed
23 off, not all of them but one or more sets, would that
24 satisfy Mewbourne?

25 A. No.

1 Q. What would satisfy Mewbourne other than
2 complete suspension of injection?

3 A. Nothing.

4 Q. Does it surprise you to learn that Mewbourne is
5 utilizing the Willow Lake for disposal?

6 A. We are not using the Willow Lake for disposal.

7 Q. How did you confirm that?

8 A. Because I cut all the haulers we had been using
9 in this well at the beginning of the year, and I put out
10 a cease and desist order -- or I sent an order to all
11 the people out in the field. Now, there might have been
12 one or two truckloads accidentally hauled to this well,
13 but we gave specific orders to our water haulers not to
14 haul to this well.

15 Q. These are third-party contractor haulers?

16 A. Yes, they are.

17 Q. You really don't control them?

18 A. We try to.

19 Q. Have you seen any recent run tickets?

20 A. No, I haven't.

21 Q. Does it surprise you to learn that OXY is
22 disposing an area of Bone Spring water through a
23 pipeline into the Willow Lake well?

24 A. I learned about this about 30 days ago.

25 Q. Would it surprise you to learn that Matador is

1 a disposal customer into the Willow Lake well?

2 A. It wouldn't.

3 Q. And by the same token, would it surprise you to
4 learn that COG is a disposal customer into the Willow
5 Lake well?

6 A. I didn't know that.

7 Q. If injection operations are ordered to be
8 suspended, where will all of those operators go with
9 their produced water?

10 A. I'm not sure, since there are only two active
11 disposal wells in all of 24 -- 24 -- 24 South, 28 East.

12 Q. And do you know if those are open facilities?

13 A. No, I don't.

14 Q. In the course of your investigation, have you
15 attempted to evaluate the effect on project economics of
16 the incremental costs of having to haul water to
17 alternative disposal operations for any of these wells?

18 A. No, I haven't.

19 Q. Would you agree with me that -- let me tell
20 you. What is -- let me ask you this: Do you know what
21 Mewbourne is currently paying for disposal?

22 A. It depends. Are you talking about hauling, or
23 are you talking about -- Mewbourne's trying to get away
24 as much as possible from hauling water. And we own a
25 majority of our own disposal wells, and they're

1 noncommercial, private. So I'd say 85 percent of our
2 water in New Mexico is being piped to our facility.

3 Q. All right. And you just indicated Mewbourne's
4 disposal faculties are closed; is that right?

5 A. Yes.

6 Q. OXY, Matador, COG, they would not be able to
7 utilize Mewbourne's injection?

8 A. No.

9 Q. And, again, do you know how much Mewbourne is
10 paying for injection in the area?

11 A. Again, are you talking to a commercial well or
12 what we're charging ourselves? It would be less than
13 \$1.00 a barrel.

14 Q. \$1.00 a barrel?

15 A. Or less.

16 Q. Did you look at Mewbourne's run tickets for
17 disposal into the Willow Lake to see if you could
18 ascertain what you're making?

19 A. Probably paying, I'd say, 85 cents a barrel.

20 Q. All right. So we're adding 85 cents to \$1.00
21 in incremental costs on wells that are producing \$35
22 oil, right? Does that sound about right?

23 A. Oil's posted [sic] as over \$40 a barrel right
24 now.

25 Q. Do you think that incremental cost -- that

1 incremental operating cost will adversely affect project
2 economics for any one of those wells out there?

3 A. There's a possibility. It could impact
4 reserves, ultimate.

5 Q. Would it result in premature abandonment?

6 A. Well, you're assuming that the price of oil is
7 going to stay constant versus time, which is it is not.

8 Q. So the answer to my question is yes, making
9 that assumption?

10 A. If we're looking at an increase in price of
11 oil, I think we'll have no -- very minimal impact on the
12 ultimate economic reserves from these wells.

13 Q. We don't know when oil's going to improve?

14 A. Right. We also don't know -- we've been
15 driving down our disposal costs through contract
16 renegotiations. So --

17 Q. Let me ask you: Other than injections into the
18 Devonian, what disposal intervals would be acceptable to
19 Mewbourne in this area?

20 A. Probably none.

21 Q. The Atoka? Would that be acceptable?

22 A. That would have to be determined by the
23 Commission. The Atoka is probably a productive interval
24 in -- in the area.

25 Q. And the Devonian is not acceptable?

1 A. The Devonian is acceptable, yes.

2 Q. Do you know -- do you have any idea how much it
3 would cost, roughly, to drill and equip that injector
4 into the Devonian?

5 A. We have -- we have been sidetracking some
6 existing wellbores probably in the 3- to \$4 million
7 range.

8 Q. So you've indicated you have talked to some of
9 the other area operators. I'm not asking you what
10 they've said, but --

11 A. Well, I can't tell you.

12 Q. That's right.

13 But you do acknowledge that you have talked
14 to them, correct?

15 A. (Indicating.)

16 Q. You need to answer verbally.

17 A. Yes.

18 Q. Who are the other persons affected by
19 Mewbourne's application here?

20 A. Kaiser-Francis would -- I believe
21 Kaiser-Francis would be affected because they have the
22 leasehold -- I believe they have the leasehold
23 surrounding the Willow Lake well to the north and to the
24 south.

25 Of course, OXY, we believe their eventual

1 development of their section has been severely impacted.
2 They have what I would believe to be normally
3 developmental locations like the east half of that
4 section based on the results of their Stent well.
5 Basically, that's been -- I would say it would very
6 risky to drill that well.

7 And I think Matador's eventually going --
8 we're seeing initial indications from their Tiger well
9 that they might be seeing some water coming across from
10 the Willow Lake disposal, and I would -- I'd be worried,
11 also.

12 Q. All right. Generally, how far away from the
13 Willow Lake injector is being affected?

14 A. We know that it's gone at least a half mile or
15 three quarters of a mile out to the west. I don't know
16 how much further it could impact to the west of that
17 well. It could be going an equivalent amount to the
18 northeast.

19 Q. All right.

20 A. We don't know what -- we don't know what layer
21 the water's going into.

22 Q. All right. Would it be sufficient to notify
23 each of the operators in the offsetting units
24 surrounding the Willow Lake?

25 MR. FELDEWERT: Objection. Calls for a

1 legal conclusion. I don't know what he means by
2 "sufficient to notify."

3 Q. (BY MR. HALL) Should more people be notified
4 than just the immediate offset --

5 MR. FELDEWERT: Objection. Calls for a
6 legal conclusion.

7 Q. (BY MR. HALL) You can answer.

8 EXAMINER BROOKS: Well, not really, because
9 the Division has the discretion to require additional
10 notice over and above the people who are specifically
11 required to be noticed. So if the answer would have
12 something to that issue, that's admissible, I think.

13 EXAMINER JONES: Could you clarify what you
14 mean by sufficient? As far as like extending a permit?
15 Is that the question?

16 MR. HALL: Well, I think they're obliged to
17 notify affected persons, and that's what we're trying to
18 establish, who is an affected person for purposes of
19 notification.

20 MR. FELDEWERT: Let's step back a minute.
21 Okay? OXY, who owns the offsetting acreage to the west,
22 is in support of this application. Kaiser-Francis, who
23 has offsetting acreage to the north, is in support of
24 this application. This case has been advertised on
25 three different dockets. There has been public notice

1 of this application. And no one is here objecting to
2 this application, and two offsetting parties are here
3 supporting this application.

4 MR. HALL: Well, we're objecting to it.

5 EXAMINER BROOKS: Yeah. I think all that
6 goes to the weight of the evidence, not to
7 admissibility.

8 MR. HALL: All right. Well, let me respond
9 to the objection. There's been no land witness
10 presented here. We don't know anything about the
11 ownership or operations of the offsetting acreage. We
12 don't know whether those affected persons, if they are
13 indeed affected, have been notified.

14 EXAMINER BROOKS: Well, some of these --
15 some of these exhibits show where certain wells are
16 located and --

17 (The court reporter requested Examiner
18 Brooks speak louder.)

19 EXAMINER BROOKS: I'm not sure exactly what
20 I said, but I think that you may question the witness on
21 this issue. I don't think that it's -- well, that's all
22 I need to say. I think it's appropriate for you to
23 continue to question the witness on this issue, if you
24 choose.

25 Q. (BY MR. HALL) Has Mewbourne communicated to the

1 BLM that Mewbourne is seeking to terminate the injection
2 authority on an injector located on federal minerals?

3 A. It's my understanding that the disposal -- the
4 disposal permit is with a private company. I think it's
5 the Roswell Water Conservation District. They are
6 the -- royalties are being paid to them.

7 Q. All right. And so the answer to my question
8 is --

9 A. No. We have not contacted the Feds.

10 Q. Did you know -- do you know that the disposal
11 interval is a preapproved SWD pool?

12 A. I'm not sure what that means.

13 Q. Approved by the OCD.

14 A. I know there was -- the well was -- a permit
15 was approved on the well in 1999.

16 Q. Would you consider introduction of tracers into
17 injection water to be significant evidence of the
18 presence or absence of interference from injection
19 operations in the other producers?

20 A. Yes. It's done all the time on water flows.

21 Q. Was it done in this case, to your knowledge?

22 A. No.

23 Q. Is it your opinion that -- well, let me ask
24 you: Utilizing a spinner survey, tell the Examiners
25 where the water was actually going.

1 A. It would probably give you a good indication
2 where the well is actually perforated, plus also
3 where -- where the water's going.

4 Q. And do we know if a spinner was conducted here?

5 A. It's not -- we don't know the wellbore.

6 Q. So we don't know?

7 A. There is no record --

8 MR. FELDEWERT: Who is "we"?

9 Q. (BY MR. HALL) Okay. You.

10 A. There is no record of the spinner survey being
11 conducted on the Commission Web site.

12 MR. HALL: No further questions for this
13 witness.

14 CROSS-EXAMINATION

15 BY MR. BRUCE:

16 Q. Mr. Harrington, you received some questions
17 from Mr. Hall about the effect on other operators if the
18 well was shut in; did you not?

19 A. Correct.

20 Q. Now, isn't that a static analysis? I mean,
21 don't other operators and other independent saltwater
22 disposal operators have the ability to go out and
23 develop additional saltwater disposal capacity?

24 A. Well, yes. I know there are at least another
25 eight or ten saltwater disposal permits by other

1 companies in this immediate area. They've either been
2 approved or they're in the permit process.

3 Q. And if this well was shut in, perhaps some
4 wells might need to be reduced in production. But from
5 what you've shown me, if, for instance, a well was
6 temporarily shut in or as production was reduced, once
7 it gets -- gets back online, it appears the decline
8 curve is the same?

9 A. Yes. I would expect that.

10 Q. So there would ultimately be no adverse effect
11 or, for that matter, premature cessation of production?

12 A. No.

13 Q. One other thing, if you look at your Exhibit
14 14, it has the API number, but I haven't memorized every
15 API number in the state. And which bar represents
16 Matador's Tiger well?

17 A. I think it's the -- it's 43012.

18 Q. So the solid red line with the solid red
19 square?

20 A. Right.

21 Q. And that looks to me like one of the two, maybe
22 three best wells of the 19 that you have on this plat?

23 A. Correct.

24 Q. And so if the Willow Lake well is affecting
25 that, that's pretty serious to have one of the best

1 wells water out, right?

2 A. Correct. Commission records already indicate
3 that the water cut -- I mean the oil cut on that well
4 has declined by 30 percent -- greater than 30 percent,
5 to 15 percent in the last three months.

6 Q. Causing waste?

7 A. Correct.

8 Q. Thank you.

9 RECROSS EXAMINATION

10 BY MR. HALL:

11 Q. You say you've reviewed a number of recent
12 C-108 applications for disposal wells in this area?

13 A. I check them every day.

14 Q. All right. And you found some?

15 A. Yes.

16 Q. And what formations will injection operations
17 take place with this new permit?

18 A. Devonian.

19 Q. Any other formation?

20 A. That's the only one I recall.

21 Q. Only one?

22 A. I know there are five or six Devonian
23 applications or approved permits in the area.

24 Q. And in what proximity to this area are you
25 talking about?

1 A. I would say with less than -- less than three,
2 four miles.

3 Q. Okay. None of those have been drilled and
4 equipped yet; is that correct?

5 A. No.

6 Q. Nothing further.

7 CROSS-EXAMINATION

8 BY EXAMINER BROOKS:

9 Q. Looking at Exhibit 13 -- yeah, 13; 13 is right.
10 Look at Exhibit 13. There is a 2nd Bone Spring well up
11 in Section 12. It's about three miles from the Willow
12 Lake. And then it has a 15 percent oil cut. And up in
13 Section 13 of 27 East, northwest of the Willow Lake,
14 maybe four or five miles -- four miles, those are lower
15 than some of the wells to the south, but they're
16 considerably higher than the -- do those facts have any
17 significance either way for -- do those wells have any
18 significance either way for purposes of your opinion
19 either to confirm or to raise any questions?

20 A. Well, if you check the small, fine -- fine
21 print below the well with the 15 percent --

22 Q. Yeah.

23 A. -- that's one month of production. So that's a
24 brand-new well. And I made mention of that in the
25 testimony, that although that well was within the box of

1 the study area, we did not utilize the limited
2 production history in our analysis.

3 Q. Okay. Thank you. I sometimes don't know what
4 well we're talking about.

5 Over here on 12 -- on the well to the
6 northwest in Section 12, adjacent township, do you have
7 anything you'd like to say about that?

8 A. You mean the well in Section 13?

9 Q. No. It's adjacent, isn't it, to the township
10 to the northwest in Section 12 of -- I guess it's 24
11 South, 27 East?

12 A. You mean the well with the 16 on top of it?

13 Q. Yes.

14 A. Yes. That well is included in the cross
15 section on Exhibit Number 17.

16 Q. Okay.

17 A. We do recognize that there is a slightly lower
18 oil cut in the Bone Spring as one moves to the west, but
19 if you look at Exhibit Number 17, if you look to the
20 water-to-oil ratio versus time, it's in -- it's in the
21 range of three to five, which is significantly lower
22 than the Stent well.

23 Q. Significantly lower water cut? No.

24 A. The water-to-oil ratio.

25 Q. Water-to-oil ratio.

1 A. Where the -- the Stent, like, in April and May
2 of this year is in the 14 to 15 range, that well is
3 maybe at six.

4 Q. And you're talking about water-to-oil ratio?

5 A. Yes.

6 Q. Okay. Thank you.

7 A. Did that answer your question?

8 Q. I think that's the only point I was concerned
9 about.

10 CROSS-EXAMINATION

11 BY EXAMINER JONES:

12 Q. The frac direction in the Bone Spring, did we
13 already talk about that? What's the -- what
14 direction -- you're talking about a well that's directly
15 or to the west or a little bit -- depending on where
16 it's coming into that well, could be either the top of
17 the southwest. So does that have anything to do with
18 your conclusion?

19 A. We have obtained a copy of a recent study being
20 done by a Stanford grad student who contacted our
21 company to see if we had any data showing the maximum
22 horizontal stress data, and we've obtained a copy of
23 that. And we physically measured the directions, and in
24 this area, we believe that the preferential frac
25 direction -- there is that a little bit of variance

1 between north 45 degrees east and north 70 degrees east.
2 So depending on -- I mean, that's a little bit of a
3 range, but if you put that through the Willow Lake well,
4 it would --

5 Q. It would go to it?

6 A. -- it would go to it. Plus, you'd have to
7 consider that the actual wellbore -- the size of the
8 wellbore in the Stent well is actually bigger because
9 you have to take into account the half frac lengths of
10 the fracs. So depending on the distance that -- the
11 actual achieved distance, you know, you could be several
12 hundred feet to 1,000 feet away from that wellbore.

13 Q. Okay. Why isn't OXY carrying the ball here?
14 It's their well. We've got OXY appearing, but we've got
15 Mewbourne employees. So is that -- go ahead.

16 MR. FELDEWERT: I can answer that.

17 EXAMINER JONES: Okay.

18 MR. FELDEWERT: I mean, Mewbourne has done
19 extensive work in this area. Okay? They had the baby,
20 so they are the ones here presenting today. But as
21 evident by my appearance, OXY fully supports their
22 application even though, Mr. Jones, they put water down
23 that well. So that tells you something.

24 EXAMINER JONES: Okay.

25 Q. (BY EXAMINER JONES) Do you have any idea of the

1 completion on the Willow Lake well? Was it just perfed
2 and acidized or --

3 A. We didn't even know where it was perfed.

4 Q. Okay. What would you do if you were --

5 A. There is no indication -- I saw no indication
6 in the records that a sand frac was done on the well.

7 Q. Okay. Except there was a lowering in
8 pressure -- reported pressure, at least at one point.
9 So there might have been something else done to the
10 well?

11 A. I mean, if I were trying to interpret that
12 data, I would -- I'd be looking for something happening
13 to the well downhole that would cause that considerable
14 reduction in pressure.

15 Q. Like a clean-out or something. Okay.

16 How much water are we talking about here
17 that the Stent well makes and is going into Willow well?

18 A. I think it's 100, 150 barrels a day, something
19 like that, of water.

20 Q. The Stent is only making 150 barrels a day of
21 water?

22 A. 100 barrels of water a day.

23 Q. Okay. And the Willow is putting in how much?

24 A. 1,800 barrels, something like that or -- let me
25 see what my -- it's a very tortuous path (reading).

1 The 2016 average is 1,729 barrels.

2 Q. Okay. So just a little bit of water coming in
3 would impact the water cut -- or oil cut quite a bit
4 either way?

5 A. We don't know what impact the water injection
6 is having due to the relative permeability in the
7 reservoir. It should be increasing the saturation of
8 water, therefore decreasing the permeability to oil
9 versus time.

10 Q. Okay. Are the sands -- this Harkey Sand and
11 these other sands, they're wet naturally, aren't they?

12 A. You mean high --

13 Q. I mean, obviously people don't complete them
14 vertically -- in vertical wells, so -- what water
15 saturation would they be naturally?

16 A. I have not calculated water saturations for the
17 individual layers. We rely considerably upon looking at
18 wells that are -- actual history from wells. We know --
19 we'll look at a well that we know what layer it's
20 drilled into, and we'll compare the rock
21 characteristics, the resistivities and the porosities in
22 those to areas where we're prospecting in. And probably
23 some of these sands, if you calculated the water
24 saturation, we would never complete them, but they do
25 make considerable hydrocarbons.

1 Q. Okay. One other case we had here -- I think it
2 was BOPCO and somebody else -- they knew where water was
3 coming into their horizontal well. And I forget exactly
4 how they determined that. I didn't know you could run
5 production logs on horizontal wells or not. Can you do
6 that?

7 A. You can do it, but it's very costly.

8 Q. So you have to have a tractor -- pull --

9 A. You could probably do it. The problem is if
10 you've got a well on artificial lift, you cannot -- to
11 get any -- the well actually has to be producing to
12 get --

13 Q. Naturally?

14 A. Yeah. So I don't know how you're going to do
15 both of them at the same time.

16 Q. Okay.

17 A. Because this well -- I'm fairly confident that
18 the Stent well is on pumping unit because I've looked at
19 the satellite photos of the -- of the tank battery. So
20 if you removed artificial lift, the fluid would probably
21 build up in the wellbore to a static condition, and then
22 there would be minimal flow.

23 Q. What would be the static condition? What would
24 be the pressure of the fluid level if you shut this well
25 in versus the -- I guess you have no idea of the

1 pressure on the Willow Lake well anyway.

2 A. No. I don't know what their injection pressure
3 is. They could be injecting over the permitted pressure
4 for all we know.

5 Q. So you wouldn't know the static level of this
6 well? You don't have any idea what it is?

7 A. What the bottom pressure in the well would be?

8 Q. Yeah.

9 A. No, I don't. We did not operate this well,
10 so --

11 Q. Okay. But you've got -- did you have access to
12 any of OXY's net pressure plots or frac jobs, like
13 the -- see if their fracs dropped off and broke into
14 something, screened out at or anything?

15 A. No. We didn't have access to that.

16 Q. And as far as chlorides go, you listed
17 chlorides. But TD [sic], is it about twice what the
18 chlorides are?

19 A. I don't have the samples in front of me, so I'd
20 just be making a guess.

21 Q. Okay. What about this -- normally, it seems
22 people try to use a Hall Plot to look at injectivity of
23 a disposal well, but you can't do that because there is
24 no pressure reported; is that correct?

25 A. Well, I think with the Hall Plot, you have to

1 be there measuring it, physically injecting at different
2 rates into the well, and we are not the operator. We do
3 not have access.

4 Q. So you did a cumulative water injection and --
5 you plotted the water injection and the cumulative water
6 injection --

7 A. Yes.

8 Q. -- and a pressure?

9 A. Right. The reported injection pressure by the
10 Commission -- to the Commission.

11 Q. So there is really no way to do a reservoir
12 engineering calculation of how much this well might be
13 changing the water saturation to affect your -- your
14 recoverable oil from these horizontal fracture?

15 A. Be very difficult.

16 Q. That's it for me.

17 CROSS-EXAMINATION

18 BY EXAMINER McMILLAN:

19 Q. This is more an engineering question. So the
20 fracture orientation is going 45 east and 70 east?

21 A. Correct. And that's basically the range
22 that -- by measuring the directions of the maximum
23 horizontal stress based on this report, the Stanford
24 grad student report, and all the data was provided by
25 local operators.

1 RECROSS EXAMINATION

2 BY EXAMINER JONES:

3 Q. The bubble plots you did, you didn't just do
4 that with standard Excel? You had to have a
5 surveillance program? Oh, Kaiser-Francis?

6 A. No. Jason did it on the workstation.

7 Q. Okay. So he painstakingly put those on there.

8 Okay. I don't have any more questions.

9 EXAMINER McMILLAN: I don't have any
10 questions.

11 MR. FELDEWERT: I have no further
12 questions.

13 EXAMINER BROOKS: No further questions.

14 MR. HALL: Nothing further.

15 EXAMINER JONES: Do you want to take a
16 break?

17 EXAMINER BROOKS: Yeah. That would be a
18 good idea.

19 (Recess 4:00 p.m. to 4:13 p.m.)

20 EXAMINER McMILLAN: Call this case back to
21 order, Case Number 15519.

22 Please proceed.

23 MR. HALL: Did Mewbourne indicate their
24 case-in-chief is complete?

25 MR. FELDEWERT: Yes. That concludes our

1 examination, Mr. Examiner.

2 MR. HALL: May I ask counsel is there a
3 Notice of Affidavit for --

4 MR. FELDEWERT: No. Because you-all
5 entered an appearance and I think we attached one of our
6 notice letters to the motion to respond, I'm sure we
7 gave proper notice to the Receiver as requested.

8 MR. HALL: Just for the record, I'm going
9 to reserve all objections with respect to notice. There
10 is no evidentiary adequacy of notice at all. They've
11 not even established a filed C-108 protocol. There is
12 no indication that they notified the BLM. I think that
13 is a serious problem.

14 EXAMINER BROOKS: Okay. You may proceed.

15 MR. HALL: At this point, Mr. Examiners, we
16 would call Rick Johnston to the stand.

17 RICK JOHNSTON,
18 after having been previously sworn under oath, was
19 questioned and testified as follows:

20 DIRECT EXAMINATION

21 BY MR. HALL:

22 Q. For the record, please state your name.

23 A. My name is Rick Johnston.

24 Q. Mr. Johnston, where do you live and by whom are
25 you employed?

1 A. I live in Austin, Texas. I'm a consulting
2 petroleum engineer with the firm of Johnston & Cloud.

3 Q. And you previously testified both before the
4 Division and the Commission and had your credentials as
5 an expert petroleum engineer established as a matter of
6 record, correct?

7 A. Yes.

8 Q. I'm not certain you've testified before these
9 Examiners before. Would you please provide a brief
10 summary of your educational background and work
11 experience?

12 A. I graduated from the University of Texas in
13 1979 with a degree in chemical engineering. When I got
14 out of school, I went to work for Amoco Production
15 Company for a few years. After that, I worked for a
16 couple independents in Houston, and in early 1986, I
17 joined a consulting company in Austin. I was there for
18 nine years, and then in 1994, I started my current
19 company.

20 Q. And -- I'm sorry. Go ahead.

21 A. I'm a registered engineer in the state of
22 Texas. I'm not registered in New Mexico. I'm a member
23 of the Society of Petroleum Engineers and the Society of
24 Petroleum Evaluation Engineers.

25 Q. All right. Have you previously testified on

1 one or more injection well cases before the Oil
2 Conservation Division of New Mexico?

3 A. Yes.

4 Q. Are you familiar with the application that
5 Mewbourne has filed in this case?

6 A. I'm familiar with it to the degree that they've
7 filed a complaint saying that the ongoing injection
8 operation they're alleging is adversely affecting a well
9 operated by OXY.

10 Q. All right.

11 MR. HALL: At this point, Mr. Examiner, we
12 would re-offer Mr. Johnston as a qualified expert
13 petroleum engineer.

14 MR. FELDEWERT: No objection.

15 MR. BRUCE: No objection.

16 EXAMINER McMILLAN: So qualified.

17 Q. (BY MR. HALL) Mr. Johnston, have you undertaken
18 a study to evaluate the possible effects of injection
19 operations through the Pyote Willow Lake injector into
20 offsetting acreage?

21 A. Yes.

22 Q. And have you compiled a number of exhibits in
23 accordance with your investigation?

24 A. Yes. I've gone and looked at the performance
25 of the wells within a three-mile radius of the Pyote

1 Willow Lake disposal well.

2 Q. All right. Let's turn to your exhibit
3 notebook. Go to Exhibit Number 1. And is that another
4 copy of Administrative Order SWD-744 that we've been
5 talking about earlier here today?

6 A. Yes, it is.

7 Q. And, again, were you able to -- well, enough
8 about that.

9 Let's go to Exhibit 2, if you would explain
10 that to the Examiners.

11 A. Exhibit Number 2 is a map I put together using
12 mapping data. The well layer data is data that I
13 received from the OCD Web site, and it's August 2016
14 data.

15 The blue dot in the middle of the map is
16 the Willow Lake SWD. Next to each well location, I've
17 had the computer label each well with the five digit --
18 the last five digits of the API number, and underneath
19 it is the well number.

20 The tan or orange circle on the map, that's
21 a three-mile radius area. I've had the computer go in
22 and put a green square around the well symbols for those
23 Bone Spring wells that have a cumulative production
24 greater than 50,000 barrels of oil.

25 The green dot on the map down at about 8:00

1 on the circle, coming towards the center, that is the
2 location of the OXY Stent Federal Com #2H.

3 I've then gone in and had the computer put
4 kind of a a reddish-colored dot on all of the wells that
5 have reported production from the Bone Spring Formation.

6 And then the purple dots are those wells
7 that show up as Bone Spring or permit but no reported
8 production.

9 Q. All right. In your area of review here, have
10 you developed an opinion as to whether injection
11 operation through the Willow Lake well has resulted in
12 the waste of any economically recoverable hydrocarbons?

13 A. Yes.

14 Q. And what is your opinion?

15 A. Based on the information that I see right now,
16 I don't know that it's conclusive that this injection
17 operation is having the alleged adverse impact that
18 Mewbourne is putting on the table today.

19 Q. All right. Tell the Hearing Examiner how you
20 reached your conclusion.

21 A. Well, what I've done is I've gone in and looked
22 at all of the performance of all the Bone Spring wells
23 in the area. I've put a cross section together. I've
24 looked at water-oil ratios of a number of these wells.
25 And based on what I'm seeing is there is a certain level

1 of randomness to where you're going to encounter higher
2 water-oil ratios.

3 While this is a resource play, there are
4 variations in the performance of wells within this area.
5 Not all of the wells are going to be good. That's the
6 nature of a resource play. You're going to have some
7 poor wells. Unfortunately, this OXY Stent well appears
8 to be an incredibly bad well. And I think, you know, if
9 you go through more detail -- you just need to go
10 through the exhibits.

11 Q. All right. Let's do that. Let's look at
12 Exhibit Number 3 and tell us what that shows.

13 A. Exhibit Number 3 is a tabulation of all of
14 the -- all the wells that have reported Bone Spring
15 production within this three-mile area. These are the
16 wells that are on Exhibit Number 2 and are either going
17 to have a red dot or a purple dot.

18 On Exhibit 3, I've also gone in and
19 identified the wells that have cumulative recoveries in
20 excess of 50,000 barrels. I'm looking at 50,000 barrels
21 as though that's a pretty good well. You can see that
22 most of the better wells are going to be down in the
23 southern part of this three-mile circle. There are a
24 couple off to the -- off to the east. And then there is
25 one old vertical well way up to the north, up at 12:00.

1 That is a very good old vertical well. The API number
2 is 22853, last five digits.

3 Q. All right. And if we take the API numbers for
4 the wells shown on Exhibit Number 3, you can compare
5 them and locate those wells on Exhibit Number 2. And
6 what does the legend of Exhibit Number 2 show us with
7 respect to the same wells?

8 A. Well, like you say, the API number -- the last
9 five digits of the API number column on Exhibit 3
10 correspond to those on the map. The listing -- Exhibit
11 Number 3 is sorted by API number, so it's easy to find
12 the data on them. I've included four of the wells that
13 have reported completions, the perforated interval.

14 For the horizontal wells, I've gone in and
15 I've looked at the directional survey and made an
16 estimate of the TVD interval where the laterals are
17 landed, and that's what I've placed in the perforated --
18 perforation columns so you get a feel for depthwise,
19 TVD-wise where these are landed. And you can take that
20 information to a cross section that we're going to put
21 in in a minute and get a feel for where in this big Bone
22 Spring section these wells are landed.

23 Q. Let's look at Exhibit 4, the cross section.

24 A. Exhibit Number 4 is a three-well cross section.
25 If you look back at Exhibit Number 2, this is the cross

1 section depicted on that map that goes from A to A
2 prime. A is going to be the log of the Willow Lake Com
3 #1, which is an old Atoka well that's been converted to
4 the current disposal well that's the subject of the
5 hearing.

6 The middle log is going to be the log from
7 the OXY Stent Federal well. In discovery, we were given
8 this log in the form of an LAS file. Apparently, from
9 the -- well, when you read the header of that log, they
10 were -- they put the logging tool in the string of
11 casing -- the surface casing, turned it on and logged
12 down, and they stuck the tool. They pulled out of the
13 wireline, and they had to fish it. So the only log that
14 we have for this well is going to be this down log.

15 In a down log, you can't run the density
16 neutron because it's pad contact. You can only run that
17 log when you're pulling out of the hole.

18 So all that we have is the gamma ray, the
19 resistivities and the neutron -- thermal neutron. It's
20 adequate for correlation purposes, but that's about it.
21 And you can see it didn't go very far.

22 I've also -- we have a gamma ray log that
23 goes deeper, and that is from the measurement while
24 drilling, I believe.

25 I've also put near the depth track roughly

1 where the lateral that the OXY Stent well has landed,
2 and you can see it's a little high in this -- what's
3 been defined -- appears to me to be a little bit shallow
4 in what's been defined as this 2nd Bone Spring sea sand,
5 under the Mewbourne nomenclature.

6 EXAMINER BROOKS: The pool sign marker down
7 8,000 to 8,100 feet?

8 THE WITNESS: Yes, sir. Actually, the
9 Division's are 20 foot, so it's going to be from 8,060
10 to 8,080.

11 EXAMINER BROOKS: Thank you.

12 THE WITNESS: And then, likewise, if you
13 look at the disposal well -- if you look back to
14 Exhibit -- Mewbourne Exhibit Number 3, on page 5, which
15 gives you the perforation information, I took that
16 initial perforation data, and those are the perforations
17 that are shown on the Willow Lake well. So you can see
18 that we have a grouping of perforations up near the top
19 and then another grouping of perforations down deeper,
20 down around the 8,600-foot interval.

21 And then to talk about the A prime log,
22 this is the Spanky Federal Com #1. It's just one of the
23 good deep logs that I had in the area. There are a
24 number of Atoka wells that have been drilled over this
25 area. There are not very many pilot-hole logs -- well,

1 none of the pilot-hole logs on these horizontal logs
2 have been released. They're all too new, if any were
3 even run. So I just picked an old Atoka log and put
4 that in the cross section.

5 The perforated interval that's shown on
6 this Spanky Federal is going to be roughly where the
7 laterals are landed on the three horizontal wells that
8 are down at roughly 6:00 near the -- near the orange
9 line on Exhibit Number 2. Those are three wells drilled
10 by COG, and they're called the Scary Federal 2H, 3H, 4H
11 and 5H. Those are very good wells, as depicted by the
12 green squares.

13 Q. (BY MR. HALL) If you look back at your cross
14 section vertically, for operators interested in
15 developing Bone Spring, what is the primary target for
16 that?

17 A. Well, it appears to me that the primary target
18 is going to be between -- what I've marked on my cross
19 section, between marker number three and the top of the
20 3rd Bone Spring.

21 Q. And where are the perforations in the Willow
22 Lake injector in proximity to that primary target?

23 A. They are above it and below it. And if you
24 look at the cross section, the density porosity logs,
25 you can see that from my correlation marker, 3rd Bone

1 Spring down to the upper set of perforations in that
2 lower grouping, you've got very low porosity values that
3 range in the order of 2 to 4 percent over an area of --
4 vertical area of over 300 -- around 350 feet.

5 And then above marker number three, again
6 you have some fairly low porosities from a depth of
7 about 7,600 down to 7,740. You can see that you've got
8 an interval there that's got, again, fairly low porosity
9 values in the order of 2 to 4 percent. I would expect
10 with those low porosity values, you're going to have low
11 permeability, and those intervals should impede the
12 vertical movement of fluid.

13 Q. Let's turn to Exhibit Number 5. I managed to
14 punch a hole right in the middle of the well name, but
15 is this data from the OXY Stent well?

16 A. Yes, it is.

17 Q. And tell us what this is, what it shows.

18 A. This is a rate-versus-time plot for the OXY
19 21 or the Stent 21 Federal #2H. The last five digits of
20 the API number are 41221. This is the OXY well that
21 Mewbourne's talked about. You can see that the well is
22 only cumed 13,890 barrels of oil. You can see that the
23 water-oil -- the water-oil ratio data is the square
24 purple symbols.

25 You can also see that in early 2015 the

1 well experienced a shut-in period. Based from the
2 discovery, they had -- they either rubbed a hole in the
3 tubing with the rod pump, or they had some sort of a
4 corrosion problem. They had to do a pulling job. They
5 had a lot of trouble with paraffin. They had to load
6 the well quite a bit with hot water to try to melt the
7 paraffin. That's what happened.

8 Q. Do you know from completion reports, data that
9 you've seen whether the well is now on a surface pump?

10 A. Based on the reports that we were given by OXY,
11 the well was on a rod pump prior the shut-in period, and
12 it was returned to a rod pump after the shut-in period.

13 Q. All right. Before the cessation of production
14 in 2015 there, do you know whether the well was on a
15 downhole pump?

16 A. It's not clear based on the information we have
17 when it went on a rod pump. We requested that
18 information from OXY, and I guess they refused to give
19 it to us.

20 Q. And does that affect your analysis at all?

21 A. It might. It depends on what it shows. I
22 don't know.

23 Q. Let's look at Exhibit 6 now. Tell us what this
24 shows.

25 A. Exhibit Number 6 is the same water-oil ratio

1 data except for I went in and put it in Excel, where I'm
2 able to do a least squares regression of the data. So
3 what I've done is -- the orange dots are the water-oil
4 ratio data prior to this shut-in period.

5 The orange straight line is the computer's
6 least squares regression of that data, and you can see
7 that it has a gentle downward slope.

8 The blue dots are the water-oil ratio data
9 after the shut-in period. Granted, it did have a higher
10 water-oil ratio after they turned the thing back on, but
11 I attribute that to all of the water they put in it and
12 the three or four days while they worked on it. They
13 had trouble pulling the rods because of the paraffin.

14 The first page of Exhibit Number 6 is
15 water-oil ratio versus time. You can see that the slope
16 of least squares regression of this data prior to
17 shut-in and after shut-in is a downward slope.

18 In a volumetric-depletion reservoir, which
19 is what you would expect the Bone Spring to be, when we
20 go and we frac these wells -- let me back up. You have
21 to frac these wells to get them to produce. And when
22 you frac them, you create a fracture system. You prop
23 it. And that is really the reservoir that you're
24 draining and the rock that's contacted by that fracture
25 system. So in that system, you would expect, as a

1 function of time, the water-oil ratio to come down.

2 That's what we see here when you take out the water that
3 was used in that workover.

4 So in a normal well that you just turn on,
5 Bone Spring, you fracked it, you would expect, function
6 of time, the water-oil ratio to come down. In a
7 situation like a waterflood or a waterdrive reservoir,
8 with time, after the water hits the producer, you expect
9 the water-oil ratio to increase. It's an indication of
10 some foreign source of water. I don't see it here.

11 There are two ways to present the data.
12 One is water-oil ratio versus time, and then the second
13 page is water-oil ratio versus cum. The result is the
14 same.

15 Q. Is the OXY Stent well behaving like other Bone
16 Spring producers in the area in terms of water-oil
17 ratio?

18 A. It's behaving like some, yes.

19 Q. All right. Let's turn to Exhibit 7. Identify
20 that for us, please.

21 A. Exhibit Number 7 is a multipage exhibit. The
22 first page is a rate-versus-time plot, along with
23 water-oil ratio data. This is for a well that is
24 located due west of the Willow Lake disposal well. The
25 last five digits of the API number are 23809. It's up

1 in the northeast quarter of Section 21.

2 This well, if you flip to the fourth page
3 of the exhibit, began producing in 2000, with
4 perforations from 7,240 to 7,264 down in the Bone
5 Spring. And you can see that it exhibited similar high
6 water ratios up on the order of what's being seen in the
7 OXY Stent well. And if you go back to the cross
8 section, you can see that those perforations are going
9 to be located up in the portion of the 1st Bone Spring
10 where the Willow Lake well is injecting.

11 I don't believe that the high water-oil
12 ratio seen in the Pardue Farms well, on Exhibit Number
13 7, are a result of the injections. Just the timing is
14 not right, because injection into the Willow Lake well
15 started in 2000, as did -- the production in this well
16 started in late 2000, and those wells are a mile apart.
17 Excuse me. It's going to be shorter than a mile. It's
18 about 4,500 feet apart, that the small amount of
19 injection that would have occurred into the Willow Lake
20 well, in my opinion, would not have caused the higher
21 water-oil ratios that are seen there. And generally,
22 the trend of those water-oil ratios is coming down.

23 And what I'm doing with the next few
24 exhibits is going and just looking at the behavior of --
25 the halo of Bone producers that surround the Willow Lake

1 SWD. So I'm just starting with that one.

2 Q. Let's turn to Exhibit 8. Tell us what that
3 shows. Identify that and tell us what this shows?

4 A. Exhibit Number 8 is a plot of the injection
5 volumes for the Willow Lake SWD. It's a two-page
6 exhibit. The first page just provides the staff with
7 the estimate of what the injection volumes have been for
8 August of 2016 and what they are through September the
9 25th.

10 Q. These are field estimates?

11 A. They are -- I would call them field estimates
12 because they are the sum of the run tickets. When a
13 truck comes in and unloads water, there is a run ticket.
14 So we took the run ticket for August and totaled them
15 up. It doesn't include pipeline water, which will
16 increase that somewhat.

17 The second page of the exhibit is just a
18 rate-versus-time plot showing the curve of the injection
19 volumes for the Willow Lake well. You can see that the
20 volumes of water injected into this well were down on
21 the order of between 10- and 20,000 barrels a month,
22 which is, you know, 3- to 600 barrels a day until 2008,
23 and that's when the volumes went up. It's also when the
24 horizontal activity in the area began.

25 Q. Let's turn to Exhibit 9 now. Identify that for

1 us, please.

2 A. Exhibit Number 9 is a graph of rate versus time
3 for the Pardue 1Q. This well -- the API number is
4 31360. You can see it's in the middle of Section 21 up
5 near the north line. This well had a water-oil ratio
6 that was running around four or five, and then starting
7 in 2009, it started increasing. The well is carried in
8 the Bone Spring Formation, but if you flip to the third
9 page of the exhibit, you can see that the well has
10 perforations from 5,150 -- excuse me -- 5,080 to 5,158.
11 While the OCD carries the well in the Bone Spring, it's
12 really a Delaware well.

13 This is the kind of behavior you would
14 expect from the Delaware because frequently the Delaware
15 sands are water driven. So it looks to me like water
16 hit the well somewhere in the '08, '09 time frame, and
17 you can see the water-oil ratios gently increasing past
18 that point. But it's not a Bone Spring well. Based on
19 that completion report, it appears to me to be Delaware.

20 Q. Let's turn to Exhibit 10. Identify that,
21 please.

22 A. Exhibit Number 10, the name of the well is the
23 Zima #1, operated by Chi Operating. API number is
24 22739. That's going to be the Bone Spring producer up
25 in the northeast quarter of Section 16. It's going to

1 be up one section away from the disposal well at about
2 11 -- 10:00, let's say.

3 This well has exhibited an increasing
4 water-oil ratio since 1994, when it was put on
5 production, and you can see initially it had a water-oil
6 ratio down on the order of three or four. And in the
7 most recent months, it's more up on the order of eight,
8 nine -- higher than that. Based on the completion
9 information I show, this is a Bone producer.

10 Q. Let's look at the next well under Exhibit 11.

11 A. In Exhibit 11, similar exhibit for the -- I'm
12 not sure. We punched through the name of the well, but
13 the API number is 23036. It's in Section 15, almost due
14 north of the Willow Lake well. You can see this well is
15 producing with a water-oil ratio for a number of months
16 on the range of four or five. And then the most recent
17 recorded month, it's up to a little over ten.

18 MR. HALL: And, for the record,
19 Mr. Examiners, I recall that the name of this well is
20 the Ann Com #1.

21 THE WITNESS: The second page of this
22 exhibit is going to be the -- again, we punched through
23 the name of the well, but the API number is 25708. This
24 well is going to be located to the southeast in Section
25 26. This well has been exhibiting a declining water-oil

1 ratio. It came in about one, and you can see it's
2 declining to less than one. Cum for that well is 41,000
3 barrels of oil. It's an old vertical well.

4 The next well is API Number 26142. It's
5 going to be located in Section 28, down to the south of
6 the Stent well, over near the eastern section line. You
7 can see that it's got a water-oil ratio of less than one
8 and has been fairly maybe declining a little bit.

9 And then the last page of Exhibit Number 11
10 is just a rate-versus-cum plot of the same data.

11 Q. (BY MR. HALL) The same well?

12 A. Excuse me. Same well.

13 Q. Let's turn to Exhibit 12 now.

14 A. Exhibit Number 12 is a rate-versus-time plot
15 for the Tiger well. This is the horizontal -- the
16 horizontal lateral that's located in Section 14, and it
17 is a well that's drilled from east to west.

18 The green square in the southeast corner of
19 Section 14 is the surface location of that well, and
20 that well is drilled over to roughly a location of 440
21 by 440 out of the southwest corner. That's where the
22 terminus of this well is located.

23 You can see that the cumulative production
24 on this well is 71,000 barrels of oil. We've gone in
25 and put a projection on the future performance, and it

1 predicts this well will ultimately recover somewhere in
2 order of 104,000 barrels. As mentioned earlier, the
3 most recent couple of months of data have shown an
4 increasing water-oil ratio for this well. This is the
5 nearest well to the Willow Lake well.

6 Not to get ahead of myself, but if you flip
7 to Exhibit Number 17, I have -- on Exhibit 17, that's a
8 copy of a portion of the map where I've gone in and put
9 the rough -- roughly placed the terminus points of this
10 Tiger well and of the OXY Stent well on the map. The
11 OXY Stent well is a little over a mile away, and this
12 Tiger well is going to be closer. I want to say it's
13 like 2,800 feet away.

14 Q. With respect to the OXY Stent well --

15 A. Excuse me. Go ahead.

16 Q. Well, with respect to the OXY Stent well, does
17 it appear that that well is economic?

18 A. Well, when we say economic -- it's not going to
19 pay out. Typically, from the information we've heard
20 today, these wells cost somewhere in the range of 5.5 --
21 5.4 to \$6.5 million. So you need to -- at \$45 oil, you
22 need to recover upwards of 150- or 160,000 barrels of
23 oil to break even.

24 Q. Back to Exhibit 12, for the Matador Tiger well,
25 you've included a completion report with that exhibit;

1 is that right?

2 A. Yes.

3 Q. What's significant about that completion
4 report?

5 A. Well, it shows -- it shows the perforated
6 interval. It shows the -- and I think that's it. The
7 well, initially, had the potential for 581 barrels a
8 day, 1,061 barrels of water.

9 Q. All right. Let's turn to Exhibit 13 now. And
10 this is SWD; is that right?

11 A. Yes.

12 Q. Identify that.

13 A. Within this three-mile area, I've only
14 identified or found one other well that has any
15 appreciable volume of the water injection, and it's this
16 Pardue Farms 29 SWD #1. The API number is 33537. This
17 well is located in the northeast quarter of Section 29.

18 Q. Do we know what interval it's injected to?

19 A. It's carried in the Bone Spring field, but if
20 you flip to the second page of the exhibit, you can see
21 it has perforations from 5,564 down to 5,745. So this
22 appears to me to be a Delaware injector. Actually, if
23 you flip to the third page, that's the first page of the
24 permit, and it's identified as a Brushy Canyon injector.

25 Q. Let's turn to Exhibit 14. Identify that,

1 please.

2 A. Exhibit Number 14 is a rate-versus-time plot
3 for the Union Federal #1. It's API Number 23749. This
4 well is located down in Section 33 over near the eastern
5 section line. You can see this well exhibits water-oil
6 ratios of ten, and some months are higher. If you flip
7 to the second page, it's a rate-versus-cum plot. So,
8 again, it's exhibiting high water-oil ratios.

9 Q. And the production from that well completely
10 preexisted injection operations through the Willow Lake
11 well; is that right?

12 A. Yes. And it's located so far away that I would
13 not expect it to be impacted by the Willow Lake
14 injection operation. And I'll also mention that this
15 well is completed with perforations from 6,155 to 7,058.
16 It's going to be up in the 1st Bone Spring.

17 Q. Let's turn to Exhibit 15 now, back on the OXY
18 Stent 21. Tell us what this is.

19 A. I've taken the available completion information
20 for the Stent 21 Federal, the OXY well. That well was
21 fracked with 1.4 -- almost 1.5 million gallons of fluid,
22 2.4 million pounds of sand. Its lateral length is
23 roughly 4,180. And then the attached pages are backup
24 information that were used to come up with these
25 figures.

1 EXAMINER BROOKS: What exhibit are you on
2 now?

3 MR. HALL: 15.

4 EXAMINER BROOKS: Thank you.

5 THE WITNESS: I selected the -- the purpose
6 of this is to show how the well was stimulated, because
7 when you compare the performance of one well against
8 other wells, we're learning that the bigger the frac
9 job, the more fluid, the more sand, the better the well.
10 The more stages, the better the well. This well was
11 fracked in eight stages.

12 Q. (BY MR. HALL) Let's compare the Stent 21 to the
13 well under tab 16. Identify that for us, please.

14 A. This is the Scary Federal 5 Number -- excuse
15 me -- Scary Federal #5H. This is API Number 40241.
16 That well is located -- surface location is down near
17 the southern section line of Section 33. It's the best
18 well in the three-mile area.

19 You can see that from 2012 through early
20 2014, the well had a declining water-oil ratio. And
21 then starting, oh, early in 2014, you can see the
22 water-oil ratio for that well bumped up over ten. Looks
23 to me, timingwise, that that well was probably hit by an
24 offset well being stimulated. And it looks to me like
25 it happened again in early 2015, where an adjacent well

1 was fractured, the frac job went over. This well
2 started producing the water. With time, it's dewatered,
3 but the decline curve is still what you would expect.
4 It's hyperbolic.

5 Q. If we look back at Exhibit 3, the base map, if
6 we look down at Section 33, does that show three Bone
7 Spring wells in close proximity to each one?

8 A. Yes.

9 Q. Anything else with respect to Exhibit 16?

10 A. I don't believe so.

11 Q. All right. Let's look at Exhibit -- we've
12 discussed Exhibit 17.

13 A. Yes.

14 Let me grab my scale so I can give you
15 better dimensions than I did previously.

16 MR. FELDEWERT: So we're on Exhibit 17?

17 THE WITNESS: Yes, sir.

18 MR. FELDEWERT: Thank you.

19 THE WITNESS: On Exhibit Number 17, the
20 scale is the same as Exhibit Number 2. It's just a copy
21 of the same map, and it copied to scale.

22 The Willow Lake well is located roughly
23 5,500 feet away from the closest point on the OXY Stent
24 21 well. And then the terminus point of the Tiger well
25 is about 3,700 feet away from the Willow Lake well.

1 Since we're injecting into what I would
2 refer to as a conventional reservoir, I would expect the
3 injection into the Willow Lake well to be radial. If
4 you look back at one of the Mewbourne exhibits, with the
5 exception of one or two months, they're showing that we
6 never exceeded the permitted injection pressure.

7 I guess my other comment there is there was
8 some testimony about the reported pressure went down to
9 500 pounds and stayed that way for months flat. I don't
10 think that's well performance. I think that's somebody
11 just repetitively reporting the same number. The odds
12 of a well having the same injection volume month after
13 month at the exact same value, I don't buy it. Not
14 believable.

15 Q. (BY MR. HALL) Is it accurate to say that high
16 water-oil ratios in the area of Bone Spring wells is
17 normal?

18 A. It's not unusual. There are a handful of them
19 in the area that have it. One of the producers on the
20 same section is the OXY 21 well. It exhibited high
21 water-oil ratios from the Bone Spring. There is
22 something about the rock there that those wells just
23 produce with higher ratios.

24 Q. You were present when the Mewbourne witnesses
25 testified. In effect, in their opinion, the injection

1 operations were the exclusive cause of water production
2 in other area Bone Spring wells.

3 A. Yes. I heard that.

4 Q. Do you agree with that?

5 A. I don't believe that the evidence is here to
6 conclusively say that the poor performance of that OXY
7 Stent well is the result of the injection operation in
8 the Willow Lake well, no.

9 Q. Thank you.

10 Take Mewbourne's exhibits before you. You
11 heard some testimony from Mr. Harrington with respect to
12 the water analysis.

13 A. Starting with Exhibit 22, I believe.

14 Q. 22, 23, 24? Which one do you want to take on
15 first? Exhibit 24?

16 A. Well, I think the best one to look at is
17 Exhibit 23 --

18 Q. All right.

19 A. -- where he overlaid the average of all the
20 other wells with three different analyses, run at three
21 different points in time on the Stent well. I don't see
22 an appreciable difference in the Stiff diagram that he's
23 generated here between the average of the seven wells
24 and the three different analyses that were done. I
25 think -- I think he's splitting hairs to say that he

1 really sees much of a difference. This is incredibly
2 salty water and having that water analyzed at three
3 different points in time with, like he said,
4 different -- different calibrated equipment, it's not
5 surprising to me that you may have 10-, 20,000 parts per
6 million chloride content variation.

7 MR. FELDEWERT: I'm sorry. Did you say
8 different calibrated equipment? Is that what you said?

9 THE WITNESS: Yes.

10 Because the equipment that was used to
11 analyze -- from Exhibit 23, he has an analysis here from
12 March of 2014, another analysis in July of '16 and
13 another analysis in September of '16. Well, I would
14 expect that they recalibrate that equipment, that that
15 equipment has been recalibrated a number of times as a
16 function of time between when these analyses were done.

17 The other thing, this -- this analysis and
18 this presumption is that for this to be a useful way of
19 thinking about it -- he's saying that the injected water
20 from the Willow Lake well -- the fluid from that well
21 has made it all the way to the OXY Stent 21 well. So
22 what I think you need to look at is is that plausible,
23 that the fluid from the Willow Lake well, could it have
24 made it that far? Cumulative injection, from their
25 exhibit, into the Willow Lake well is 8.7 million

1 barrels.

2 Q. (BY MR. HALL) Have you conducted an
3 evaluation -- have you calculated the volumes of
4 injection fluids that would be required in order for an
5 injection plume to reach the OXY Stent well?

6 A. Yes.

7 Q. Tell us what you did.

8 A. Well, what I did was I went and looked at my
9 cross section, Exhibit 4, and I looked at only the upper
10 perforated interval. And I went and I calculated -- or
11 I counted the number of feet of clean sand that's
12 exhibited in those upper sets of perforations, and it
13 looks to me like it would be in excess of 120 feet.
14 Using a porosity of 12 percent and a radius of 5,280
15 feet, for the fluid front to have gone out 5,280 feet,
16 120 feet thick, 12 percent porosity, we would have had
17 to have injected 224 million barrels of water. We
18 haven't done that.

19 You know, the flip side of that is we've
20 injected 8.7 million barrels. Using 120 feet, 12
21 percent porosity, that is a plume of about 1,038 feet,
22 assuming radial flow, piston-like displacement.

23 This analysis of water and saying that he
24 sees some variation in the analysis that has to be from
25 the Willow Lake well, I don't think it goes around.

1 Q. You calculated an injection plume. Did you
2 presume that water was passing through each of the
3 perforations shown on the log for the Willow Lake well?

4 A. No. Only the upper set of perforations.

5 Q. All right. What do you conclude with respect
6 to whether or not injection operations are resulting in
7 waste or the prevention [sic] of correlative rights?

8 A. I don't believe that the evidence that we have
9 thus far is conclusive that that's occurring.

10 Q. All right. Are there other methods for testing
11 for water intrusion that have not been conducted by
12 either party in this case?

13 A. Yes.

14 Q. Name some, please.

15 A. The simple thing is to put a trace element in
16 the water that's being injected into the Willow Lake
17 well and then analyze the OXY Stent-produced water to
18 see if that trace element shows up. There's been some
19 allegation that may be happening in the Matador Tiger
20 well. Maybe analyze that well, too. But that's
21 probably the best way to do it, and I've seen that done
22 a handful of times.

23 Q. All right. And I'm sure the Examiners know
24 this. Tell them what a spinner survey is.

25 A. A spinner survey is a tool with -- that has, so

1 to speak, a propeller on it with a cage around it.
2 While you're injecting into the well, you run that into
3 the well and you look at how fast it's turning as a
4 function of depth. And as you go past the set of
5 perforation that's taking fluid, the propeller is going
6 to slow down. So by analyzing the speed as a function
7 of depth, you can figure out where the water is going.

8 Q. And that's not been done in this case as far as
9 we know?

10 A. No.

11 Q. And would that allow us to determine whether
12 all of these perforations have, in fact, been opened and
13 FD levels reported?

14 A. Well, what it would tell you is, snapshot in
15 time when you run the survey, what's taking water. As
16 far as the issue of what's been perforated, the
17 application for the disposal permit was filed by
18 Griffin. He told the OCD where he was going to
19 perforate it. He's the one that went in and completed
20 the well and operated it for a number of years before he
21 sold it to Mesquite. So I tend to believe that probably
22 the well is perforated as reflected on the application.

23 Q. All right. Anything further with respect to
24 your testimony or exhibits?

25 A. I don't believe so.

1 Q. Were Exhibits 1 through 17 prepared by you or
2 compiled from available records?

3 A. Yes.

4 MR. HALL: At this time, I'd move the
5 admission of Exhibits 1 through 17.

6 MR. FELDEWERT: No objection.

7 MR. BRUCE: No objection.

8 MR. HALL: And that concludes our
9 examination of this witness.

10 EXAMINER McMILLAN: Exhibits 1 through 17
11 may now be accepted as part of the record.

12 And we're going to take a couple-minute
13 break and come back for cross-examination.

14 (Pyote Well Service, LLC Exhibit Numbers 1
15 through 17 are offered and admitted into
16 evidence.)

17 (Recess 5:07 p.m. to 5:13 p.m.)

18 EXAMINER McMILLAN: Call Case Number 15519
19 back to order, and cross-examination shall commence.

20 MR. FELDEWERT: Thank you, sir.

21 CROSS-EXAMINATION

22 BY MR. FELDEWERT:

23 Q. Mr. Johnston, you mentioned a tracer survey and
24 spinner survey; is that right?

25 A. Yes, sir.

1 Q. Those are tests that are usually done by the
2 operator of a disposal well?

3 A. Normally they are done by the operator of the
4 well, yes.

5 Q. Okay. And Pyote's been preparing for this
6 hearing for some time, right?

7 A. Yes. But to do the tracer survey -- well,
8 actually --

9 Q. And Pyote could have gotten an extension to
10 prepare for this hearing, right?

11 A. Well, to do the tracer survey, we'd have to
12 have coordination with OXY and Matador, because us
13 putting a tracer in our water is kind of academic if you
14 don't have somebody looking for it.

15 Q. But you've seen Mewbourne's data present here
16 today, and you've had that available to you, right?

17 A. Well, actually, I've seen situations where the
18 operator generating the water has put the tracer in,
19 even into the disposal well --

20 Q. Hold on. My question was: You've the seen the
21 data that Mewbourne has presented here today, and you've
22 had some of that available to you, correct?

23 A. You're going to have to be more specific than
24 that. I haven't seen all the water analyses that they
25 presented.

1 Q. I guess my point is can you explain why Pyote
2 hasn't initiated efforts to do a tracer survey or a
3 spinner survey?

4 A. I don't know why.

5 Q. All right. Now, looking at your Exhibit Number
6 3 -- or Number 2, okay, what is -- did you calculate
7 water-to-oil ratio for the wells in your study area that
8 were completed in the Bone Spring Formation?

9 A. You mean a cumulative?

10 Q. Just an average.

11 A. No.

12 Q. Have done any kind of average?

13 A. Not with respect to water-oil ratio. I've
14 looked at everything on an individual well basis.

15 Q. Okay. And, in fact, some of the wells in your
16 study area weren't even completed in the Bone Spring,
17 right? You have a Delaware well in there?

18 A. I think I mentioned that, yes.

19 Q. In your study area included what you call --
20 labeled "Bone Spring-producing wells"?

21 A. Oh, my study area was a three-mile area.

22 Q. I'm sorry. But within that three-mile area,
23 you looked at what you call Bone Spring-producing wells?

24 A. I looked at what are classified by the OCD as
25 being Bone Spring.

1 Q. Okay. You didn't specifically examine, for
2 example, any particular interval within the Bone Spring
3 like the 2nd Bone Spring interval?

4 A. No. For some wells, I did look at the cross
5 section to see where they would land, yes.

6 Q. And so you didn't -- for example, in comparing
7 the analysis, you're aware that the Stent well, for
8 example, which is what you're trying to compare here
9 today, is a horizontal well that's completed in the 2nd
10 Bone Spring Sand, correct?

11 A. It's completed in a shaley-looking portion of
12 the 2nd Bone Spring, yes.

13 Q. Okay. All right. So it's in the 2nd Bone
14 Spring Sand.

15 How many wells within your study area are
16 horizontal wells completed within the 2nd Bone Spring
17 Sand?

18 A. I would say most of them. I don't have a
19 number more definitive than that.

20 Q. Your study includes horizontal wells completed
21 in the 2nd Bone Spring Sand?

22 A. Some of these wells, based on my study, are
23 completed in the 2nd Bone Spring, yes.

24 Q. Would you turn to Mewbourne Exhibit Number 13?
25 Did you look at this exhibit?

1 A. Within the hour, yes.

2 Q. You don't have anything to disagree that the
3 average oil cut for wells completed in the 2nd Bone
4 Spring Sand in the area is 25 percent?

5 A. I haven't done an independent study to verify
6 or dispel that. I don't know if that's correct or
7 not.

8 Q. Okay. So you don't have anything to disagree
9 with that?

10 A. Personally, I don't think averages like this
11 are very definitive or useful.

12 Q. Okay. In this particular exhibit, while the
13 average for the area is 25 percent, the Stent well was
14 only 8 percent?

15 A. I have not looked at what the cumulative oil
16 cut would be on the Stent well.

17 Q. Well, we can at least agree -- and I'm using
18 your words. I'm sure you're right -- that the Stent
19 well is an incredibly bad well? Those were your words,
20 right?

21 A. When I -- yes. When I say that I'm looking at
22 the oil recovery.

23 Q. Then on your Exhibit Number 15, you seem to
24 talk about the completion that was done on the Stent
25 well, correct? That's what Exhibit Number 15 does?

1 A. Yes.

2 Q. And did you compare that completion stage with
3 any other wells in your study area?

4 A. I looked at some of the others, but my primary
5 comparison was with the Scary Federal 5H and the Tiger
6 well, the Matador Tiger.

7 Q. All right. And so, for example, do you know --
8 if I look at Mewbourne Exhibit Number 18, you don't
9 disagree with that comparison, do you, that analysis?

10 A. I agree that, you know, the OXY Stent appears
11 to be using a significantly less amount of proppant and
12 significantly less volume of frac fluid, which would
13 result in a smaller fracture pattern.

14 Q. But you don't disagree, for example, with the
15 data shown on Exhibit 18 and, in particular, the data
16 shown on Exhibit 19, where one of the wells has a much
17 smaller frac proppant in the Stent well? It's actually
18 one of the best wells in the Bone Spring.

19 A. Well, the one -- the one thing I will say about
20 this analysis in Exhibits 19 and 20 is we're not -- we
21 also haven't looked at the number of stages and the
22 length of the horizontals. Are we talking apples and
23 apples? Are they all up on the order of the 4,200 to
24 4,600-foot laterals? How many stages, that sort of
25 thing? I think you have to look at all those things.

1 Q. Now, if I look at your Exhibit Number 12,
2 that's the Tiger well?

3 A. Yes.

4 Q. And that's the well directly offsetting the
5 disposal well to the northeast?

6 A. Yes, sir.

7 Q. It's a south half-south half lay-down well?

8 A. Yes.

9 Q. Okay. Which means the toe of that well is
10 closer to the disposal well?

11 A. I believe that's what I showed in Exhibit 17,
12 yes.

13 Q. Because it's oriented differently than the
14 Stent well.

15 And if I'm reading your Exhibit Number 12
16 correctly and I look at the water-to-oil ratio that
17 shows that the water-to-oil ratio for the Tiger well is
18 increasing, correct?

19 A. I believe I testified that in the most recent
20 couple of months, it shows an upward trend.

21 Q. Okay. So both -- the two closest wells to the
22 disposal well, one to the west and one into the
23 northeast, are both showing increasing water-to-oil
24 ratios?

25 A. I agree that the couple of -- most recent

1 couple of months on the Tiger well show an increasing
2 water-to-oil ratio, and like was testified to, Matador
3 is concerned. I don't know that it's conclusive, but
4 you can make some conclusions from that. And then --

5 Q. And if I go your Exhibit Number 6 -- okay?
6 Let's go to your Exhibit Number 6. That's the Stent
7 well.

8 A. Yes.

9 Q. That's the next closest well to the west?

10 A. Yes.

11 Q. And I'm not an expert on this, but if I draw a
12 line from your orange dots and I take that through the
13 blue dots, I show, does it not, an increasing
14 water-to-oil ratio?

15 A. If you do a least squares regression of all of
16 the data and don't take into account the foreign fluid
17 that was injected or put into the system by the
18 workover, you're right, least squares regression will
19 give you a positive slope. If you account for those
20 fluids, if you look at it before and after the workover,
21 in both cases you have a negative slope.

22 Q. If I look at -- if I turn to Mewbourne Exhibit
23 Number 25 -- keep this out and go to Mewbourne Exhibit
24 25 -- the downward slope that you try to project with
25 your selection of blue dots seems to correspond with a

1 downward trend in the disposal rate at the SWD, correct?

2 A. Yes. But, you know, the problem with
3 Mewbourne's data is it only goes through May of this
4 year, and I would have to regenerate the equivalent of
5 this Exhibit 25 to see what the most recent couple of
6 months of data have done on the --

7 Q. Well, to be fair here, it looks like your data
8 goes into June, right?

9 A. I believe it's later than that.

10 Q. It looks to me like, just looking at Mewbourne
11 Exhibit Number 5, it goes into May or June in similar
12 fashion.

13 A. I believe yours only goes to May.

14 Q. Okay. All right. Then your Exhibit Number 4,
15 this is your type log. This is your type log, correct?

16 A. The cross section.

17 Q. Cross section.

18 I guess what I'm interested in is your type
19 log for the Willow Lake SWD on the right-hand side.

20 A. Yes, sir.

21 Q. And you show -- you represent in there with red
22 squares the perforated intervals?

23 A. For the Willow Lake well, yes.

24 Q. Okay. What data did you utilize to arrive at
25 those perforated intervals?

1 A. The data that was included in the C-108
2 application.

3 Q. And no other data?

4 A. That is the only piece of information that I
5 could find that tells me where the well is.

6 Q. So we're all in the same boat. Okay.

7 All right. And if I'm understanding you --
8 go to Mewbourne Exhibit Number 3.

9 A. Yes, sir.

10 Q. What you're relying on is page 5?

11 A. Yes, sir.

12 Q. And that's labeled in there. This is the
13 application that is filed before the well's approved and
14 before the well is drilled and perfed, correct?

15 A. No.

16 Q. And this application was filed before the well
17 was approved?

18 A. When you say approved --

19 Q. Approved for injection.

20 A. Well, certainly. Yeah. The application is
21 filed before they can approve it.

22 Q. Okay. And the only thing we can go on is the
23 language in here, correct? You don't have any
24 additional data. I don't have any additional data.

25 A. The document speaks for itself, yes.

1 Q. And it labels these as "initial perfs." Do you
2 see that?

3 A. Yes.

4 Q. And there is nothing in this document or any
5 document thereafter that identifies the actual perfs
6 that they're utilizing?

7 A. That is cor- -- I don't -- I don't -- excuse
8 me, but I don't have a document that says this is what
9 what was done when the well was converted. I'm just
10 assuming that this was prepared by Griffin who converted
11 the well and operated it for a period of time. I'm
12 assuming that this is representative of what was
13 perforated.

14 Q. You're assuming that?

15 A. Yes, sir.

16 Q. Did you ask the current operator where the
17 perfs are?

18 A. There have been some discussions about that.

19 Q. What kind of discussions?

20 A. "What do you have in your well file" sort of
21 thing.

22 Q. What did they tell you?

23 A. Thus far I haven't seen any documentation that
24 sheds any light on that.

25 Q. So you don't know where the water's going?

1 A. Well, that's different from where the well's
2 perforated. If you want to know where the water is
3 going, you need to run a spinner survey.

4 Q. And there's been no study done by Pyote to
5 determine where the water's going?

6 A. Not so far.

7 Q. Okay. Let me ask you about the operations.
8 Who is operating this well currently?

9 A. Well, I can only give you a thumbnail sketch or
10 tell you what my understanding is. And that is that
11 there is a contract --

12 MR. HALL: Mr. Examiner, let me object. I
13 think we clarified this as the first order of business
14 this morning. The record's clear. The operator takes
15 direction from those parties for whom Mr. Antweil and I
16 have made an appearance. There is no question about who
17 is in charge. And Mr. Feldewert's question is beyond
18 the scope of our direct.

19 EXAMINER BROOKS: I agree it's beyond the
20 scope of direct, so I would sustain that part of the
21 objection.

22 Q. (BY MR. FELDEWERT) Are you aware that the
23 operator of record, Pyote Well Service, according to the
24 pleadings that have been filed by whoever is operating
25 it now, that they have disavowed responsibility for this

1 well? That's their words, not mine.

2 A. I don't know what you're talking about. I've
3 not seen any document like that.

4 Q. You didn't see their motion for a continuance
5 where they state that the current operator of record
6 with the Division -- the approved operator of record
7 with the Division has disavowed responsibility for this
8 well?

9 A. You'd -- you'd have to tell me what the date of
10 it is. I don't believe I've seen it.

11 Q. Okay. All right. Are you aware whether the
12 current operator of record is identifying the injection
13 rate -- I'm sorry -- the injection pressure for this
14 well to the Division?

15 A. I don't know.

16 Q. Are you aware that at a prehearing conference,
17 Examiner Jones asked the operator to provide the
18 Division and all parties of record with the daily
19 records of disposal since August 26th?

20 A. The way that was conveyed to me was that one of
21 the Examiners was interested in having updated injection
22 volumes, and that's what I've tried to supply in my
23 Exhibit 8.

24 Q. And that takes us through August and September?

25 A. Yes.

1 Q. Okay. All right. What is the surface
2 injection pressure currently; do you know?

3 A. I do not know.

4 Q. Turn to Mewbourne Exhibit Number 2.

5 A. Yes, sir.

6 Q. I'm looking at the second page, Mr. Johnston.
7 You're here representing whoever the operator is,
8 correct?

9 A. Mewbourne Exhibit 2 or you mean --

10 Q. Mewbourne Exhibit Number 2. I'm sorry. My
11 bad. Exhibit Number 1.

12 A. Yes, sir.

13 Q. Page 2.

14 A. Okay.

15 Q. You're here on behalf of whoever the current
16 operator is?

17 A. I'm --

18 MR. HALL: Again, the witness has been
19 asked and answered. Same objection.

20 EXAMINER BROOKS: Well, I believe that
21 the -- yeah. I'm going to sustain that objection
22 because the record reflects they're here on behalf of
23 the owner. So since the operator is whoever -- since --
24 whoever is made responsible for the operations by the
25 owner is an operator, at least in my view of things. I

1 don't know if there is a Commission ruling on that, but
2 I think legally he can be treated as a representative of
3 the operator.

4 MR. FELDEWERT: Okay.

5 Q. (BY MR. FELDEWERT) And you've examined this
6 disposal well?

7 A. When you say "examined this disposal well,"
8 I've not been on location.

9 Q. Oh, you have not?

10 A. No.

11 Q. So you can't tell us, for example, whether that
12 injection well is currently operating as required by
13 page 2 of this order, whether it has a pressure limiting
14 device?

15 A. I would assume that it is operating in
16 compliance with these provisions. I have seen some
17 inspection reports, so I would assume that sort of
18 equipment was installed.

19 Q. But you didn't check, yourself --

20 A. I've not been on location, no.

21 Q. -- to determine what injection pressure has
22 been used since Pyote --

23 MR. HALL: Mr. Examiner, I'm going to
24 object at this point. This is beyond the scope. It's
25 even beyond the scope of their application. There is no

1 allegation or assertion in their application or
2 elsewhere that they're operating in violation --

3 EXAMINER BROOKS: Well, I don't remember
4 that the subject of injection volumes -- well, yeah,
5 there was testimony about -- the testimony about
6 injection volumes and pressure was irrelevant to his
7 testimony about -- about the distances. So I think that
8 is a proper subject to cross-exam on. I'll overrule the
9 objection.

10 Q. (BY MR. FELDEWERT) All right. So you don't
11 know what pressure at which they've been injecting since
12 Pyote was operating this well, correct?

13 A. No, sir.

14 Q. And you saw the Mewbourne exhibit where --

15 A. Well, let me --

16 Q. You may have commented on this already.

17 MR. HALL: Hang on. Hang on.

18 THE WITNESS: Let me back up. I have been
19 shown a document wherein early on, when Pyote took over
20 the well, the injection pressure was 740 pounds.

21 Q. (BY MR. FELDEWERT) And you said you saw a
22 document to that effect?

23 A. I don't have a paper copy of it. I was just
24 shown that on a computer screen.

25 Q. You don't know what documents you were looking

1 at?

2 A. It was a -- I believe it was a letter from
3 Pyote to a prospective, so to speak, company to put
4 water into the well.

5 Q. Okay. But you can't explain why Pyote has not,
6 since they operated this well, reported their injection
7 pressures to the Division?

8 A. No. But I would expect that that will be
9 rectified.

10 Q. Okay. Now, you are -- you have nothing here
11 today to dispute the geology that was presented by
12 Mr. Lodge, correct?

13 A. You're going to have to be more specific.

14 Q. You sat here during his geologic presentation?

15 A. Yes.

16 Q. You don't have anything to dispute the fact
17 that the 1st Bone Spring Sand exists in and around
18 Section 22?

19 A. I agree with that. The 1st Bone Spring, the
20 2nd Bone Spring and the 3rd Bone Spring intervals are
21 blanket resource plays that extend for miles in all
22 directions from the injection well.

23 Q. Including the Harkey Sands --

24 A. Well, I believe even your testimony showed that
25 as you move, I believe, to the east that that sand

1 thins, so I don't know how far it goes before it shales
2 out.

3 Q. And you don't have anything to dispute his
4 conclusion that all three of these productive Bone
5 Spring sands are potentially productive in the area in
6 which the disposal well is located?

7 A. Well, when you say "in the area," you're going
8 to have to be more specific. I think if you limit that
9 test to within two miles, which is the test for the
10 C-108, I don't think that that's correct.

11 Q. You don't think that the Hark -- that the sands
12 exist within two miles of the saltwater disposal well?

13 A. They may exist, but I'm not sure that there's
14 been demonstrated production.

15 Q. But you don't have anything to indicate that
16 they're not productive?

17 A. Well, they've been penetrated by a number of
18 wells within two miles, and nobody has -- you know, I
19 don't believe that production has been established from
20 all of those benches within the two miles.

21 Q. So if you look at Mewbourne Exhibit Number 4,
22 your testimony is that there is -- despite this exhibit,
23 Mewbourne Exhibit Number 4, your testimony is that there
24 has been nothing to suggest that the 2nd Bone Spring
25 Sand is potentially productive within two miles of the

1 Willow Lake well? Is that your testimony?

2 A. No.

3 Q. Okay. I thought that's what I thought I heard
4 you say.

5 A. No. You were lumping everything together.

6 Q. Okay. So you would agree, then -- you have
7 nothing to dispute the conclusion reached by the
8 geologist that the 2nd Bone Spring Sand within two miles
9 of the Willow Lake well is potentially productive of
10 hydrocarbons?

11 A. I believe the 2nd Bone Spring is clearly
12 productive within two miles of the Willow Lake. It is
13 also clearly the predominant, primary producer.

14 Q. And you're looking at Exhibit Number 6 --
15 Mewbourne Exhibit Number 6?

16 A. Okay.

17 Q. And we see there are two Harkey Sand wells
18 within two miles of the Willow Lake well. Do you see
19 that?

20 A. Yes.

21 Q. And your testimony is that the Harkey sands,
22 within two miles of the Willow Lake well, are not
23 potentially productive? Is that what you're saying?

24 A. I have not verified that those two vertical
25 wells that he's talking about there are Harkey Sand

1 wells. I'm not sure.

2 Q. Okay. Let's assume that he did his homework
3 correctly. Let's assume he did it right. And let's
4 assume that that Harkey well down there in Section 26
5 produced -- what's that number? 43? Can you read that
6 number, cumulative of oil production?

7 A. It appears to be 43,000.

8 Q. Okay. You would agree that that's productive,
9 right?

10 A. Yeah. But I haven't gone and pulled the log on
11 it and verified that that's Harkey Sand. And the other
12 one is 2,000. So I haven't verified from the cross
13 section where those wells are completed.

14 Q. Okay. That's all the questions I have.

15 EXAMINER JONES: Mr. Bruce?

16 MR. BRUCE: No questions.

17 EXAMINER McMILLAN: Okay. I'll start.

18 MR. HALL: May I do some brief follow-up?

19 EXAMINER McMILLAN: Sure. I'm sorry.

20 MR. HALL: Very brief.

21 REDIRECT EXAMINATION

22 BY MR. HALL:

23 Q. Mr. Johnston, have you seen photographs of the
24 surface facility at the Willow Lake location?

25 A. I have seen a couple of photographs, yes.

1 Q. What are we talking about here? What's at
2 stake here? What is --

3 A. Well, I've seen a picture of the wellhead.
4 They have a tank battery that has four or six 500-barrel
5 water tanks, a couple of oil tanks, a gun barrel,
6 secondary containment. Looked to be a fairly sizable
7 triplex pump. So it's -- it's a significant investment.
8 The facility is there. It's been up and running for a
9 number of years.

10 Q. Is the well certified pipeline as well?

11 A. And it is connected to OXY who delivers their
12 water by pipeline.

13 Q. And you've seen recent run tickets for disposal
14 customers utilizing the facility?

15 A. I was provided a spreadsheet of the trucking
16 run tickets from June 1 through September of 25 of this
17 year.

18 Q. And do those customers include COG?

19 A. Yes.

20 Q. Do they include Matador?

21 A. Yes.

22 Q. Do they include Mewbourne?

23 A. Yes.

24 Q. Do they include other operators?

25 A. Yes.

1 MR. HALL: Nothing further.

2 CROSS-EXAMINATION

3 BY EXAMINER McMILLAN:

4 Q. My question is: You said this is a radial
5 flow, right?

6 A. Yes.

7 Q. So do you believe the geologist's -- or I
8 should say the engineer's statement that the fracture
9 orientation is north 45 east to north 70 east?

10 A. I believe that he's probably absolutely
11 correct, but the distinguishing factor is we're
12 injecting into a conventional reservoir. We're keeping
13 the injection pressure within the confines of the
14 permit. So we're not fracking the formation. We're
15 injecting into something that's got pretty good porosity
16 and permeability.

17 Q. But what I'm trying -- so with the Stent well,
18 what's going to be the preferred fracture orientation of
19 that well going to be?

20 A. Well, based on what Mewbourne has just said,
21 which lines up with what I've heard from other operators
22 in the Basin, the frac orientation is -- typically 70
23 degrees off the north is what most people think it is.
24 So the orientation, because that well's been fracked, is
25 going to be almost, you know, east-west.

1 Q. So could a stage of the fracture orientation --
2 could that have aligned up with the Willow Lake well?

3 A. I think the odds of one of the frac stages in
4 the OXY well having extended over a mile are slim to
5 none.

6 Q. You're not aware of any case in the Basin --
7 I'm sorry -- in the Delaware Basin?

8 A. I've heard situations of wells a quarter of a
9 mile away or a location away, 600 feet away, where a
10 frac job -- one well is being fracked and it's being
11 felt or it hits an adjacent well. I haven't heard of
12 anything in this Basin wherein a frac job extends and
13 hits a well a mile away.

14 EXAMINER JONES: Mr. Brooks?

15 EXAMINER BROOKS: No questions.

16 EXAMINER JONES: You're ready for Rotary
17 tonight.

18 (Laughter.)

19 CROSS-EXAMINATION

20 BY EXAMINER JONES:

21 Q. Mr. Johnston, would you say that your injected
22 fluid versus your reservoir is an unfavorable mobility
23 ratio? In other words, why isn't it stimulating other
24 wells around it? Why isn't it sweeping some oil?

25 A. Well, if you look at my Exhibit Number 4, I

1 don't believe that we are injecting into the same
2 stratigraphic equivalent where they're landing these
3 laterals.

4 Q. So you don't think the frac job from the
5 lateral is getting up into these sands that you're
6 probably injecting into?

7 A. I wouldn't think so. I think generally these
8 operators are trying to stay out of the sands that we're
9 injecting into because they are -- they have low water
10 saturations and they're full of water. They don't want
11 the ocean. So I believe that they're designing their
12 frac jobs so that they have a certain height growth
13 that's not going to extend up to the 1st Bone Spring
14 where we are.

15 Q. So would you drill a well in Section 22, a
16 horizontal Bone Spring well? Would you put your money
17 into that?

18 A. I don't know. I guess it would depend on the
19 terms.

20 Q. Right.

21 What about the configuration of the well?
22 Now, you're hired as a witness about this well, so you
23 must know where the plug is set in the well and all the
24 perforations -- where the perforations are, because you
25 had to have seen their data in the well file. Do you

1 know that there is a plug below where they're permitted
2 to inject, and do you know the perforations are within
3 the range of what was permitted?

4 A. Unfortunately, the situation you have is the
5 well was completed -- I'll make this as short as I can.
6 The well was completed by Griffin, and all I can do is
7 assume that the representations that he made in the
8 C-108 as to where the well was going to be perforated
9 and where the bridge plugs below the interval were set,
10 that those are reasonable representations of how the
11 well was completed. Unfortunately, Griffin drilled the
12 well. They turned around and sold it to Mesquite, and
13 then Mesquite sold it to Pyote. And in those
14 transactions, the paper trail got thinner and thinner
15 and thinner, and what they have is a pretty meager well
16 file.

17 Q. But you have seen their well file?

18 A. I've -- during the hearing, I've looked at
19 pieces of it on that iPad right there (indicating).

20 Q. Okay.

21 A. And I didn't find anything that sheds a whole
22 lot of light on, Here is the workover report, where it
23 was converted, and here is where we perforated. I
24 looked through it quickly, but I didn't see it.

25 Q. No chance it's perforated up in the Brushy

1 Canyon, since one of these other wells, you said, is
2 actually a Brushy Canyon well, and it was mistakenly
3 called a Bone Spring well?

4 A. Well, I would hope that that's not the case,
5 but sure, that's a possibility. I guess maybe a
6 solution would be to run a spinner survey and let's find
7 out where the water's going.

8 Q. Okay. Thank you very much.

9 MR. FELDEWERT: One other question.

10 RECROSS EXAMINATION

11 BY MR. FELDEWERT:

12 Q. Do you know -- Mr. Johnston, do you know what
13 the current tubing injection pressure is for the Willow
14 Lake disposal well?

15 A. No.

16 Q. So we don't know the surface pressure, and we
17 don't know the tubing injection pressure?

18 A. Well, they would be one and the same.

19 Q. Okay. Thanks.

20 EXAMINER JONES: Is that it?

21 MR. HALL: That's it.

22 THE WITNESS: Thank you.

23 EXAMINER JONES: Thank you very much.

24 EXAMINER McMILLAN: Thank you.

25 EXAMINER JONES: Any closing statements?

1 MR. FELDEWERT: No.

2 EXAMINER JONES: No?

3 (Laughter.)

4 MR. FELDEWERT: It's ten to 6:00. He's
5 (indicating) got to go to Rotary.

6 I don't think you need any more information
7 than what you've got.

8 MR. HALL: I'm going to make a very brief
9 close.

10 CLOSING ARGUMENT

11 MR. HALL: Bear in mind that this well was
12 originally permitted and approved for injection into the
13 established SWD pool, SWD Bone Spring 96095. That is
14 worth bearing in mind.

15 Now, from the evidence we've seen here
16 today, I don't think anybody has provided you with any
17 evidence that shows anything other than these
18 water-to-oil ratios exhibited by these area wells are
19 anything but normal. And the Division has previously
20 looked at high-water production in this Willow Lake;
21 Bone Spring Pool. There are pool rules for the Willow
22 Lake; Bone Spring Pool that are revealing, but the
23 neighboring pool is the Southeast Willow Lake; Bone
24 Spring Pool and they do have special pool rules. And I
25 refer you to Order R-13427. And in finding seven of

1 that order, the Division found that water production in
2 this area in the Bone Spring is very high. It's normal.
3 And it's been known for some time.

4 So you have -- Mewbourne is coming here
5 with what I think is ambivalent, unclear evidence,
6 asking the Division to render very drastic relief.
7 They're asking that you undo a previously approved state
8 permit for injection, leaving a number of operators high
9 and dry without access to injection operations, and we
10 now know that that adversely affects project economics
11 out there. That will lead to waste. What they're
12 asking you to do will lead to waste.

13 So the strength of evidence they have
14 presented here, to do something like that, to revoke a
15 permit, it has to be more than a preponderance of the
16 evidence, I think. It has to be overwhelming.

17 During the course of the day today, I was
18 reminded of another case that I was involved in. I
19 think it predates everybody in the room except me and
20 Jim Bruce. And it involved the Pendragon and Maralex
21 case, where we were talking about fractures out of
22 formation out the Pictured Cliffs, out of the Fruitland
23 coal. It appears that both wells fracked into each
24 other and operators were pointing fingers. And the same
25 thing, Fruitland coal operators came before the Division

1 and asked for termination of a producing permit. And
2 the Division -- in fact, the Commission said, you know,
3 Based on the evidence you presented -- and it went on
4 for more than a week. The Division said, We cannot
5 resolve this case; you're going to have to come back to
6 us with better information.

7 And what the Division had -- in fact, I
8 think it was the Commission had the operators do in that
9 case was shut in both their wells, insert pressure bombs
10 and then pulse the wells to see what the pressure
11 responses were back and forth to try to get a better
12 picture.

13 Something akin to that could be done here,
14 so you have stronger evidence upon which you can base a
15 ruling. You can run a tracer survey. You can run a
16 spinner survey. It doesn't sound like either one of
17 those are that difficult to do, but neither party has
18 come forth to give you that today. We don't think it's
19 warranted based on the other evidence. But if you're
20 going to make a determination about the existence of
21 this permit, it has to be stronger evidence than what
22 we've seen today.

23 Another telling fact here, there is an
24 absence of evidence. Where is COG? Where is OXY? They
25 didn't think enough of this to send personnel to support

1 Mewbourne here. Where's Matador? They actually had
2 people here today. They left. Kaiser-Francis, they
3 could have sent someone up. They didn't. I think
4 that's pretty telling. I don't think they're as worried
5 as Mewbourne asserts they are.

6 Finally, I think you have to look closely
7 at absence of notice in this case. It seems to me that
8 if you're going to approve an injection permit and then
9 if you're going to consider an application to undo an
10 injection permit, you need to follow the protocols that
11 are set out in Rule 19.15.26.8(B)(2), the standard
12 injection well application protocols. You notify all
13 the operators within a half mile or affected persons.
14 We had zero testimony about who the operators were, who
15 the other affected persons were. We don't have any
16 evidence they even notified the land management agency,
17 the BLM. I think the Division really needs to consider
18 this wholesale failure of notice in the case. And I
19 think that for that reason alone the application -- it's
20 required to be rejected.

21 EXAMINER BROOKS: Isn't the rule you cited
22 the rule of application for new permit?

23 MR. FELDEWERT: Yes.

24 MR. HALL: Permit for injection. It
25 doesn't limit it to new permit. It would seem to be

1 equally applicable to modification of an existing permit
2 or revocation of an existing permit.

3 EXAMINER BROOKS: I had assumed that the
4 modification or revocation would be an other action, and
5 it would come under the catchall rule in the 12.4 that
6 says all other applications require notice to whoever
7 the Division directs.

8 If you're through, I --

9 MR. HALL: I'm finished.

10 EXAMINER BROOKS: -- want to ask
11 Mr. Feldewert a question about the notice issue.

12 Did you file an Affidavit of Notice?

13 MR. FELDEWERT: No, because we provided
14 notice to the operator of the well and Receiver.

15 EXAMINER BROOKS: There are no notice
16 issues as far as these respondents because they're here
17 and they've appeared.

18 MR. FELDEWERT: Yes.

19 EXAMINER BROOKS: They have notice. But
20 you did not file any Affidavit of Notice indicating
21 any --

22 MR. FELDEWERT: To whom?

23 EXAMINER BROOKS: To anyone other than the
24 Receiver. We haven't required you to notify anyone
25 else?

1 MR. FELDEWERT: Well, you know, we were
2 told to notify the Receiver. That's what they said
3 needed to be done, and that's what we did.

4 EXAMINER BROOKS: Well, that's one of the
5 issues.

6 MR. FELDEWERT: And we also -- Mr. Brooks,
7 we also gave notice to the operator of record with the
8 Division at their address.

9 EXAMINER BROOKS: Right. I think I
10 remember that in the motion to continue -- motion for
11 continuance.

12 Thank you very much.

13 MR. FELDEWERT: Let me say a couple of
14 things.

15 EXAMINER BROOKS: Okay. You're entitled to
16 respond.

17 CLOSING ARGUMENT

18 MR. FELDEWERT: Thank you.

19 You are the Division. What's your job?
20 Prevent waste and protect correlative rights. Okay?

21 And we're looking at a disposal well here
22 where, under their own filing, the current operator
23 said, Hey, we're disavowing responsibility for this
24 well; we're out of here.

25 Who is the operator? I don't know. You

1 guys don't know. They won't tell us. They won't let me
2 ask this guy (indicating). Okay? What pressures are
3 they injecting at? Who's doing the operation out there?
4 You guys don't know. You don't know at all. Okay?

5 Mr. Hall says, Oh, well, you know, this
6 Bone Spring is a high-water content. Well, that doesn't
7 authorize for them to increase the water content in what
8 we now know, based on the evidence presented today,
9 undisputed, is a clearly productive oil and gas
10 producing zone, whether you want to look at the 1st Bone
11 Spring Sand, the 2nd Bone Spring Sand or the Harkey
12 Sand.

13 Unlike 1999, when they got approval for
14 this, when they represented Griffin, there was no
15 production out there; this was not a productive oil
16 zone. Okay? We now know this is a productive zone.
17 You-all know this is a productive zone, and it is your
18 job to prevent waste and protect correlative rights.

19 You have OXY appearing here today saying,
20 We agree this well should be shut in; Kaiser-Francis
21 appearing here today saying, We agree this well should
22 be shut in. Okay?

23 Let's say nobody appeared, and let's say
24 the evidence came to you today without any other
25 supporting parties that shows you that this is a

1 productive oil and gas zone. What is your
2 responsibility at that point? To shut this well in
3 because you are drowning a productive oil and gas zone,
4 and that is your duty. That is your responsibility.
5 And unless you disagree with the evidence, that this is
6 not a productive zone, then under the terms of that
7 order, to prevent waste and protect correlative rights,
8 you have to shut this well in.

9 Now, if they want to go out and do some
10 kind of tracer survey and do some kind of spinner survey
11 and try to show finally where this water is going,
12 because nobody can tell us where the perfs are, okay,
13 fine, they can do that. But under this current order,
14 it is permitted in a productive oil and gas zone. Now
15 that you know that, that order has to be rescinded.
16 This well has to be shut in or you're not -- you're not
17 complying with your statutory duties to prevent waste
18 and protective correlative rights.

19 EXAMINER BROOKS: Now, are you relying on
20 something specific in the permit or just the general
21 rules about --

22 MR. FELDEWERT: If you look at SWD-704.

23 EXAMINER BROOKS: That's what I was in the
24 process of doing.

25 MR. FELDEWERT: Yeah. Page 2, "Provided

1 Further...jurisdiction is retained" -- I don't want to
2 read it because you'll (indicating) type it all in. But
3 you read that, and you have continued jurisdiction to
4 ensure that this well is not -- is not impairing
5 correlative rights and it's not causing waste.

6 EXAMINER BROOKS: Yeah. That's a standard
7 provision we put in all our orders, but I was wondering
8 if there was something somewhere that says or
9 explains -- a permit or a rule that says you cannot --
10 you cannot under any circumstances authorize injection
11 into a productive zone, because I thought --

12 MR. FELDEWERT: Well, let me step back.
13 There have been some recent orders issued by the
14 Division in which they have examined whether they're
15 going to allow injection into the Delaware. Okay? And
16 they've said that injection is not authorized where
17 there is a viable potential for occurrences of
18 hydrocarbon resources -- that's the orders' language --
19 or where there is a probability that recoverable oil and
20 gas reserves exist. That's the standard to allow
21 injection.

22 EXAMINER BROOKS: Okay. Well, I don't -- I
23 don't want to prolong this at this hour of the night,
24 but if Mr. Hall -- since you have made some additional
25 argument, if Mr. Hall wants to respond, I think he

1 should have --

2 MR. HALL: Thank you. We'll pass. I need
3 to get my guys on a plane.

4 EXAMINER JONES: What about Kaiser-Francis?

5 MR. BRUCE: Well, I had a bunch of things
6 to say, but based on Mr. Feldewert's last comment, he
7 said recent Division order. I would go state to the
8 Commission, but I don't have the order number. But the
9 High Roller wells case said exactly what Mr. Feldewert
10 said. If there is a reasonable chance of production in
11 the zone, don't inject. I can get you the order number.

12 EXAMINER BROOKS: I would appreciate that.
13 I'm not going to write this order, but I may be
14 consulted on the legal issues.

15 EXAMINER McMILLAN: Thank you.

16 So Case Number 15519 shall be taken under
17 advisement.

18 And this concludes the docket for September
19 the 29th, 2016. Thank you very much.

20 (Case Number 15519 concludes, 6:00 p.m.)

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1 STATE OF NEW MEXICO
2 COUNTY OF BERNALILLO

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CERTIFICATE OF COURT REPORTER

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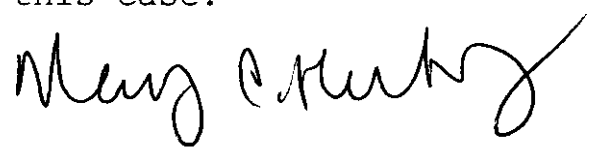
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