

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

4 IN THE MATTER OF THE HEARING CALLED
5 BY THE OIL CONSERVATION COMMISSION FOR
6 THE PURPOSE OF CONSIDERING:

7 APPLICATION OF THE NEW MEXICO OIL CONSERVATION DIVISION THROUGH THE
8 SUPERVISOR OF DISTRICT II FOR AN EMERGENCY ORDER SUSPENDING CERTAIN
9 APPROVED APPLICATIONS FOR PERMITS TO DRILL, AND FOR ADOPTION OF A
10 SPECIAL RULE FOR DRILLING IN CERTAIN AREAS FOR THE PROTECTION
11 OF FRESH WATER, CHAVES AND EDDY COUNTIES, NEW MEXICO. CASE NO. 15487

12 REPORTER'S TRANSCRIPT OF PROCEEDINGS
13 COMMISSIONER HEARING

14 December 6, 2016
15 Volume 2 of 3
16 Santa Fe, New Mexico

17 BEFORE: DAVID R. CATANACH, CHAIRPERSON
18 PATRICK PADILLA, COMMISSIONER
19 DR. ROBERT S. BALCH, COMMISSIONER
20 CHERYL BADA, ESQ.

21 This matter came on for hearing before the
22 New Mexico Oil Conservation Commission on Tuesday,
23 December 6, 2016, at the New Mexico Energy, Minerals and
24 Natural Resources Department, Wendell Chino Building,
25 1220 South St. Francis Drive, Porter Hall, Room 102,
Santa Fe, New Mexico.

26 REPORTED BY: Mary C. Hankins, CCR, RPR
27 New Mexico CCR #20
28 Paul Baca Professional Court Reporters
29 500 4th Street, Northwest, Suite 105
30 Albuquerque, New Mexico 87102
31 (505) 843-9241

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

APPEARANCES

FOR APPLICANT NEW MEXICO OIL CONSERVATION DIVISION:

DAVID K. BROOKS, ESQ.
STATE OF NEW MEXICO OIL CONSERVATION DIVISION
ENERGY, MINERALS & NATURAL RESOURCES DEPARTMENT
OFFICE OF GENERAL COUNSEL
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
(505) 476-3463
Davidk.Brooks@state.nm.us

FOR PECOS VALLEY ARTESIAN CONSERVANCY DISTRICT:

A.J. OLSEN, ESQ.
and
OLIVIA R. MITCHELL, ESQ.
HENNINGHAUSEN & OLSEN, L.L.P.
604 North Richardson Avenue
Post Office Box 1415
Roswell, New Mexico 88202-1415
ajolsen@h2olawyers.com
omitchell@h2olawyers.com

FOR RESPONDENTS COG OPERATING, LLC; OXY USA, INC.; AND
FASKEN OIL & RANCH:

MICHAEL H. FELDEWERT, ESQ.
HOLLAND & HART
110 North Guadalupe, Suite 1
Santa Fe, New Mexico 87501
(505) 988-4421
mfeldewert@hollandhart.com

FOR RESPONDENTS EOG Y RESOURCES AND LIME ROCK RESOURCES
II-A:

GARY W. LARSON, ESQ.
HINKLE SHANOR, LLP
218 Montezuma Avenue
Santa Fe, New Mexico 87501
(505) 982-4554
glarson@hinklelawfirm.com

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

APPEARANCES (Cont'd)

FOR RESPONDENTS MACK ENERGY CORPORATION AND DEVON ENERGY
PRODUCTION COMPANY, L.P.:

JAMES G. BRUCE, ESQ.
Post Office Box 1056
Santa Fe, New Mexico 87504
(505) 982-2043
jamesbruc@aol.com

FOR RESPONDENT INDEPENDENT PETROLEUM ASSOCIATION OF NEW
MEXICO (IPANM):

KARIN V. FOSTER, ESQ.
SOUTHWEST GOVERNMENT AFFAIRS, LLC
5808 Mariola Place, Northeast
Albuquerque, New Mexico 87111
(505) 238-8385
karin@SWgovernmentaffairs.com

1	INDEX	
2		PAGE
3	Case Number 15487 Resumed	7
4	NMOCD's Case-in-Chief (Cont'd):	
5	Witnesses:	
6	Paul Kautz (Cont'd):	
7	Continued Cross-Examination by Mr. Feldewert	7
	Cross-Examination by Mr. Larson	16
8	Cross-Examination by Chairman Catanach	18
	Cross-Examination by Commissioner Balch	23
9	Cross-Examination by Commissioner Padilla	25
	Recross Examination by Chairman Catanach	29
10	Redirect Examination by Mr. Brooks	30
	Recross Examination by Mr. Feldewert	36
11		
12	NMOCD Rests	40
13	Pecos Valley Artesian Conservancy District's	
	Case-in-Chief:	
14	Witnesses:	
15	Jack B. Atkins:	
16	Direct Examination by Mr. Olsen	42
17	Voir Dire Examination by Mr. Feldewert	70
	Continued Direct Examination by Mr. Olsen	76
18	Cross-Examination by Mr. Brooks	83
	Cross-Examination by Mr. Feldewert	85
19	Cross-Examination by Mr. Bruce	96
	Cross-Examination by Commissioner Balch	96
20	Cross-Examination by Commissioner Padilla	105
	Recross Examination by Commissioner Balch	115
21	Cross-Examination by Chairman Catanach	115
	Recross Examination by Commissioner Padilla	119
22	Recross Examination by Mr. Feldewert	120
23		
24		
25		

1	INDEX (Cont'd)	
2		PAGE
3	Pecos Valley Artesian Conservancy District's	
4	Case-in-Chief (Cont'd):	
5	Witnesses:	
6	Roger Peery:	
7	Direct Examination by Mr. Olsen	124
8	Cross-Examination by Mr. Feldewert	160
9	Cross-Examination by Ms. Foster	171
10	Cross-Examination by Commissioner Balch	177
11	Cross-Examination by Chairman Catanach	184
12	Cross-Examination by Commissioner Padilla	186
13	COG, OXY and Fasken's Case-in-Chief:	
14	Witnesses:	
15	Carl Bird:	
16	Direct Examination by Mr. Feldewert	196
17	Cross-Examination by Mr. Brooks	233
18	Cross-Examination by Mr. Olsen	243
19	Cross-Examination by Mr. Bruce	256
20	Cross-Examination by Chairman Catanach	259
21	Cross-Examination by Commissioner Padilla	266
22	Cross-Examination by Commissioner Balch	270
23	Recess	274
24	Certificate of Court Reporter	275
25		

1	EXHIBITS OFFERED AND ADMITTED	
2		PAGE
3	NMOCD Exhibit Number 2	40
4	PVACD Exhibit Numbers 1 and 2	160
5	PVACD Exhibit Numbers 4 through 8	160
6	COG, OXY and Fasken Exhibit Numbers 1 through 11	233
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		
25		

1 (8:10 a.m.)

2 CHAIRMAN CATANACH: Call the hearing back
3 to order this morning. I believe that when we adjourned
4 yesterday, Mr. Feldewert was still cross-examining
5 Mr. Kautz, so we'll resume where we left off.

6 MR. FELDEWERT: Good morning.

7 CHAIRMAN CATANACH: Good morning, sir.

8 CONTINUED CROSS-EXAMINATION

9 BY MR. FELDEWERT:

10 Q. Good morning, Mr. Kautz.

11 A. Good morning.

12 Q. Do you have Respondent's Exhibit 1 in that
13 package in front you? That would be the Division's
14 current rules. And, if so, would you turn to that,
15 please, although I suspect you're fairly familiar with
16 it.

17 A. I don't have that.

18 Q. Okay. I'm going to represent to you that
19 Respondent's Exhibit 1 is Subpart 16.9, which is
20 entitled "Sealing Off Strata," and then 16.10, which is
21 the "Casing and Tubing Requirements." You're familiar
22 with those, right, Mr. Kautz?

23 A. Yes, I am.

24 Q. And I believe you have implemented these
25 regulations on behalf of the Division for a number of

1 years, correct?

2 A. Yes, sir.

3 Q. And as I read through 16.10A, it requires at
4 least one casing string cemented to surface to seal off
5 and isolate the water-bearing strata, correct?

6 A. Yes, sir.

7 Q. And then it further provides that for two
8 protective strings as may be necessary, giving you the
9 flexibility you need to adjust across the Basin; isn't
10 that true?

11 A. Yes, sir.

12 Q. Okay. And you have implemented those rules for
13 quite some time?

14 A. Yes, sir.

15 Q. And I think you testified in May, Mr. Kautz,
16 that you thought that a single protective string was
17 appropriate in most circumstances so long as it extended
18 deep enough to cover the deepest aquifer?

19 A. That's correct.

20 Q. And, of course, cemented to surface, right? I
21 mean, we would want that single string to be cemented to
22 surface as well, correct?

23 A. Yes, sir.

24 Q. And that's what the current rules provide now?

25 A. Yes, sir.

1 Q. And if I go down and I continue to look through
2 16.10B, of course that's the one that requires the
3 protective string to be cemented to surface, and then
4 there are provisions that follow that. And I realize
5 you don't have them in front of you, but they require,
6 for example, that all the casing strings, once they've
7 been -- they've stood and been cemented for a period of
8 time, to be pressure tested, right? That has to be
9 done?

10 A. Yes, sir.

11 Q. And it requires them to -- it has other
12 requirements set forth in this particular rule to ensure
13 that the protective string and the production string are
14 all cemented properly and that they have mechanical
15 integrity, right?

16 A. That's correct.

17 Q. Would you agree with me that these regulations
18 that have been implemented now for a period of time,
19 when they are properly applied, that those have
20 withstood the test of time and proven to be protective
21 of aquifers?

22 A. Yes, sir.

23 Q. And if I look -- I don't know if you have in
24 front of you -- well, you should have the Division's
25 Figure 3. We all saw that yesterday. And that showed

1 the shallow area -- that's the shallow aquifer area that
2 showed the artesian deeper aquifer area, your designated
3 area.

4 You would agree with me that there have
5 been thousands of wells drilled in that area, correct,
6 Mr. Kautz?

7 A. In which area?

8 Q. In the area that is included within what the
9 Division has defined as the designated area.

10 A. That is correct. Yes.

11 Q. How many years of drilling would you estimate
12 there has been out there?

13 A. 75 years at least.

14 Q. Okay. And many, if not most of those wells,
15 Mr. Kautz, were drilled and completed with a single
16 protective string through the aquifers; is that correct?

17 A. Yes, sir.

18 Q. I mean, there are circumstances where there
19 have been two protective strings utilized?

20 A. That is correct.

21 Q. Okay. And do you see those, for example, where
22 you have drilling hazards that are encountered during
23 drilling?

24 A. I'm not sure on that.

25 Q. Okay. So you haven't examined the

1 circumstances under which there were two protective
2 strings utilized instead of a single protective string?

3 A. Usually the well costs do not state any reason
4 why they ran a second string.

5 Q. Okay. All right. Now, you have been -- let's
6 see. I looked at your resume. You have been the
7 Division geologist since 1981; is that right?

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

9 Q. You are their longest-serving technical expert?

10 A. Yes, sir.

11 Q. It's been your job to review the applications
12 to drill in this area to ensure that they meet the
13 Division requirements?

14 A. From time to time, yes, I have.

15 Q. All right. And you've spent the past few
16 months -- as I recall your testimony in May, you've
17 spent the past few months before that and I assume after
18 that studying the issues presented by this particular
19 case?

20 A. Yes, sir.

21 Q. And you have found no evidence to suggest that
22 the existing regulations are not sufficient to protect
23 the aquifers, have you?

24 A. That is correct.

25 Q. No evidence of groundwater contamination; no

1 evidence of fluid migration; is that right?

2 A. That is correct.

3 Q. And I think you testified back in May that you
4 met with the Pecos Valley Conservancy about their
5 concerns in this particular area?

6 A. Yes, sir.

7 Q. And I think you testified that you specifically
8 requested information from them about any groundwater
9 issues. Do you recall that?

10 MR. OLSEN: Mr. Director --

11 THE WITNESS: Yes, sir.

12 MR. OLSEN: -- I'd like to tender at least
13 an objection or go to counsel's objection yesterday
14 about making reference to the witness' prior testimony.
15 If we're going to go that route, I'd like to proffer to
16 the Division the transcript of the witness' testimony
17 for the Division to review and/or the witness have an
18 opportunity to be identified that part of his testimony
19 that counsel's making reference to. I think it's only
20 fair. If counsel wants to make reference to that part,
21 we do have a copy of the transcript of the testimony
22 available for the Division.

23 CHAIRMAN CATANACH: Mr. Feldewert, do you
24 want to work from that transcript?

25 MR. FELDEWERT: Mr. Chairman, there is no

1 need to work from the transcript because Mr. Kautz
2 recalls his testimony. The only time you use a
3 transcript is when the witness needs to have his
4 recollection recalled about what he testified, and
5 Mr. Kautz remembers his testimony. We don't need the
6 transcript.

7 CHAIRMAN CATANACH: Okay. Let's proceed.

8 Q. (BY MR. FELDEWERT) Mr. Kautz, getting back, you
9 met with the Conservancy District and asked them if they
10 had any specific information about groundwater
11 contamination; is that right?

12 A. Yes, sir.

13 Q. And you informed them that if they had
14 anything, that they should bring it to you so that you
15 could look at it?

16 A. That is correct.

17 Q. And did they provide you any information or any
18 evidence of any groundwater contamination or fluid
19 migration in this area?

20 A. They provided two possible groundwater
21 contaminations where hydrocarbons were present. I
22 referred that immediately to the district supervisor and
23 Heather and Mike. They're environmental specialists in
24 the Artesia office.

25 Q. Okay. And did that indicate that there was any

1 fluid migration or groundwater contamination as a result
2 of these decades of oil and gas drilling?

3 A. I don't believe -- I don't believe there was
4 any indication whether it was -- hydrocarbons were
5 originally in place or were from a source of
6 contamination. It's impossible to determine.

7 Q. Okay. All right. So this application is
8 suggesting that these special rules are necessary, but
9 you have not found any evidence to indicate that they
10 have not been protected, correct, that the existing
11 rules --

12 A. I have not found any instances where the
13 groundwater has not been protected.

14 Q. Okay. And the Pecos Valley -- and the Division
15 overall has not found any instances to indicate that
16 these existing rules have not been protective of the
17 aquifers, correct?

18 A. That's correct.

19 Q. And Pecos Valley Conservancy has not presented
20 you with any information indicating that the existing
21 rules have not been protective?

22 A. That's correct.

23 Q. Given your opinion -- let me ask your opinion,
24 Mr. Kautz, as a regulatory expert with over 35 years of
25 oversight in this area. Does the available evidence

1 that we have here today indicate that the existing
2 regulations and the current drilling practices have
3 adequately protected both the shallow aquifer and the
4 deeper artesian aquifer in this area?

5 A. I -- I believe our rules have led to the
6 potential of groundwater contamination based on the fact
7 that when this first came to light, nobody in the
8 Artesia District Office was aware of any special casing
9 requirements in this area. So I do believe we need
10 special pool rules -- or special rules for this area so
11 that in the future, the groundwater is protected to the
12 fullest extent possible.

13 Q. Okay. But if we take your rules today,
14 Mr. Kautz, and if everybody is educated about the
15 current rules and if they are properly applied, you're
16 not aware of any evidence indicating that they are not
17 protective of the aquifers out there, correct?

18 A. Correct.

19 Q. All right. And that the only issue that has
20 arisen, and I think this is what you're alluding to, is
21 that certain applications to drill were mistakenly
22 approved without casing that is sufficient to cover both
23 aquifers because some people were not aware of the
24 aquifers or not aware of the regulations; is that
25 correct?

1 A. That's correct.

2 Q. And we don't need special rules to solve that
3 problem, do we?

4 A. I believe so.

5 Q. Okay. All right. One alternative, though,
6 would be to make sure that everybody is properly
7 educated about the aquifers and about the existing
8 rules; isn't that correct, Mr. Kautz?

9 A. That's correct.

10 MR. FELDEWERT: All right. That's all the
11 questions I have.

12 CHAIRMAN CATANACH: Thank you,
13 Mr. Feldewert.

14 Mr. Larson?

15 CROSS-EXAMINATION

16 BY MR. LARSON:

17 Q. Good morning, Mr. Kautz.

18 I admit to being somewhat confused by your
19 testimony yesterday afternoon in response to questions
20 by Mr. Olsen and Mr. Brooks about your testimony at the
21 May 10 hearing, and I would like to clarify one point.

22 Do you recall testifying at that hearing
23 that you had not ruled out continuing to allow a single
24 surface casing string that would reach the lower depth
25 of protectable groundwater?

1 A. Yes, sir.

2 Q. Are you now saying that you've ruled out that
3 option?

4 A. I have my concerns on particularly the artesian
5 aquifer and the use of natural mark to -- whether it's
6 adequately weighted enough to prevent cross-flow.

7 Q. And is that a mudding issue or a casing string
8 issue?

9 A. That's mudding -- mud issue.

10 Q. If the mud issue was addressed, in your
11 opinion, would a single casing string to the bottom of
12 the artesian aquifer cased to the surface be protective
13 of groundwater?

14 A. Yes.

15 Q. And in your considerable experience in the
16 Hobbs District Office, do you recall being provided with
17 information about oil shows at the base of the confining
18 unit continuing into the top of the San Andres?

19 A. Yes. I did receive information.

20 Q. And in that circumstance, if there is an oil
21 show -- and for reference, I direct your attention to
22 Figure 4 of Division Exhibit 1. Do you have that handy,
23 the Stratigraphic column?

24 A. Yes, I do have that.

25 Q. Okay. And a circumstance where there is an oil

1 show, for instance, at the base of the confining bed and
2 oil shows in the artesian aquifer, where would you have
3 an operator install an intermediate casing string? To
4 what depth?

5 A. At least 50 feet above the occurrence of the
6 show.

7 Q. So if the show's in the confining bed, the
8 intermediate casing string would not go down to the San
9 Andres, would it?

10 A. That's correct.

11 MR. LARSON: That's all I have,
12 Mr. Examiner.

13 Thank you, Mr. Kautz.

14 CHAIRMAN CATANACH: Mr. Bruce, any
15 questions?

16 MR. BRUCE: No questions.

17 CHAIRMAN CATANACH: Ms. Foster?

18 MS. FOSTER: No questions.

19 CROSS-EXAMINATION

20 BY CHAIRMAN CATANACH:

21 Q. Good morning, Mr. Kautz. I have a few
22 questions.

23 Historically, what have we done in that
24 area? I know that there are a lot wells that have two
25 water protective strings and there are a lot of wells

1 that have a single water protective string. I mean, has
2 that just been -- how has that been permitted over the
3 years? We've never had a consistent policy over there?

4 A. That's true. We have not. There are even
5 examples of some of the older wells, some back in the
6 '50s where the casing was just mudded in instead of
7 cemented in.

8 Q. So what we're proposing is something new with
9 the two water protective strings? We've never enforced
10 that in the past?

11 A. That's true. We have not.

12 Q. So with two water protection strings -- I
13 understand how the shallow aquifer is absolutely
14 protective. What is your concern with regards to a
15 single water protection string? What do you feel -- why
16 is that inadequate?

17 A. There's the potential that you're not
18 preventing a cross-flow from the artesian aquifer into
19 the shallow aquifer.

20 Q. Would that be during drilling operation?

21 A. Yes, sir.

22 Q. Are you concerned, Mr. Kautz, about the
23 qualities of the cement for the possible channelling of
24 the cement on a single water protection string?

25 A. I, so far, have seen no problems with that.

1 Q. Have you talked to the BLM about this issue,
2 because wouldn't they have jurisdiction over federal
3 wells in this area?

4 A. I believe BLM is leaving it up to our -- for
5 the OCD to solve this problem.

6 Q. And they would abide by whatever we decided?

7 A. Yes, sir.

8 Q. Okay. The two contamination cases that you
9 talked about previously, am I correct that those -- you
10 have, to a certain extent, investigated what the causes
11 might be of that, or District 2 staff did?

12 A. District 2 staff did, so yes.

13 Q. And they came to no conclusion that -- where
14 the contamination might be or might have originated
15 from?

16 A. That's correct.

17 Q. Do you know what the contamination issue was
18 specifically?

19 A. There was one well that when they first started
20 producing the water from the well, it produced about
21 five -- something like five barrels of oil or something
22 like that, and just after that, it cleared up, just
23 water.

24 Q. Were they producing from the shallow aquifer?

25 A. I'm not sure about that.

1 Q. Mr. Kautz, I asked Mr. Goetze this. Have you
2 seen any issues of lost circulation when cementing the
3 deeper artesian casing string?

4 A. Yes. There has been instances of lost
5 circulation. It's usually made up with -- after a
6 period of time.

7 Q. So would that be a concern with cementing that
8 longer string -- that water protection string?

9 A. It could be a potential problem.

10 Q. Do you know of any instances where any company
11 had to run a 1-inch to finish putting the cement --
12 placing the cement to the surface?

13 A. There's been numerous times that they have had
14 to use 1 inch. I don't know an exact number.

15 Q. So cementing that longer string is definitely a
16 concern?

17 A. Yes, sir.

18 Q. Mr. Kautz, there was a question with regards to
19 the production casing being required to circulate to
20 surface. That is not a recommendation you're proposing;
21 is that correct?

22 A. No, sir.

23 Q. So you would be okay with -- you would accept
24 500 feet into the upper casing string on the long
25 string?

1 A. I really take that back. If they're only
2 running two strings, I require both strings to be
3 circulated no matter where they are at, whether they're
4 in Lea County or Eddy County. If they're running more
5 than two strings, then I require them to at least tie
6 back into the intermediate casing.

7 Q. So if the Commission chooses to adopt a single
8 water protection string, you're saying if the production
9 string is the only other casing string, you would
10 require that to be circulated?

11 A. Yes, sir.

12 Q. With two water protection strings, would it be
13 adequate? You just tie that back into the deeper water
14 string?

15 A. That's correct.

16 Q. I just want to clarify also your position on
17 the 2-inch. Are you recommending 2 inches in excess of
18 the coupling size in the casing?

19 A. Yes, sir, because that's what we've always
20 required in the past.

21 Q. So 2 inches greater than the largest diameter
22 of the casing?

23 A. That's correct.

24 Q. Okay. I have no further questions.

25

1 CROSS-EXAMINATION

2 BY COMMISSIONER BALCH:

3 Q. Good morning.

4 A. Good morning.

5 Q. A lot of my questions have been asked already.

6 I'm a little bit curious about the curing
7 of the cement. Do you have any idea how long that might
8 take to cure on an average?

9 A. Well, I've talked to our resident expert here
10 on cement and cement bonds, and he feels that 24, 26
11 hours is a minimum requirement before running cement
12 bond logs, and that he would actually prefer a week even
13 better, especially if you're running any light cement.
14 But 36 hours -- 24 to 36 hours would probably be the
15 ideal time.

16 Q. So one-and-a-half to seven days would be a time
17 range?

18 A. Yes, sir.

19 Q. And what happens if one of these bond logs were
20 to come to you and it was not sufficient?

21 A. Well, then, I'd have to get together with the
22 district supervisor and the operator and talk about
23 possibilities of -- any possibilities of remedying that
24 problem.

25 Q. I'm a little bit concerned about the amount of

1 time a rig is going to be sitting idle in this scenario.
2 It could mean tens of thousands of dollars a day for a
3 large rig.

4 If you drill and case and cement the
5 surface, run the bond log whenever it's ready but
6 continue drilling otherwise, would you end up in the
7 same situation if that bond log remediates before you
8 complete the well?

9 A. Yes, sir.

10 Q. Do you think that would be -- would give the
11 same level of protection for sure?

12 A. I'm really not sure.

13 Q. But if you have a scenario where you're running
14 two casing strings and you have two to seven days' delay
15 on the first string and then two to seven days' delay on
16 the second string, that could add up to as much as 14
17 days of idle rig time.

18 A. We're not -- we're not recommending a seven-day
19 delay. We're recommending 24 to 36 hours.

20 Q. But if you want to have the best result for the
21 cement bond log, you may have to wait as many as seven
22 days for the lighter cement?

23 A. Yes, sir.

24 Q. Thank you. That's all my questions.

25

1 CROSS-EXAMINATION

2 BY COMMISSIONER PADILLA:

3 Q. Good morning, Mr. Kautz.

4 I just want to follow up on what Dr. Balch
5 was talking about there with the cement bond logs. So
6 when we spoke yesterday about the OCD processing or
7 approving those logs as we go forward, you're really
8 talking about from the point at the end of the two to
9 seven days, correct, when OCD theoretically would see
10 that information and say yea or nay?

11 A. That's correct.

12 Q. Okay. I have the same concerns that Dr. Balch
13 has with having standby to complete a drilling package.
14 To me that seems like quite a bit of regulatory
15 uncertainty for those kind of expenditures.

16 Yesterday you testified that that
17 turnaround would be pretty instantaneous. Mr. Goetze
18 did as well, assuming it comes to your desk or his or
19 someone else like-minded. I can't help but think that
20 this is a little bit -- this proposal is really kind of
21 predicated on having people with the -- you know, the
22 obvious level of dedication to the job. I'm a little
23 worried that -- we're talking about something that's
24 going to be, you know, in perpetuity. It's got to
25 outlast everyone, as far as the rule goes. Do you have

1 any concerns about that, as far as processing under an
2 admittedly strained agency budget going forward?

3 A. That is a potential problem.

4 Q. Okay. The 2-inch diameter that's been referred
5 to --

6 COMMISSIONER PADILLA: Mr. Brooks, I should
7 ask you. Do you have a further witness who is going to
8 testify more on this?

9 MR. BROOKS: No, sir.

10 Q. (BY COMMISSIONER PADILLA) You said 2 inches
11 from the max outside diameter of that casing was what
12 you were looking at as far as a standard because that's
13 the way the OCD had always done that. Is there any
14 reason for that, for using the coupling?

15 A. There's a requirement in the State Engineer's
16 Office for -- well, it's for casing that penetrates
17 freshwater zones, that it at least be 2 inches greater
18 than the external diameter -- the maximum external
19 diameter of the casing, and that's something we've tried
20 to adhere to even before I came to work with the OCD.

21 Q. It seems to me that if you have a -- and you
22 probably have more -- you definitely have more
23 experience with it than I do, but a 40-foot length of
24 nine-and-five-eighths, the ratio of coupling to regular
25 pipe is pretty low on a joint like that. So wouldn't

1 that -- if you're basing your calculations for
2 turbulence off a very small percentage of that, wouldn't
3 that affect your overall performance as far as what
4 you're expecting out of that cement?

5 A. I'm not sure.

6 Q. Well, if your coupling is maybe 18 inches out
7 of 40-foot pipe and your calculation is based on that
8 18, in your opinion, do you think that might -- that
9 might have some bearing on whether that's successful or
10 not?

11 A. I don't know.

12 Q. Okay. And I'm just curious. We talked about
13 the May 10th hearing. And since then, you seem to have
14 changed your opinion on the two-string design, and I'm
15 just wondering what the overall reason for that is.
16 What swayed you to think that two strings were required?

17 A. I asked a guy from the Pecos Artesian Servicing
18 District what type of pressures did they see on an
19 artesian water well at the surface, and based on that
20 and the calculation using the natural muds, it was -- it
21 was very close to breakeven on that well where the mud
22 would be of sufficient weight to control the influx of
23 water without adding any type of additives to the mud.

24 Q. Did OCD ever consider changing the requirements
25 for the mud on these wells?

1 A. No, sir.

2 Q. Was there a reason why it was -- the casing
3 design was -- I mean, from what you just said, it sounds
4 like maybe the mud could be a factor here, and I'm
5 wondering why we're talking about casing rather than
6 mud.

7 A. I was not part of the decision on the two
8 strings of casing.

9 Q. Do you feel like the mud solution would be
10 adequate if it were weighted appropriately?

11 A. It's possible.

12 Q. Do you think that the two string is a surefire
13 way to do it?

14 A. I have mixed feelings on that.

15 Q. Based on what?

16 A. Based on cost, based on the mud, based on
17 the -- you know, freshwater is getting very scarce in
18 the southeast part of New Mexico, and we need to protect
19 what freshwater we do have left.

20 Q. I'm sorry. I meant is the two casing string
21 design a fix-all. That's what I meant. Would this fix
22 the problem unconditionally?

23 A. It would be a proactive stance on protecting
24 the freshwater.

25 Q. Thank you.

BY CHAIRMAN CATANACH:

My understanding was that there was a possible agreement between the State Engineer and the OCD over the 2-inch issue. Have you ever found any evidence to that effect?

Q. Do you recall what that document specified?
Was it just --

A. It provided --

Q. Sorry. Go ahead.

A. It provided for the surface -- I mean the 2-inch diameter greater than the maximum external diameter. It also specified what could be used and what cannot be used for lost-circulation material in a freshwater zone, things like that.

Q. We've not been able to locate that document subsequent to that meeting?

A. That's correct.

1 Q. Have we been in contact with the State Engineer
2 with regards to that? Have you -- do they have a copy
3 by any chance?

4 A. I do not know. I never contacted them about
5 that.

6 Q. Thank you.

7 MR. BROOKS: Redirect?

8 CHAIRMAN CATANACH: Go ahead, Mr. Brooks.

9 MR. BROOKS: Okay. Thank you.

10 REDIRECT EXAMINATION

11 BY MR. BROOKS:

12 Q. Mr. Kautz, you answered in response to --

13 A. I don't hear anything.

14 Q. I'm sorry. Can you hear me now?

15 CHAIRMAN CATANACH: He's not able to hear.

16 THE WITNESS: I can hear you now.

17 Q. (BY MR. BROOKS) Okay. Can you hear me?

18 A. Yes, I can.

19 Q. Okay. Mr. Kautz, I'll try to speak loudly,
20 which I generally do anyway.

21 Under the existing rule, as Mr. Feldewert
22 pointed out, the District could require an additional
23 casing string if they had a specific reason, right?

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

25 Q. Can you describe any circumstances in which --

1 if you were reviewing an APD in the -- in this area, you
2 would think that it was necessary to have two strings
3 even if one string was the general rule?

4 A. Yes, sir.

5 Q. What would those circumstances be in general
6 terms?

7 A. The presence of that second artesian aquifer.

8 Q. And that itself would be a reason for two
9 strings?

10 A. Yes, sir.

11 Q. Now, you just testified that you were not part
12 of the decision, is that correct, to require two strings
13 in the proposed rule?

14 A. That is correct.

15 Q. But was not that your recommendation, that we
16 require two strings?

17 A. I felt that that was a reasonable provision,
18 and I agreed with it.

19 Q. You said you did agree with it?

20 A. Yes, sir.

21 Q. Thank you.

22 You indicated both in response to my
23 questions and in response to Mr. Feldewert's questions
24 that you had not found any evidence of aquifer
25 contamination in the Roswell Artesian Basin area,

1 correct?

2 A. That is correct.

3 Q. Is it often difficult to determine the source
4 of contamination or may it be difficult to determine the
5 source of contamination when there is contamination?

6 A. Yes, it is difficult. The only thing I can
7 think of is if you do a fingerprint of the oil. That's
8 a possibility.

9 Q. And was that why you could not -- you
10 determined that you could not appraise [sic] or pass on
11 what the situation was and the wells that were brought
12 to our attention by the Conservancy District?

13 MS. FOSTER: Objection.

14 MR. FELDEWERT: She beat me to it.

15 MS. FOSTER: The testimony was that some
16 other OCD personnel reviewed that, not Mr. Kautz. He
17 testified he had passed that on. So if Mr. Brooks would
18 like to bring those two OCD personnel in, he can do so.
19 But I think that question is way out of line.

20 CHAIRMAN CATANACH: Can you channel that in
21 a different direction or --

22 MR. BROOKS: Okay. It's not a major point.

23 Q. (BY MR. BROOKS) Does the fact that there has
24 been no reporting incidents of contamination
25 specifically identified with a well, is that sufficient

1 in your opinion to prove that there is not -- has not
2 been any such contamination from oil and gas operations
3 in this area?

4 A. That indicates to me there is a high
5 probability that there has not been any contamination,
6 but that doesn't mean there hasn't been.

7 Q. Now, even if there hasn't been any, is there a
8 possibility of water from the valley-fill aquifer
9 migrating into the artesian aquifer as a well is drilled
10 through it if the valley-fill has not been first cased
11 off?

12 A. I would -- more likelihood of artesian aquifer
13 affecting the shallow aquifer.

14 Q. So by movement back up the hole?

15 A. Yes, sir.

16 Q. And that would be -- would that be what you
17 would be concerned about if the mud weight were
18 inadequate for the particular situation?

19 A. Yes, sir.

20 Q. Now, is the mud weight fairly standard in this
21 area, or is it -- are there a lot of different
22 circumstances where you might need different mud
23 weights?

24 A. I can't answer that question.

25 Q. Okay. So you would probably -- if you were

1 setting out to review mud programs in this area, on your
2 present knowledge, you would probably specify what you
3 thought was a standard rather than -- rather than
4 looking for any particular circumstances that you know
5 about that would make it different one -- one case from
6 another one; is that correct?

7 A. Usually our -- the APDs do not specify what
8 specific mud they're using other than it's just a
9 freshwater mud, and so I don't think we can answer that
10 based on the information that's provided on an APD.

11 Q. You could, however, require that if you felt it
12 was necessary, correct?

13 A. That's a possibility.

14 Q. Okay. Thank you.

15 Now, yesterday you indicated that you did
16 not have the proposed Rule 19.15.39.11, did not have a
17 copy of that. Is that still the case, or do you have a
18 copy now?

19 A. Well, what were those numbers again?

20 Q. Do you have a copy of proposed --

21 A. Yes, sir.

22 Q. -- 19.15.39.11?

23 A. Yes, sir.

24 Q. Okay. I will call your attention, then, to --

25 CHAIRMAN CATANACH: Mr. Brooks, what are we

1 looking at here?

2 MR. BROOKS: This is Exhibit A to the
3 Fourth -- Fifth Amended Application, the proposed rule.

4 Q. (BY MR. BROOKS) I will call your attention to
5 paragraph C, subparagraph 5. And paragraph C is
6 entitled "Wells that penetrate the shallow aquifer."
7 And subparagraph 5 states, "The operator shall cement
8 production casing to a depth not less than 500 feet
9 above the intermediate casing shoe." Now, that is in
10 accordance with your recommendations, correct?

11 A. Yes, sir.

12 Q. And paragraph C requires two strings of
13 protection casing, correct?

14 A. Yes, sir.

15 Q. Okay. Now, if we go to paragraph E, which
16 deals with wells that penetrate only the artesian
17 aquifer, now under this rule, wells that penetrate only
18 the artesian aquifer require only one casing -- surface
19 protection casing string, correct?

20 A. Yes, sir.

21 Q. Okay. And in that rule, it says, the last two
22 lines, "The intermediate casing string required by
23 paragraph 3 of Subsection C may serve as the surface
24 casing, and cement on the production casing shall be
25 circulated to surface." Now, is that provision

1 consistent with your recommendation that if you have
2 only one surface string, that the production string will
3 be circulated to surface?

4 A. It's consistent with a two-string casing
5 program for a well that requires both -- both strings to
6 circulate to the surface.

7 Q. And a two-string casing program is what is
8 contemplated by paragraph 11E -- by paragraph E of the
9 rule; is that correct?

10 A. Yes, sir.

11 Q. Thank you.

12 MR. BROOKS: I believe that's all I have.

13 CHAIRMAN CATANACH: Thank you, Mr. Brooks.

14 Mr. Feldewert?

15 RE CROSS EXAMINATION

16 BY MR. FELDEWERT:

17 Q. Mr. Kautz, when you and Mr. Brooks were
18 discussing the possibilities out there without any
19 evidence to support those possibilities, I think you
20 testified that you said it was more likely that the
21 artesian aquifer could possibly migrate to the shallower
22 aquifer and then vice versa, correct?

23 A. That's correct.

24 Q. And you were here for the testimony from
25 Mr. Goetze where he pointed out that the artesian

1 aquifer has much better water quality than the shallow
2 aquifer?

3 A. Yes, sir.

4 Q. And you were here when Mr. Goetze pointed out
5 that in that large area under consideration here, that
6 those two aquifers were already in communication with
7 one another?

8 A. In some areas, yes.

9 Q. And the fact that you found -- despite your
10 research and despite the request from Pecos Valley and
11 despite all these years of drilling, the fact you found
12 no evidence of any fluid migration or contamination,
13 that would just as likely yield a conclusion that the
14 current rules are protective; would it not?

15 A. The only thing we had to go by is the well
16 files, and based on the well files, there is no
17 indication of any type of contamination.

18 Q. Okay. And those current rules require the
19 cement to be circulated to surface on the protective
20 string?

21 A. Yes, sir.

22 Q. And so when you and Mr. Catanach were talking
23 about lost circulation. If we have a circumstance of
24 lost circulation, measures have to be taken under the
25 current rules to get that cement to surface, correct?

1 A. Yes, sir.

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

4 CHAIRMAN CATANACH: Thank you,
5 Mr. Feldewert.

6 Any further questions of this witness?

7 This witness may be excused.

8 Mr. Brooks, do you have anything further?

9 MR. BROOKS: Yes. I want to submit Exhibit
10 Number 2 -- OCD Exhibit Number 2, which is my Affidavit
11 of Notice, which describes the procedures that were
12 given -- were used to give notice to this proceeding --
13 notice of this proceeding.

14 Attached to Exhibit Number 2 is Attachment
15 A, which is a copy of the official notice that was
16 published in the New Mexico Administrative Code and also
17 in the newspapers and posted as required.

18 Attachment B-1 is an Affidavit of
19 Publication from the Artesia Daily Press, certified to
20 be a daily newspaper, qualified for that purpose within
21 the meaning of Chapter 167 of the 1937 Session Laws of
22 New Mexico in Eddy County, New Mexico.

23 Attachment B-2 to Exhibit 2 is an Affidavit
24 of Publication from the Roswell Daily Record, a
25 similarly certified daily newspaper published in

1 Roswell, New Mexico. The publication in the Artesian
2 Daily Record occurred on October 28th, 2016, and the
3 publication in the Roswell Daily Record occurred on
4 October 29th, 2016.

5 Attachment B-3 is a notice, together
6 with -- as published in the New Mexico Register, this
7 copy having been downloaded from the November 15th
8 edition of the New Mexico Register as indicated by the
9 legend at the top. And also attached to that -- also
10 part of Attachment B-3 is a receipt indicating the
11 payment of the fee for publication.

12 Exhibit Number 2, Attachment B-4 is a copy
13 of an email sent to -- showing the address list to which
14 the notice of this proceeding, which is Attachment A,
15 was sent on November 15th, 2016.

16 Now, since this proceeding has been done in
17 the nature of both a proceeding under 19.15.4
18 adjudicatory rules and 19.15.3 rulemaking rules and may
19 eventuate in an order which will have some provisions
20 that affect some operators, as well as a rule or in
21 substitution for a rule, depending upon the decision the
22 Commission makes as to what relief is needed, we also
23 include Attachment B-5 to Exhibit 2, which is certified
24 mail receipts from the operators in this area that were
25 notified by certified mail of the filing of this

1 proceeding. The notice was stated for an earlier
2 hearing. However, the hearing of this case has been
3 continued in each case in accordance with the
4 continuance rules of the Division and the Commission.

5 So with that description, I tender
6 affidavit -- I tender Exhibit 2, my Affidavit of Notice
7 and the attachments, submitted in connection therewith.

8 CHAIRMAN CATANACH: Any objections?

9 MR. FELDEWERT: No objection.

10 MR. OLSEN: No objection.

11 MR. LARSON: No objection.

12 CHAIRMAN CATANACH: Exhibit 2 will be taken
13 into evidence.

14 (NMOCD Exhibit Number 2 is offered and
15 admitted into evidence.)

16 MR. BROOKS: With that, the Division rests.

17 CHAIRMAN CATANACH: Let's take a break here
18 and let you set up.

19 (Recess 9:06 a.m. to 9:26 a.m.)

20 CHAIRMAN CATANACH: Call the hearing back
21 to order at this time and turn it over to Mr. Olsen.

22 MR. OLSEN: Mr. Director and Members of the
23 Commission, I thank you for the opportunity to be here.

24 First of all, a couple of housecleaning
25 things, if I may. I previously tendered our exhibits to

1 the parties and to the Commission. However, I've
2 presented each of you with copies of the exhibits. That
3 should be in your book. Two things: One, they're
4 larger, I think, than what's maybe in your book. And
5 two, they're numbered. When we tendered our exhibits,
6 they were not numbered because we had a late-minute
7 change in a witness, so that affected it.

8 So what you have in front of you are the
9 exhibits. Numbers 1, 2 and 3 will be exhibits presented
10 by Mr. Atkins, and Exhibits 4 through 8 will be exhibits
11 tendered on behalf of Mr. Peery.

12 MS. FOSTER: Mr. Olsen, do you have copy
13 for other parties? I did not receive a copy. If you
14 don't have a copy, could you tell me what -- tell me
15 what the numbers are for your exhibits?

16 MR. OLSEN: Sure. I emailed you --

17 MS. FOSTER: Yes. But you didn't send me
18 numbered copies?

19 MR. OLSEN: No. That's correct. I'm
20 sorry.

21 MS. FOSTER: Tell me what's numbered and
22 I'll follow.

23 MR. OLSEN: Exhibits 1, 2 and 3 will be --
24 let me have those for a second. Will be --

25 MS. MITCHELL: Exhibits 1, 2 and 3 are the

1 same order as they were in our original pleading.

2 Sorry.

3 MR. OLSEN: With your permission, sir.

4 CHAIRMAN CATANACH: Yes, sir. Go ahead.

5 JACK B. ATKINS,

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

8 DIRECT EXAMINATION

9 BY MR. OLSEN:

10 Q. Please state your name.

11 A. Jack B. Atkins.

12 Q. Before proceeding, Mr. Atkins, were you present
13 yesterday, December 5, during the time that the oath of
14 testimony was tendered?

15 A. Yes, I was.

16 Q. And did you affirm -- did you present your
17 affirmation? Did you affirm the oath?

18 A. Yes, I did.

19 Q. Mr. Atkins, where do you reside?

20 A. Roswell, New Mexico.

21 Q. And are you employed, sir?

22 A. Yes. I'm self-employed, president of Atkins
23 Engineering & Associates in Roswell.

24 Q. I'd like to start with some personal data, if I
25 may first, sir. Would you describe for the Commission

1 your educational background?

2 A. Yes. I have a BS degree in mechanical
3 engineering from New Mexico State University in 1970.

4 Q. And after that, any postgraduate work, sir?

5 A. Oh, yes. We have to maintain short courses
6 to -- over the years to maintain your license under the
7 state law. There's a series of short courses that I've
8 taken related to geohydrology and materials and
9 surveying and environmental science.

10 Q. I'd like to talk for a moment, if I may, about
11 your employment history, and if you'd like to start
12 following your graduate -- following graduation from
13 college.

14 A. Yes. I went to work for the State Engineer's
15 Office in Roswell, New Mexico in January or February of
16 1983 and worked in the field unit doing basic data
17 acquisition and support of hearings with the State
18 Engineer, did many pump tests, many well completion,
19 cementing, witnessing end reports through the years and
20 stayed there.

21 And then I was appointed as assistant field
22 engineer, where I took care of the irrigated acreage and
23 mapping and water data resource collection, which was
24 well-log locations and water-level measurement programs
25 that the State had in conjunction with U.S. Geological

1 Survey. And then later I went into -- also did a lot of
2 work in support of the hearings with the State related
3 to aquifer permeability and well completions and how
4 they would affect some modern modeling effects on the
5 other sources or water right applications.

6 And then I moved into the position of Pecos
7 drainage supervisor, where I took care of the entire
8 Pecos drainage, which encompasses the Roswell
9 Groundwater Basin, and held that position for, I
10 believe, three years or four years.

11 Then I went into private practice in 1983,
12 after ten years with the State Engineer, and went into
13 the -- oh, specializing in water rights, water-resource
14 investigations, environmental science related to mapping
15 of contaminant plumes and remediation of those plumes,
16 also testifying in hearings related to how groundwater
17 moves and different kind of water right applications
18 through the years.

19 And then in 1984, I went into private
20 practice, and I've been in private practice ever since
21 with regards to these subjects and also land surveying,
22 environmental science and remediation of contaminant
23 plumes in the shallow aquifer.

24 Q. Let me ask a couple of specific questions. Do
25 you hold any licenses or professional registrations in

1 the state of New Mexico or in other states?

2 A. Yes. I'm a registered professional engineer in
3 New Mexico and Texas, registered land surveyor in
4 New Mexico. Back when they had a certified scientist
5 with the Environment Department, I held that license.
6 Also, I hold a contractor license for remediation
7 through the environment -- of the environment -- through
8 the Construction Industries Division. And I believe
9 that's it. Not sure. Oh. Go ahead.

10 Q. Are you a licensed welder?

11 A. Yes. You're right. I missed that one.

12 Q. Anything else that we've missed?

13 A. I think that's it, I believe.

14 Q. Over the years, have you had -- or have you
15 been recognized as an expert in the field of geology and
16 geohydrology in any administrative agencies in the state
17 of New Mexico and the district court?

18 A. Yes, in geohydrology and hydrology and water
19 rights in many courts, in state and district court, and,
20 on occasion, federal court.

21 Q. If you would tell us some of the professional
22 associations you hold, memberships.

23 A. I've held membership with the New Mexico
24 Association of Professional Engineers and Land
25 Surveyors, the National Society of Professional

1 Engineers, the New Mexico Groundwater Association, the
2 American Water Works Association and also the Public --
3 Public Works Group.

4 MR. OLSEN: Mr. Director, we would
5 respectfully tender Mr. Atkins as an expert in the field
6 of hydrology and geohydrology.

7 CHAIRMAN CATANACH: Any objection?

8 MR. LARSON: No objection.

9 MR. FELDEWERT: No objection.

10 MR. BROOKS: No objection.

11 CHAIRMAN CATANACH: So qualified.

12 Q. (BY MR. OLSEN) Mr. Atkins, I want to take just
13 a moment to talk about your knowledge and familiarity
14 with the area that's called the Roswell Artesian Basin.
15 How long have you been working professionally --
16 professionally within the area that is referred to as
17 the Roswell Artesian Basin?

18 A. Well, since 1973. When I went to work for the
19 State Engineer, one of the first jobs I had was to sit
20 on the cementing artesian wells in the Roswell Basin,
21 and I proceeded from there.

22 Q. I'd like to direct your attention --

23 MR. OLSEN: And, Mr. Director, for the
24 Commission's information, we have blown up some of the
25 exhibits that you have before you, and in this

1 particular case, this is Exhibit 1 of the PVACD --
2 PVACD's exhibits.

3 Q. (BY MR. OLSEN) Mr. Atkins, behind you is what
4 has been marked as PVACD Exhibit Number 1. Can you
5 describe for the Commission, please, what Exhibit 1
6 reflects?

7 A. Yes. This is Figure 1 of the Welder report
8 that we've been referring to, which is Ed Welder, a
9 geologic survey in conjunction with the State Engineer
10 office. He did the work in the '70s. And it's really a
11 map showing the -- this particular -- his original
12 report was entitled "Geohydrologic Framework of the
13 Roswell Groundwater Basin, Chaves and Eddy Counties, New
14 Mexico," dated 1983. And this particular Figure 1 is
15 from that report, and it's kind of a basic outline of
16 the data that's really in the report. When you use this
17 map, you need to use the data in the report, which is
18 where this map was derived from. There are a whole
19 series of plates in that report that are more detailed.

20 And if you look at this particular map,
21 it's -- this map shows the surface drainage, legal
22 boundary and aquifer limits of the Roswell Groundwater
23 Basin. The legal boundary has been extended since that
24 time.

25 Q. Mr. Atkins, first, just as an aside, did you

1 know Mr. Welder?

2 A. Yes, I did. I helped him work on some of this
3 for this report.

4 Q. And as an aside, Mr. Welder's retired?

5 A. Yes.

6 Q. Do you know where his reports associated with
7 his work in the Roswell Artesian Basin are located?

8 A. Yes. I have all of his field reports and maps
9 that he used for this Technical Report Number 42. He
10 wanted to move to Mexico, and he wanted somebody to take
11 all the data. And I had a geohydrologist and a
12 geologist that worked for me there named Pinky Galloway
13 [phonetic] in Roswell, and they were good friends. And
14 we were all friends, so he left all the big boxes of
15 data and maps.

16 Q. Now, Figure 1 -- or Exhibit 1, is this exhibit
17 a figure that's relied upon extensively by you and
18 others who work within the Roswell Artesian Basin and
19 related to the hydrology, geohydrology of the Basin?

20 A. Yes. It's kind of a general map, but it
21 reflects what's mapped in the report under various
22 plates. So you use this map as kind of a guide to get
23 into the plates on the report. There's -- I forgot how
24 many plates in the report that cover structure of the
25 San Andres, red bed depths or shallow aquifer

1 thicknesses, all on separate plates like these, and the
2 artesian aquifer thicknesses, the decline of the
3 artesian aquifer and then the rise of it again and the
4 decline data for the shallow aquifer. So the report is
5 really loaded with information that you need.

6 Q. Now, let's talk about what you have before you.
7 Does the -- does the exhibit point out the boundaries of
8 both the shallow and the artesian aquifers? Are they
9 identified?

10 A. Yes, they're identified.

11 Q. Now, can you identify and describe, please,
12 what those boundaries are from north to south to east to
13 west?

14 A. Yes. The artesian aquifer extends from this
15 area, 5 -- this southern part of 5 North -- Township 5
16 North, some 100 miles long, down into this area within
17 23 South -- I mean -- did I say north? I meant 5 South
18 to 23 South about 100 miles. And it extends from east
19 to the Pecos River some 30 miles out to the western edge
20 of the artesian aquifer that's producible in the Roswell
21 Basin.

22 Q. Now --

23 A. And the shallow, I guess -- excuse me?

24 Q. Go ahead, "the shallow."

25 A. The shallow extends from -- oh, right slightly

1 east of the Pecos River where the Artesia Group rises
2 that we heard about yesterday, and then it extends out
3 some -- oh, I believe it's 12 miles to the west, right
4 here in this area (indicating), and some 65 miles long
5 north and south down to slightly south of Seven Rivers,
6 New Mexico.

7 Q. Can you tell us the township and range, the
8 southern boundary -- approximate southern boundaries of
9 the township and range of the shallow?

10 A. Yes. It's about the southern end of Township
11 20 South.

12 Q. And to the west? What's the furthest to the
13 west, if you can for us, please?

14 A. Oh, about the western edge of Range 21 East.

15 Q. I'd like to stop for a moment and talk about
16 the drainage area for the Roswell Artesian Basin. Can
17 you tell the Commission and describe the drainage area?

18 A. Yes. The drainage area is encompassed by these
19 outside lines that extend much further westward up into
20 the top of the White Mountains. All that drains this
21 way (indicating) and is a recharge area for the Roswell
22 Artesian Basin. And it extends going up north quite a
23 distance, but it's outlined here.

24 And what happens in the recharge area is
25 precipitation and percolation into the outcropping

1 Permian systems up there allows percolation into the --
2 in deep underflow into the Roswell Basin through
3 fractures and solution channels, and it comes westward;
4 and the lower portions of the San Andres carry that
5 flow. All of the rivers leak into the San Andres up
6 there and lose their flow, unless we have a substantial
7 flow. And it comes in as underflow into the Roswell
8 Basin.

9 Q. Now, do you know if there is any other area in
10 the state of New Mexico where there is recharge and
11 aquifer -- aquifer makeup as that identified in
12 Exhibit 1?

13 A. Well, you know, there may be some a little bit
14 similar, but they're nothing like these conditions that
15 allow an infinite life expectancy into this Basin. And
16 if you look at the water-level decline data and plot it
17 versus the water thicknesses of the aquifer systems, you
18 derive an infinite water supply. So it's well protected
19 by PVACD on over-appropriation, and it's an infinite
20 system, really.

21 Q. Let's talk about the map itself a little bit
22 further. In preparation for this hearing, have you
23 added anything, drawings, lines, markings to the map,
24 from the way it is reflected in the Welder report?

25 A. Yes. I did add all down through here, the

1 outside -- all of the township -- townships of interest
2 in this area, which you can easily see. It lets you see
3 where you are. And then I've added all the cross
4 sections from Welder that indicate the aquifer, the
5 geologic cross sections that show the formations and the
6 water-bearing zones in the Roswell Basin from north to
7 south.

8 Q. What's the benefit of this? What do we derive
9 from your additions to the exhibit?

10 A. The benefits allow you to look at this map and
11 get a pretty close idea of where the boundaries are on
12 the aquifer systems and also to allow you to see where
13 the aquifers are present and the thicknesses, the tops,
14 all the kind of information that you need to kind of go
15 back into the report and pick out the specific pages
16 that allow you to come up with, you know, a preliminary
17 casing, a plan for wells and how do you drill, how do I
18 cement, how do I produce this, you know, get this well
19 done and what specifications do I need to write and
20 those kind of things.

21 Q. Let's talk about the aquifer system makeup
22 itself for just a moment. How much -- or what's the
23 production, if you may, of the artesian given the size
24 and the drainage area?

25 A. Oh -- you mean the actual inflow and recharge?

1 Q. Correct.

2 A. Oh, okay. Well, there's -- it's not precisely
3 determined, but it's probably in the range of 500,000
4 acre-feet per year, maybe slightly less depending on the
5 precip.

6 Q. How much water is in an acre-foot?

7 A. 325,851 gallons.

8 MR. FELDEWERT: Are you sure?

9 THE WITNESS: I'm absolutely sure.

10 (Laughter.)

11 THE WITNESS: If you have the barrels, you
12 divide by 42 (laughter).

13 Q. (BY MR. OLSEN) The difference between artesian
14 and shallow, which one produces at the greater level?

15 A. The artesian wells are much more -- are drilled
16 into much more permeable systems than the shallow, and
17 the transmissivities are much higher, and the wells
18 produce from 1,000, 2,000 gallons per minute and over.
19 Some wells, I've seen flowing 3,000 gallons per minute,
20 flowing east to Roswell presently -- in present day
21 time. And they did flow a lot more than that before the
22 water level declined to some extent or the pressure head
23 in the artesian.

24 And the shallow can be produced up to
25 1,000 or over gallons per minute. A lot of times it's

1 much less, like 3- or 400 gallons per minute.

2 Q. Can you tell the Commission, please, what the
3 use of the water produced both from the shallow and
4 artesian within the RAB is? What is it -- what is it
5 used for?

6 A. It's used for all uses, municipal, commercial,
7 irrigation, dairy use. All of the industries, they all
8 rely on the Artesian Basin and the Shallow Basin. And
9 it's basically -- and domestic. I left that out. Yeah.

10 Q. Let's talk about water quality just generally
11 for a moment. Describe the difference of the water
12 quality between the artesian and the shallow, if you
13 would, please?

14 A. Okay. The artesian is a much better quality
15 water. Out on the western edge of the Artesian Basin,
16 where you have the incoming flows, it's much better, and
17 even in some areas down in the Basin, it's much better.
18 It's always better than the shallow. But it's in the
19 range of, say -- oh, the TDSes can be less than 1,000
20 parts per million total dissolved solid and much better
21 than that.

22 Q. Okay. Let's take just a moment, if you would,
23 please, and point to the -- for the -- use your pointer.
24 Where is the intake -- what we call the intake for the
25 artesian?

1 A. Well, the intake is this entire area up here
2 (indicating) all the way to the top of the Sacramento
3 Mountains, up into the Vaughan area and even south, and
4 west of the Hope area in the southerly Sacramento.

5 Q. Now, the reason I ask that the water quality on
6 the west side of the artesian -- northwest side of the
7 artesian, what's the water quality there?

8 A. In the Artesian Basin?

9 Q. Yeah.

10 A. Out in the northwest, it's very good. Oh, I
11 would say less than 1,000, when you get out in the
12 western edge. When you get north -- north and east of
13 Roswell, the artesian quality falls off. It can get up
14 into the higher ranges in a smaller area northeast of
15 Roswell, out in here (indicating). And so it's not used
16 as much out in that area. But it's still used for
17 irrigation, but it's not nearly as good.

18 Q. Now, the water quality of the shallow, let's
19 talk about that for a minute --

20 A. Yes, sir.

21 Q. -- north to south. You heard testimony
22 yesterday talking about the water quality of the
23 shallow, and I'd like to address the water-quality issue
24 for a moment if we can. So what is the water quality of
25 the shallow, and why is it -- why is it -- why are --

1 why are the -- what is the makeup of that water, and why
2 is it in that form?

3 A. Oh, okay. If you read the historic reports, it
4 started out with artesian irrigation that was being used
5 across the area, especially in the area of Roswell
6 South, as you had artesian flow in that area. And where
7 you have artesian flow, they used irrigation and just
8 put it all over the shallow -- or the top of the land,
9 and so you got a natural-leaching characteristic through
10 the upper portions of the shallow aquifer that included
11 various minerals that would dissolve in the water and
12 the leaching process. And that accounted for some of
13 the water quality being worse because it's being
14 recycled up through return flow.

15 Then you have precip there locally that
16 does the same thing as the irrigation return flow,
17 leaches through the natural sands and gypsum. There are
18 some gypsum areas in the upper shallow that dissolve
19 readily into the -- into the shallow aquifer. But it's
20 subject to being reached kind of coming through a
21 leached area. And then when you use the irrigation --
22 the artesian irrigation, you try to leach it more. You
23 try to put more water and leach the salts down there,
24 the natural salts out of the soil.

25 Q. So is it safe to say, then, that the water

1 quality of the shallow is the result of natural minerals
2 combined with those contaminants caused by man?

3 A. Yes. Basically, the water quality is being a
4 little adverse as a result of the formations itself, the
5 materials that it has to leach through.

6 Q. Within the area that you've identified as a
7 shallow, what is the primary use of the shallow water?

8 A. In the shallow aquifer?

9 Q. Yes.

10 A. Oh, basically irrigation, mostly. There are
11 some that rely on it for domestic use quite a bit, where
12 they don't have any co-op system, because it's too
13 expensive to drill a deep artesian well. So they'll
14 rely on the shallow wells for domestic use and mainly
15 irrigation. Some of the dairies use shallow -- shallow
16 water, quite a bit of shallow water. Almost all the
17 dairies do.

18 Q. Before continuing on, as a licensed surveyor, I
19 assume that you're familiar with the rectangular survey
20 system that's used in the state of New Mexico?

21 A. Yes.

22 Q. Now, Exhibit 1, explain for us the significance
23 of what you've labeled as A, A prime.

24 A. A, A prime is the geologic section, the most
25 northerly section in this -- on this Figure 1 map, and

1 it was put there to show what the geologic cross section
2 is. It's from surface into the Yeso Formation. And it
3 then shows the geologic formation as well as the
4 aquifers and some of the surface stations as you come
5 along the section.

6 Q. Okay. Let's talk about the significance of
7 what's been labeled as D, D prime.

8 A. Same thing. Coming south, you just -- these
9 sections just kind of define the limits of the shallow
10 aquifer and the artesian aquifer systems. And on the
11 next exhibit, you'll see the sections themselves. But
12 this is the actual locations of these aquifers and
13 geologic formations.

14 Q. And before we move to the next exhibit, the
15 significance of F, F prime, which runs north to south?

16 A. Oh, okay. F, F prime runs slightly west of
17 Pecos River, and it shows when you're coming down sort
18 of the eastern portion of the artesian aquifer where the
19 artesian resides in the formations, as well as the
20 shallow aquifer and the geologic -- geologic formations
21 that are present there. So it encompasses the whole
22 Basin north to south, basically.

23 Q. Let's go to your next poster, which will be
24 Exhibit 2, PVACD Exhibit 2, that I've provided to the
25 Commissioners. You may want to turn that sideways.

1 A. Oh, yeah.

2 Q. What is Exhibit 2, sir?

3 A. Exhibit 2 is Figure 4, the Technical Report
4 Number 42 in its entirety, and it shows the geologic
5 sections. Down on the bottom of the map, it's labeled.
6 And the shallow and artesian aquifers of the Roswell
7 Basin, Chaves and Eddy Counties.

8 Q. Where are these locations -- I should say where
9 are these sections located specifically, if you can tell
10 us?

11 A. They were located on the first exhibit, the
12 locations.

13 Q. All right. So starting at the top, number one
14 at the top of Exhibit 2, what is that location?

15 A. That is, as shown on the other exhibit, the
16 bottom of Township 7 South coming across east to west.
17 It shows only the one aquifer in blue and then the
18 geologic sections.

19 Q. So starting from top to bottom of Exhibit 2, it
20 would be beginning from north to south, correct?

21 A. Yes.

22 Q. So what does the first -- at the top, what does
23 that show?

24 A. The first cross section.

25 Q. Okay. And that cross section -- what is the

1 significance of that cross section?

2 A. Basically shows there is not a shallow aquifer
3 out there and just an artesian aquifer that resides in
4 the San Andres out there, north of Roswell, in the area
5 of the southern part of Township 7 South.

6 Q. Let's go to the second cross section.

7 A. The second cross section is through Roswell,
8 New Mexico. It shows both aquifer systems and the
9 geology in the sections. And so, therefore, it gives
10 you the extent of the eastern and western boundaries of
11 the artesian system, as well as the shallow aquifer.

12 Q. The next cross section?

13 A. Same thing.

14 Q. What's the location of that --

15 A. That one is -- let's see. Oh, in the Hagerman
16 area, east to west. And you can see then -- we talked
17 about yesterday -- it's getting to be more of a
18 separation in the Artesia Group, as was referred to,
19 right in here (indicating). And so what actually
20 happens, the artesian system is deep -- much deeper in
21 that area as you come south in the Roswell Basin.

22 Q. And the next -- the next cross section?

23 A. Yes. The next one is in the Artesia, New
24 Mexico area. And it shows the separation between the
25 artesian and the shallow and the western -- eastern and

1 western limits of the artesian and shallow aquifers and
2 the geologic sections.

3 Q. And the next cross section?

4 A. The next one is getting down to the Seven
5 Rivers area, southern part of the Basin.

6 Q. When we say Seven Rivers, the Brantley Lake --

7 A. Yes.

8 Q. -- is --

9 A. Old Lake McMillan, Seven Rivers Farms, Brantley
10 Reservoir, yes.

11 Q. Now, the bottom cross section, explain that.
12 Describe that for us for just a moment.

13 A. That's Section F, F prime. It comes down the
14 length of the Roswell Basin.

15 And if you notice on this side, there's not
16 a shallow -- shallow aquifer until you get about right
17 in here (indicating), and then you have -- which is the
18 9 South area -- Township 9 South, where the beginning of
19 the shallow aquifer is.

20 It just kind of traverses the whole Basin,
21 gives you the aquifer, the continuity through the whole
22 Basin and the depths, the thicknesses of the aquifers,
23 the extent between the aquifer systems that's referred
24 to as Artesia Group. Even in the southern portion, you
25 begin to see, south of Artesia, that the aquifer -- the

1 artesian aquifer system is no longer confined to the
2 San Andres. It comes into the basal parts of the
3 Grayburg, which is the confining bed, but it's just
4 permeable down there and has solution channels through
5 the limestone and sandstone sections.

6 So you get into the Seven Rivers area. You
7 get water in the Grayburg, which is the lower portion of
8 the Artesia Group, and you get -- you can see at Seven
9 Rivers, the San Andres is deeper than the water zone,
10 the artesian zone.

11 Q. Now that we've considered the cross sections,
12 tell us how you use the cross section and this
13 information in making -- in recommending cementing and
14 casing programs.

15 A. What you would do is take the cross sections.
16 Then you would go into Technical Report Number 42 and
17 find the actual maps that were used and the data that
18 was used to make these cross sections. And you can get
19 down to the very detail, thicknesses of the red beds,
20 instead of trying to measure from this map, which, you
21 know, would be a mistake because you can't measure that
22 closely on these maps. So you have to go to all those
23 other plates in Technical Report Number 42.

24 Then you plot your -- you would plot your
25 proposed well location, and that would give you a good

1 idea -- a very good idea of a plan -- a plan that you
2 need for your well construction, what kind of -- how
3 deep do I need to case, what do I need to cement
4 through, what casing strings I need to run. And you
5 actually do that from the actual data and maps within
6 Technical Report Number 42. But this is a guide or an
7 index to get there.

8 Q. Let's talk about the depth of the artesian.
9 And we've seen the number 1,200 feet to the bottom. Is
10 that a standard or an accepted depth to the bottom of
11 the artesian?

12 A. Well, it's fairly representative of the -- the
13 deepest artesian zones I've seen are less than 1,200,
14 slightly, in areas. And above that, you know, you have
15 higher zones in the artesian. The basal part of the
16 artesian can be much higher than that.

17 Q. Now, let's talk about the importance of casing
18 and cementing off those -- those two aquifers. Why do
19 we do that?

20 A. The reason that we would like to see casing
21 through the shallow zone is to entirely cut it off and
22 make sure it's cased and cemented off from any other
23 leakage that may occur into it, and that's the main
24 reason behind that, you know.

25 Then when you come -- and it's also to

1 protect against deeper drilling, where if you didn't
2 case it off and you're drilling deeper in some other
3 zone, you may -- it may unload -- the brine in the
4 shallow may unload down the hole into the artesian if
5 you don't case it off, because the artesian is highly
6 permeable. It's like cavernous limestone that are made
7 up of fractured joints that are dissolved out over
8 millions and millions of years in the channels and
9 caverns. And so when you -- when you drill through
10 these caverns of this highly permeable area loaded with
11 water, it's easy to lose circulation. It's almost --
12 almost all the time, you lose circulation in the
13 artesian.

14 So if you didn't -- if you didn't case off
15 the shallow, you could easily get an unloading of the
16 shallow brine or worse water into the artesian zone.
17 And it may take a while to cure that circulation. It's
18 not a simple matter to just all of a sudden --

19 MR. FELDEWERT: Mr. Examiner, I'd object at
20 this point. I appreciate Mr. Atkins is a hydrologist
21 and a geologist, but he's not a drilling engineer. He's
22 not drilled any oil and gas wells. He has no foundation
23 to testify about what happens as you drill an oil and
24 gas well.

25 MR. OLSEN: With all due respect,

1 Mr. Atkins is a licensed well driller and drills wells.
2 And we're talking about the separation -- we're not
3 talking about drilling an oil and gas well right now.
4 We're talking about the drilling of a water well or a
5 well through those two aquifers and the requirements.
6 So we're not holding Mr. Atkins out as an expert in
7 drilling of oil and gas wells, but more specifically as
8 the hydrology and ensuring the integrity of the two
9 aquifers.

10 CHAIRMAN CATANACH: You may proceed,
11 Mr. Olsen.

12 THE WITNESS: Yes. It's almost never done
13 in the water well industry, to cement -- it's not
14 allowed to not case off the shallow and drill into the
15 artesian.

16 What is required by the State Engineer and
17 by good practice -- because what is required is you land
18 through the shallow and through the red bed and right up
19 to the top of the San Andres. That's the way they do
20 that. That's the way they land the shallow casing for a
21 water well.

22 Then they drill out through the artesian.
23 And, of course, they don't cement it. It's open for
24 production. Then it's open for the length of the
25 artesian aquifer. It's sufficient to give the

1 capacities that they want for the artesian well. And a
2 lot of times it's open hole because it's only open in
3 the artesian, and many times they do run a liner system
4 in there in case the hole has some shale sections in
5 it -- the San Andres does have some shale sections -- to
6 hold back so you can produce water, so they don't fill
7 the hole up.

8 And so, you know, to contemplate drilling a
9 water well through the shallow end of the artesian
10 without casing and cementing off the shallow is -- it's
11 not a good practice. I mean, it can -- it can just lead
12 to unloading of the hole. I've seen it many times. You
13 start losing your mud loss, and you may or may not get
14 that back with lost-circulation materials required
15 sometimes. Sometimes it's very difficult.

16 Q. (BY MR. OLSEN) Mr. Atkins, let me ask one more
17 question in conjunction with this. Is the artesian
18 aquifer under pressure?

19 A. Yes.

20 Q. What does that mean?

21 A. Oh, okay. Well, if you look at the intake area
22 out here (indicating), it's feeding the water in at a
23 higher elevation, so it begins to fill up this artesian
24 zone and raising the water level. It keeps the water
25 level under pressure. And then in these pressurized

1 zones of the artesian where you have an over-confining
2 bed between the artesian and the shallow, the Artesia
3 Group causes -- it will not allow the water to move
4 upward without a very low seepage.

5 It pressures this formation up over here in
6 the deeper zone. If you notice at the top -- if you
7 notice the top of the artesian -- well, they haven't
8 plotted it here, I don't believe. But if you look at
9 the top of the artesian pressure head, it's equivalent
10 to the water level out in the limestone rocks in the
11 intake area, because the water's coming in and it's
12 filling this. And it can't come up on the confining bed
13 areas to the east, so it pressures up to whatever that
14 head is out to the west. So it's pressurized, and it
15 tends to try to -- it will slowly leak through the red
16 bed.

17 Q. Now, Mr. Atkins, if the artesian is perforated,
18 not sealed off from the shallow, what happens? Does the
19 artesian lose its pressure?

20 A. Yes. Certain times a year, the leakage
21 reverses. You can have leakage from the artesian to the
22 shallow or the shallow to the artesian. The artesian
23 water level at times is 150 feet in pumping season in
24 the central part of the Roswell Basin. So after the
25 pumping ceases for irrigation, the large withdrawals of

1 water, then the artesian level -- pressure level comes
2 back up, and the leakage begins to go the other way. So
3 what you are able to do is get a mixture back and forth,
4 shallow leaking downward in the summer and artesian
5 leaking upward in the winter. And it just kind of
6 mixes. You get some brine leaking down, and it
7 disperses partially and not all comes back and just a
8 mixing.

9 Q. And is that considered a contamination of the
10 aquifer?

11 A. Sure. It's not under the state -- state law,
12 artesian waste, and it's under the waste laws that have
13 been around since 1905.

14 MS. FOSTER: Mr. Commissioner, I'm going to
15 object to that statement the witness just made. If he
16 could clarify what waste law he's talking about.

17 THE WITNESS: There are a series of
18 artesian waste laws in the statutes.

19 MS. FOSTER: Which regulations?

20 THE WITNESS: It's a statute.

21 MS. FOSTER: Under which agency?

22 THE WITNESS: The State Engineer
23 administers that.

24 MS. FOSTER: You're not able to tell me
25 which rule you're referring to?

1 THE WITNESS: There is not -- I go by the
2 state law on artesian waste. Now, if it's in a rule,
3 I'm not sure, or, you know, in the New Mexico
4 Administrative Code. Probably is somewhere. I don't
5 know where.

6 Q. (BY MR. OLSEN) Let's go to the next -- let's go
7 to your next --

8 A. Oh, okay.

9 Q. Now, we're only talking about drilling water
10 wells here. And could you describe for the Commission,
11 please, your requirements when you're cementing -- doing
12 your cement job, the requirements as to the circulation
13 of the cement?

14 MR. FELDEWERT: Hold on a minute. This is
15 a diagram of a typical oil and gas well, not a water
16 well.

17 MR. OLSEN: Correct. And I'm just going to
18 use it as to a water well only, just for descriptive
19 purposes only.

20 MR. FELDEWERT: Well, what's the --

21 I have to object to the foundation for this
22 exhibit. I don't know where this came from. I don't
23 know what it's supposed to represent.

24 MR. OLSEN: I can lay a foundation.

25 MR. FELDEWERT: Do you have a water well

1 diagram?

2 MR. OLSEN: No. But I can ask Mr. Atkins
3 to lay a foundation to describe where this diagram came
4 from.

5 Q. (BY MR. OLSEN) We're talking about proposed
6 Exhibit Number 3, Mr. Atkins. Can you describe for us
7 where -- where this exhibit comes from?

8 A. This is an exhibit of looking at some of the
9 completions in the Artesia area, oil wells without the
10 horizontal drilling, maybe slightly south of Artesia.
11 And then adding in what the State Engineer requires --
12 no. I'm sorry -- what we think would be needed to be
13 done in the upper part of the hole to protect the
14 shallow and artesian aquifers. So it's kind of a
15 combined schematic.

16 MR. FELDEWERT: Okay. Let me ask, if I
17 may.

18 MR. OLSEN: Sure.

19 VOIR DIRE EXAMINATION

20 BY MR. FELDEWERT:

21 Q. So, Mr. Atkins, this is not a diagram that you
22 took from any well file?

23 A. No.

24 Q. This is something you created?

25 A. Yes.

1 Q. And so this does not -- so would you agree with
2 me that the heading on this, "Typical Oil and Gas Well
3 Completion Within the Roswell Basin, is just a little
4 bit misleading?

5 A. Well, I would say with a production string,
6 it's close.

7 Q. Wouldn't this be more properly characterized as
8 an oil and gas well completion proposed by Pecos Valley?

9 A. That may be a better definition.

10 Q. Is that a better definition?

11 A. It may be.

12 Q. Number one.

13 And then number two, you cannot vouch as to
14 whether this completion design on here is feasible
15 today, can you?

16 A. In as far as what -- what type of feasibility?

17 Q. What type of equipment's available, what type
18 of drill bit is available, what type of casing is
19 available. You have no experience in that area, do you?

20 A. I have some, yes.

21 Q. You don't put yourself forward as an expert in
22 oil and gas well drilling, do you?

23 A. No. But I know -- I know the API aspects and
24 casing sizes.

25 Q. But you have never drilled an oil and gas well

1 in this area?

2 A. No.

3 Q. And you've never overseen the drilling of an
4 oil and gas well in this area?

5 A. No, I have not.

6 Q. Okay. And you don't know what specifications
7 for casing is being utilized for oil and gas wells
8 today, do you?

9 A. I know they're using the API listing of
10 casings. Yeah, API casing.

11 Q. You don't know whether they're using the size
12 casing, for example, that you have on here, do you?

13 A. Well, I'm pretty sure you'd be okay through the
14 water-bearing zones. The deeper -- I didn't put in the
15 production zone the weight of casing of 6-5/8.

16 Q. Well, you have on here 22-inch drill bit using
17 6-5/8 casing, right? That's what you're proposing as
18 production casing?

19 A. Yes. It could even be dropped to 5-and-a-half.

20 Q. Have you looked to see whether 6-5/8 casing is
21 available or being used today?

22 A. Well, I know it's on the API listing of casing
23 that's manufactured casing.

24 Q. Do you know if it's available or in use today?

25 A. I don't know if it's in use here, but I know

1 it's available in the United States.

2 Q. Would you be surprised to learn that our
3 witness will testify it is not available?

4 A. Not available completely? Well, I see it on
5 Houston -- production casing, so --

6 Q. Now, wait a minute. You see it on what?

7 A. On their listings of available casings.

8 Q. Have you inquired as to whether they have that
9 casing available?

10 A. I have not called them, but I've looked at
11 their listings.

12 Q. Would it surprise you to learn that our witness
13 has and that that casing is not even available?

14 A. Well, I wouldn't know, you know, what he would
15 say.

16 Q. But you don't know one way or the other what's
17 available?

18 A. Well, I know it's manufactured, so --

19 Q. Okay. All right. And have you discussed with
20 anyone the label on here that you have called this, "Oil
21 Field Neat Cement Grout With Additives Circulated to
22 Land Surface"? Do you see that? Where did that come
23 from?

24 A. I just --

25 MR. OLSEN: Mr. Director -- Michael, if

1 you're going -- are you -- is this a voir dire of the
2 witness, or -- is that what this is, or is this just to
3 clarify some kind of -- I'm kind of -- I wasn't done.

4 CHAIRMAN CATANACH: Do you have an
5 objection?

6 MR. FELDEWERT: I do. There is no
7 foundation for this exhibit.

8 MR. OLSEN: Okay.

9 MR. FELDEWERT: He's not a knowledgeable
10 oil and gas driller. He's never put a well design
11 together for oil and gas wells. He's got no background
12 to testify as to a design for oil and gas wells. If
13 they want to put up a water well design, that's fine.
14 But an oil and gas well design, this witness has no
15 background, experience to be able to proffer this
16 exhibit.

17 MR. LARSON: I will join the objection.

18 MR. OLSEN: Mr. Director, with Michael's
19 assistance, we would change the title of the -- of the
20 exhibit to clarify it and use this exhibit solely for
21 the purpose of discussing the methodologies that we
22 believe is appropriate for casing the two strings to
23 protect the aquifer.

24 MR. FELDEWERT: He has no background in oil
25 and gas drilling to be able to apply an opinion.

1 MR. OLSEN: Well, certainly he has a
2 background in casing -- in drilling water wells and
3 casing in those strings. So certainly he's -- and he's
4 licensed to do that in the state of New Mexico, so I
5 think he's certainly free to discuss that and familiar
6 with the State Engineer regulations governing the
7 drilling of water wells. So to the extent that he's
8 familiar with drilling -- the setting of casing per the
9 regulations, we believe he's qualified to testify. And
10 we'll tender that testimony to the issue of casing in --
11 casing in and cementing in for a water well for
12 two aquifers.

13 MR. FELDEWERT: This does not purport to be
14 a diagram for a water well. It purports to be a diagram
15 for an oil and gas well, and he's not no background --
16 admittedly, no background, no experience to proffer that
17 type of testimony, Mr. Commissioners.

18 CHAIRMAN CATANACH: Mr. Olsen, can your
19 witness testify as to the requirements for a water well
20 completion by using this exhibit --

21 MR. OLSEN: He can.

22 CHAIRMAN CATANACH: -- and not go into any
23 details with regards to an oil well?

24 MR. OLSEN: Absolutely.

25 CHAIRMAN CATANACH: Then I think we can

1 proceed on that.

2 MR. OLSEN: Thank you.

3 CONTINUED DIRECT EXAMINATION

4 BY MR. OLSEN:

5 Q. Mr. Atkins, using the exhibit, I'd like to talk
6 about using -- casing in a two string, drilling a well
7 into the Artesian Basin and setting both the shallow and
8 the artesian, top to bottom. Can you use this exhibit
9 to tell us how that's done?

10 A. Yes.

11 I want to make a correction a little bit
12 here. On that 18 OD API, that's not an API size. It
13 should be an 18-5/8. A lot of times they run an 18 ASTM
14 casing, but if you're going to run an API, it's 18-5/8,
15 is the standard API size.

16 And so -- and you don't necessarily have to
17 run this conductor, but if you do run this conductor, it
18 needs to be cemented to prevent water from the surface
19 coming down into the shallow aquifer. So that is
20 typical to the rule change.

21 So you have a 22-inch diameter hole,
22 18-inch -- 18-5/8-inch API casing. You have more than
23 the 4-inch clearing required by the State Engineer for
24 cementing. You can do that with a training pipe, set an
25 FB pump and plug. And then you come down and you get on

1 into -- you land this 17-1/2 through the -- through the
2 shallow aquifer in that area and cement it back to land
3 surface. They have allowed that to be done by training
4 pipe in the State Engineer's office, but in this case,
5 if you're going deeper, you may want to protect with
6 pump-and-plug Halliburton method to be a little safer.

7 Then you come on down the hole and land
8 13-3/8 down to -- I believe that's 1,200 feet in there.
9 In this -- in this case you would not do that in a water
10 well because it would just be casing off the artesian
11 water. But if you're going deeper, even for another
12 zone or something, it needs to be cased off. And if you
13 make -- if you make that -- you run the 9-5/8, that
14 12-1/4 -- there is another little minor change. The
15 12-1/4 needs to be changed to 12-5/8, which you have
16 plenty of clearance to do that. And that's the hole
17 size.

18 Q. Now, Mr. Atkins, let me stop there. So we're
19 down to the bottom of the -- of the artesian, the San
20 Andres, and we're going to cement that off. Now,
21 describe -- and I want to go back up to the top of the
22 shallow and assuming we're drilling an artesian well.
23 When you get into the shallow, into the red bed, what do
24 you do then? Do you circulate cement back to the top?

25 A. In the shallow?

1 Q. Yes.

2 A. Yes.

3 Q. Why?

4 A. To prevent any movement of water behind the
5 casing. When you're going into the artesian zones, you
6 can get leakage, as we were talking about, back and
7 forth, depending on the head difference between the two
8 aquifers. And so you don't want that to happen.

9 Q. Now, describe the cement job, if you would,
10 after you seal off the shallow and you go to the bottom
11 for the -- for the artesian. What is the procedure?

12 A. In many cases you have -- what actually happens
13 in the water well industry is you drill deeper through
14 the red bed and cement on the top of the San Andres with
15 that first string.

16 Q. Okay.

17 A. In this case, if you just get into the red bed
18 50 feet, it should be plenty to bond into the red bed
19 and the cement to make sure there is no leakage across
20 that -- behind the casing in the shallow.

21 Q. Let's talk about the -- the spacing
22 requirement, the 2-inch spacing. And from that
23 2-inch -- from the collar, do you -- do you agree with
24 the 2-inch spacing that's recommended on the collar --
25 from the collar app, or should it be 2 inches from the

1 casing?

2 MR. FELDEWERT: Object to the form of the
3 question. He's got no experience to testify to the
4 appropriate distance for oil and gas wells, which is the
5 issue before this Commission.

6 MR. OLSEN: Again, we're only talking about
7 the drilling of the water well and setting of the casing
8 for the well.

9 MR. LARSON: Join in the objection because
10 he asked the question in terms of the recommended new
11 proposed rule.

12 MR. OLSEN: I'll restate the question.

13 Q. (BY MR. OLSEN) What are -- what are the
14 requirements by the New Mexico State Engineer Office in
15 spacing when setting a casing and cementing it?

16 A. Well, on the string -- on casing strings, they
17 require -- in their present regulations?

18 Q. Correct.

19 A. If you're going to use pump-and-plug method,
20 Halliburton, some of those types, you would have a
21 3-inch -- a 3-inch clearance between the casings.

22 Q. From the casing and --

23 A. Yeah, casing.

24 Q. -- and the collar if the collar --

25 A. Collars would be 2-inch, yeah.

1 Q. So right now --

2 MS. FOSTER: Mr. Chairman -- I'm sorry.

3 Mr. Chairman --

4 CHAIRMAN CATANACH: Hold on, Mr. Olsen.

5 MS. FOSTER: Thank you.

6 This witness, again, is testifying to a
7 rule that is with a different agency. He doesn't know
8 the number of the rule. I'd like to have him testify as
9 to what that rule is so we can verify the information
10 he's testifying to is accurate. And, again, these are
11 rules that this agency has no jurisdiction over; the Oil
12 Conservation Division does not.

13 CHAIRMAN CATANACH: Mr. Olsen, do we have a
14 copy of those regulations?

15 MR. OLSEN: I do believe I do.

16 May I approach the witness?

17 CHAIRMAN CATANACH: I think it might be a
18 good idea to make some copies of these. Why don't we
19 take five minutes and make some copies of those?

20 (Recess 10:31 a.m. to 10:44 a.m.)

21 CHAIRMAN CATANACH: So we did get copies of
22 the regulations to all the different parties, Mr. Olsen?

23 MR. OLSEN: Correct.

24 CHAIRMAN CATANACH: Okay. Are we good,
25 Ms. Foster?

1 MS. FOSTER: I did.

2 And I would just like to note for the
3 record that the aquifer -- and I also know that the
4 Office of the State Engineer did have hearings on this
5 very rule this past summer. However, those rules have
6 not been finalized as of yet.

7 MR. OLSEN: These are the rules in effect
8 today. These are not the proposed rules or rules that
9 may or may not be promulgated. These are the rules in
10 effect today that we're bound by.

11 CHAIRMAN CATANACH: Understood. Okay.

12 MR. OLSEN: Mr. Director, if you'd like, I
13 can go into the detail with the witness about his
14 understanding of the regs, or he's testified he's
15 familiar with the regs. I can go through that litany
16 with the witness if you prefer or if counsel is
17 insistent. If not, I've got, I think, a couple more
18 questions and I'm done. So if you'd prefer, I can go
19 through the regs with him, the water drilling regs, if
20 you prefer. If not, I'll get close to closing. I guess
21 it's objection of counsel.

22 CHAIRMAN CATANACH: I think we can probably
23 read the regulations and interpret those without
24 having -- I'm sure some of it might come up on
25 cross-examination.

1 MR. OLSEN: With that said, may I continue?

2 CHAIRMAN CATANACH: Yes, sir.

3 Q. (BY MR. OLSEN) Mr. Atkins, have you reviewed
4 the proposed regulations, which are found in Exhibit A
5 to the Fifth Amended --

6 MR. OLSEN: Am I saying that right, David?

7 MR. BROOKS: Yes, Fifth Amended
8 Application.

9 Q. (BY MR. OLSEN) -- to the Fifth Amended
10 Application for rulemaking?

11 A. The proposed?

12 Q. Yes.

13 A. Yes.

14 Q. And I want to limit my question to your opinion
15 regarding the -- do you have an opinion whether the
16 proposed regulations adequately serve to protect the
17 integrity of the shallow and the artesian groundwater
18 aquifers in the RAB?

19 A. Yes. I believe that they will protect the
20 aquifer systems.

21 Q. Okay.

22 MR. OLSEN: We'll pass the witness.

23 CHAIRMAN CATANACH: Mr. Brooks, do you have
24 any questions?

25 MR. BROOKS: I do have one question at

1 least.

2 CROSS-EXAMINATION

3 BY MR. BROOKS:

4 Q. Mr. Atkins, Mr. Kautz testified that it would
5 be more likely there was communication in the well
6 between the waters in the artesian zone -- in the
7 artesian aquifer and the waters in the shallow aquifer,
8 it would be more likely that they would move up from
9 the -- that fluids would move up from the artesian
10 zone -- artesian aquifer to the shallow aquifer, right?
11 They would move down from the shallow aquifer into the
12 artesian aquifer.

13 Well, first of all, I got the -- I got the
14 artesian quality -- what you said about the artesian
15 quality -- water quality, which was in accord with what
16 other witnesses said. But you said it was less than
17 1,000 parts per million, right?

18 A. Yes.

19 Q. And in many places, considerably less, right --

20 A. Yes.

21 Q. -- significantly less?

22 I did not get, in my notes, what you said
23 about the quality of the valley-fill.

24 A. As I recall, it can be upwards of, oh, 2,000,
25 1,500, 2,000 total dissolved solvents parts per million,

1 and even higher, 3,000.

2 Q. Okay. Now, if artesian waters were to be given
3 a channel where they could move out of the artesian
4 aquifer and into the valley-fill, that would not pollute
5 the valley-fill. But to the extent that happened, would
6 it not be a degrading of the available water in the
7 artesian aquifer because some of the good water is taken
8 out and mixed with some of the bad, so it's not as good
9 anymore, and there's less good water left. Is that not
10 a reasonable scenario?

11 A. Yes. To prevent water from leaking
12 quantity-wise is a good idea, also.

13 Q. And there is only so much usable water
14 available at a given time, right?

15 A. Right.

16 Q. So that if you deteriorate the quality of the
17 good water, that is a water hazard or a water -- that is
18 a danger to freshwater even though you do not -- whether
19 you do it by moving the good water to a place where it
20 mingles with less good water or whether you do it by
21 bringing the less good water in and mingling it with the
22 good water?

23 A. Yes.

24 Q. Okay.

25 A. It mixes both ways during the year.

1 Q. Thank you. I think that's my only area of
2 inquiry.

3 MR. BROOKS: Pass the witness.

4 CROSS-EXAMINATION

5 BY MR. FELDEWERT:

6 Q. Mr. Atkins, I'm looking at Pecos Valley's
7 Exhibit Number 2.

8 A. I'm not sure which one that is.

9 Q. It is the --

10 COMMISSIONER BALCH: Cross section.

11 THE WITNESS: Oh.

12 Q. (BY MR. FELDEWERT) All right. Now, if I'm
13 understanding, the second cross section from the top
14 corresponds roughly with B to B prime on the Welder
15 exhibit, correct?

16 A. Yes.

17 Q. And in that area, it shows the two aquifers
18 almost running together there?

19 A. Yes. The -- can I comment on that?

20 Q. Well, that's what it shows, right?

21 A. That's what it shows, but the scale -- if you
22 look at the actual information within Welder, you see
23 you have separation.

24 Q. Okay. And is that one of the areas where you
25 said that there is, you know, a flow between the two

1 based upon the seasons?

2 A. Flow occurs through the Basin, basically.

3 Q. Through the Basin?

4 A. Yeah.

5 Q. Okay.

6 A. Through the red bed, partially. It's not
7 abundant in places.

8 Q. Okay. But there is communication there between
9 the two aquifers?

10 A. Yeah, but it's not reflected in the water
11 quality there. It's not enough to make any difference
12 in water quality, to speak of.

13 Q. And with respect to the other cross sections
14 here, I see those singles that indicate solution altered
15 zones. Do you see that, those squiggly things?

16 A. Which section?

17 Q. Well, I see it in the A to A prime cross
18 section, and, more importantly, I see it in the B to B
19 prime cross section, where they have distance between
20 the two aquifers. Do you see those squiggly lines?

21 A. Yes.

22 Q. And then I see it again in the -- down there --
23 I see it in various other areas of the cross section,
24 right?

25 A. Yes.

1 Q. Those indicate areas, does it not, where people
2 have commented that there is kind of a leaky barrier,
3 for lack of a better word?

4 A. If you read the legend on those squiggly lines,
5 "solution altered zones," where the rocks have been
6 thinned by solution and evaporites and subsequent
7 substance.

8 Q. And that would indicate the -- having people
9 commented that there appears to be areas within the
10 Basin here where the two aquifers are in communication?

11 A. Well, the communication -- if you drill these
12 areas, the water quality is substantially different. So
13 the communication is very minor. It's called leakage
14 boundary. It's modeled that way in the State Engineer
15 models. It's a semi-confined section, basically. The
16 leakage is a little higher to the north.

17 Q. Okay. And then I heard you comment on the
18 quality of the artesian water, and you mentioned the
19 quality -- let's see. What's the best -- let's use your
20 Pecos Valley Exhibit Number 1. Okay?

21 A. Yes.

22 Q. And I think in talking with you about the
23 artesian aquifer, you testified about the quality of the
24 water in the area northwest -- the northwestern area and
25 the north area and then kind of east of the Roswell

1 area?

2 A. Northeastern area.

3 Q. Northeast. Okay.

4 A. Yes.

5 Q. What happens with the quality of the artesian
6 water as you move to the south and to the east, say
7 around the artesian area? Doesn't it become
8 lower-quality water?

9 A. As you get in close to the Pecos River area, it
10 does get somewhat worse. There is a brine -- a brine
11 area east, right along the Pecos that is somewhat worse
12 down here, out to the western part of the Basin where
13 it --

14 Q. As you get more of a salty area?

15 A. Yes.

16 Q. And the water, I think -- you even testified
17 that north and east of Roswell, the water quality drops
18 off where it's not used as much?

19 A. That's correct.

20 Q. And I guess that would be more the case as you
21 move to the south and to the east?

22 A. Well, it's a very thin area as you come down
23 south along the Pecos. The artesian gets a little bit
24 worse as you come south. There are exceptions where, in
25 the eastern plains area, the water is excellent water,

1 but then as you come on south, it can get slightly --
2 it's all mapped in the Welder report. You can tell
3 where these are.

4 Q. And do you get into areas that are oily?

5 A. That are what? I'm sorry.

6 Q. Into areas that are oily.

7 A. Still didn't hear.

8 Q. Do you get into areas that are oily?

9 A. Oily.

10 Q. Yes.

11 A. Yes. Well, you can get some slight shows of
12 oil southern -- in the southern part -- south part of
13 the artesian, in that area.

14 Q. So if I'm looking at this map, if I use C to C
15 prime as my guide, are you talking kind of south of that
16 C to C prime?

17 A. Down to -- down in C, C prime?

18 Q. South of that line?

19 A. South of that?

20 Q. Is that what you're talking about, a show of
21 oil?

22 A. Mostly -- no. It's going to have to be down in
23 C, D prime area.

24 Q. The D, D prime area?

25 A. Yeah, the D, D prime.

1 Q. That's where there are observations of oil in
2 the artesian aquifer?

3 A. Yeah. There has been some observance of some
4 slight oil sections that are thin in the Grayburg
5 section.

6 Q. And just -- and also in that area where you get
7 into areas where it's more salty?

8 A. Well, when you come on south, the water quality
9 gets excellent just right west of there. You can have a
10 little bit of -- you can actually have a little bit of
11 oil and excellent artesian water quality.

12 Q. So naturally occurring?

13 A. Well, at times -- you don't think it's
14 producible, but it's very small, little shows that pump
15 off and are gone.

16 Q. So that would be naturally occurring oil?

17 A. Yeah. It happens in the Grayburg.

18 Q. All right. And then with respect to your
19 testimony about how you design water wells, I've looked
20 at the regulations that are promulgated by the State
21 Engineer. And am I correct, Mr. Atkins, that the --
22 first off, the regulations, I think as we all know, only
23 apply to water wells, right?

24 A. Yes.

25 Q. And they, by language, specifically exclude

1 from their application oil and gas wells?

2 A. Yes.

3 Q. All right. And when I look at those
4 regulations that the State Engineer put in place for
5 water wells, there is nothing in there that specifies,
6 is there, that you have to have a protective string
7 through the shallow aquifer when you drill into the
8 deeper aquifer?

9 A. No. Normally what's done is it's protected by
10 a deeper setting into the top of the San Andres.

11 Q. So you don't -- the State Land Office
12 regulations don't require that -- I'm sorry -- the State
13 Engineer's regulations don't require that the shallow
14 aquifer be cased and cemented when drilling into a
15 deeper aquifer? It's not in the regulations, is it?

16 A. Well, it's -- it's that it's cased -- in the
17 State Engineer regulations?

18 Q. Yeah.

19 A. The way it's administered is that it's cased
20 off, along with the red bed.

21 Q. Well, I'm looking at the regulations, and there
22 is nothing in the regulations that say that the -- that
23 the shallow aquifer must have a separate protection
24 casing string when you're dealing -- when you're
25 drilling into the artesian aquifer, correct?

1 A. Well, there is a waste -- a section that states
2 you can't allow inner-aquifer communication.

3 Q. Okay. Let's look at subparagraph E.

4 MR. OLSEN: Which section?

5 MR. FELDEWERT: Oh, I'm sorry.

6 Q. (BY MR. FELDEWERT) Of Subpart 4.31, "Casing
7 installation requirements." Is that what you're talking
8 about, Mr. Atkins?

9 A. Where are you at again?

10 Q. Well, I'm trying to find the source of your --
11 are you suggesting that the State Engineer regulations
12 require that there be a protective string through the
13 shallow aquifer when you're drilling the water well in
14 the deeper aquifer?

15 A. Yes. If you look at paragraph G under --

16 Q. The part talking about annular spacing
17 requirements?

18 A. Yes. And that's what allows the inner-aquifer
19 communication, and that's where it's put.

20 Q. I'm looking for casing requirements.

21 A. Oh, casing requirements. Okay. Well, it has
22 to be cased to prevent inner -- inner-aquifer
23 communication.

24 Q. Okay. What reference -- what are you
25 referencing in these regulations?

1 A. In paragraph G.

2 Q. Okay. I don't see anything in there. Maybe
3 I'm missing something.

4 A. The last sentence. You can't have a seal
5 without casing.

6 Q. It says, "If the surface casing is used,"
7 correct?

8 A. No. It says "when necessary" -- "when
9 necessary, sufficient annular seal shall be placed to
10 prevent inner-aquifer exchange of water and prevent loss
11 of hydraulic head between geologic zones."

12 Q. That's talking about annular seal, right?

13 A. Yes.

14 Q. So that would be between my --

15 A. Casing and hole.

16 Q. -- my casing and the hole and the outer
17 diameter of the hole.

18 You're a water well driller?

19 A. Yes.

20 Q. So I've got one casing down to the artesian,
21 and I've got to make sure that's cemented to prevent
22 migration out of the artesian aquifer elsewhere, right?

23 A. Yes. The way it's done is to -- under this.
24 It's been around a long time. It's required for
25 everybody, to case and cement off the shallow into the

1 red bed and usually to the top of the artesian before
2 you proceed into the artesian.

3 Q. Okay. I'm just going by the regulations.
4 There is nothing in there that tells me you have to have
5 a surface -- a protective string through the shallow
6 aquifer.

7 A. Well, it says "annular seal," which is the
8 defined space between the casing and the hole. So that
9 indicates to me it has to be cased, or you wouldn't use
10 the words "annular seal" for that, in that regulation.

11 Q. Don't you have annular space between the
12 outer -- between your casing and the outside diameter of
13 the hole? Isn't that the annular space?

14 A. Yes. And that's the casing we're talking about
15 that separates the aquifer systems.

16 Q. Okay. All right. And then they do have a
17 subparagraph E that deals with casing installation
18 requirements, correct?

19 A. Paragraph what? I'm sorry.

20 Q. E. Subparagraph E, "Casing installation
21 requirements." Do you see that right above where you
22 were just looking?

23 A. Oh, just slightly above. Is this under the
24 first series of paragraphs?

25 Q. No. I'm at subparagraph E, "Casing

1 installation requirements."

2 A. Oh.

3 Q. Are you there?

4 A. I'm getting there.

5 Q. I don't have a page number on here. I
6 apologize.

7 MR. OLSEN: Next page.

8 THE WITNESS: Yes.

9 Q. (BY MR. FELDEWERT) Okay. Go to the last
10 sentence. So this is the sum and substance of what they
11 have for casing installation requirement, and it says,
12 "The casing shall be un-perforated and the well be
13 designed in a manner to prevent the commingling of water
14 from the artesian stratum with water in an overlying or
15 underlying geologic unit." Correct?

16 A. Yes. I was referring to the other E on the
17 first page -- I mean the other -- on the first page, I
18 was referring to --

19 Q. That's all right. That's all the questions
20 I've got.

21 CHAIRMAN CATANACH: Mr. Larson?

22 MR. LARSON: I don't have any questions.

23 CHAIRMAN CATANACH: Mr. Bruce?

24 MR. BRUCE: Just a couple, Mr. Chairman.

25

1 CROSS-EXAMINATION

2 BY MR. BRUCE:

3 Q. Mr. Atkins, you testified about leakage during
4 the course of the year, at some point water flow from
5 the upper zone to the artesian and other times of the
6 year to the upper?

7 A. Yes.

8 Q. And that's caused by -- mainly by water flow
9 and pumping of water, right?

10 A. Yes.

11 Q. By the members of the Conservancy District?

12 A. Yes, the water rights holders.

13 Q. Not by oil and gas drillers?

14 A. No.

15 Q. Thank you.

16 CHAIRMAN CATANACH: Ms. Foster, any
17 questions?

18 MS. FOSTER: No questions.

19 CHAIRMAN CATANACH: Commissioners?

20 COMMISSIONER BALCH: I have a couple of
21 questions.

22 CROSS-EXAMINATION

23 BY COMMISSIONER BALCH:

24 Q. Good morning, Mr. Atkins.

25 A. Good morning.

1 Q. I'm going to ask you a few hydrology questions
2 because I'm curious.

3 A. Of what? I'm sorry.

4 Q. I'm going to ask you a few hydrology questions
5 just because I'm curious.

6 A. Oh, okay.

7 Q. They don't have any bearing.

8 So going back to Mr. Bruce's question, that
9 updip contact between the shallow and the deep aquifers,
10 is that a potential recharge point for the shallow
11 aquifer?

12 A. Oh, partially -- the water can leak up into the
13 shallow at slow rates through the red beds referred
14 to as -- low-permeability red beds that occurs. There
15 is seepage over a long period of time.

16 Q. Particularly during the recharge season, which
17 is winter and spring?

18 A. Well, it depends on the water levels in both
19 systems in the chain, the difference in the head causing
20 the leakage.

21 Q. Am I right in thinking that the flowback for
22 the shallow aquifer are going to be primarily driven by
23 the Pecos River downdip to the south?

24 A. The Pecos River is a natural discharge point
25 for all the water. And what actually happens is the --

1 both -- both aquifers eventually discharge into the
2 Pecos River.

3 Q. Both aquifers?

4 A. Both, yes.

5 Q. Okay. So artesian, as well as the shallow?

6 A. The artesian can leak through the shallow along
7 the Pecos River System and contributes to some extent to
8 the Pecos River flow.

9 Q. Okay. But the artesian recharge itself is
10 going primarily east to west until it hits the Pecos --

11 A. Yes.

12 Q. -- west to east?

13 A. Yes. It's retarded by the uprising Artesian
14 Group on the east side of the Pecos River, and it tends
15 to turn south and discharge -- if un- -- un- --
16 unappropriated, it would discharge at the Major Junction
17 Springs [phonetic] area in the southern part of the
18 Roswell Basin.

19 Q. Is the -- and how quickly is the artesian
20 aquifer being depleted? Is it right now, or has it
21 reached a steady state?

22 A. It's actually -- the Conservancy District
23 measured a series of wells through the Basin, and it
24 actually dips. It kind of -- it'll go up awhile and
25 come down awhile and go back. And it's kind of based on

1 the recharge, and it seems to be pretty well in balance.
2 But, you know, it's just a long period of monitoring.
3 You can't really come up with any decline information
4 because of that fact, when the recharge comes back up.

5 Q. It's not being driven down like the Ogallala?

6 A. No. No. Not even related.

7 Q. Doing a better job, apparently?

8 A. Yes.

9 Q. All right. Going back to the water well, the
10 drilling of them, it's not quite clear to me. Is it
11 required that you case off and cement through the
12 shallow interval when you're drilling a water well?

13 A. Yes. If you want to drill deep into the
14 artesian, you have to case -- cement off the channel.

15 Q. And when they do that, they circulate cement to
16 the surface?

17 A. Yes. They have to circulate cement. If they
18 don't, then they have to bind the top of the cement.
19 And, you know, usually a temperature survey is done at
20 first, if time be enough, for the heat and hydration.
21 If not, later -- I have required some cement bond logs
22 just to know where the cement was and how it was bonded,
23 many years back.

24 Q. Not a regulatory requirement?

25 A. No. It's not a normal -- but usually what they

1 let them do is they'll let them run a 1-inch pipe down
2 or see if they can tag the top of the cement behind --
3 you know, down behind the -- from the land surface down.
4 That's why you need these sizes, so you can get that
5 1-inch down. Find the top of the cement, be sure that's
6 it by tagging and then bringing it on up.

7 But if you're able to isolate the shallow
8 aquifer in the red bed and on up, kind of overlap up
9 into the shallow and bring the 1-inch on up, it's
10 considered to be safe where you've lost circulation.

11 Q. So when you're drilling a water well -- I'm
12 kind of going through the sequence and writing it down.
13 I just want to make sure I have it clear, if you don't
14 mind. You drill to the base of the red beds,
15 essentially?

16 A. Yes.

17 Q. Then you cement up, circulate to the top --

18 A. Correct.

19 Q. -- before you drill to the base of the
20 artesian, if that's your target --

21 A. Yes.

22 Q. -- your water well target?

23 And then you cement back to where from
24 there?

25 A. You don't. The cement's -- you just drill into

1 the -- the San Andres open hole, and then it's a
2 production zone. So it's open. You don't run another
3 casing string.

4 Q. So really below that 50 feet into the red beds,
5 you're --

6 A. You're in the artesian. You're in the --

7 Q. Open hole or -- casing?

8 A. -- top of the artesian.

9 Right.

10 Q. And it looks like the State Engineer requires
11 3 inches from the casing, 2 inches from the joint --

12 A. They do.

13 Q. -- for water wells?

14 A. Yes.

15 Q. And that's probably where this came into this
16 proposed regulation?

17 A. Yes.

18 Q. So there's a little bit of a difference between
19 water wells and oil wells, I think, in that the water
20 wells are deliberately trying to tap into those
21 resources either individually or separately, so you have
22 to manage that flow?

23 A. As far as water wells, you're trying --

24 Q. Yeah, water wells.

25 A. -- produce the zones, so you need to protect

1 the zones from leakage from lower zones that may be --

2 Q. And vice versa. You don't want them dropping
3 down --

4 A. Yeah, between the two.

5 Q. But the oil well is trying to just avoid those
6 zones entirely. And once you case it off, cement it,
7 and then go deeper?

8 A. Yes. They want to case off both zones and go
9 deeper.

10 Q. So I think I counted 345 pools that are within
11 the groundwater basin there?

12 A. Yes.

13 Q. There's got to be thousands of wells perhaps.

14 A. Of water wells?

15 Q. Oil wells.

16 A. Yes.

17 Q. Has to be -- has to be --

18 A. Right.

19 Q. -- a lot oil wells --

20 A. Right.

21 Q. -- going back quite a ways --

22 A. Right.

23 Q. -- probably the 1920s.

24 A. Right.

25 Q. Technologies were not the same back then, of

1 course.

2 So it seems as though thus far there hasn't
3 been a leakage sign -- sign of a leakage, and that was a
4 question that was asked of prior witnesses. So I wanted
5 to ask that of you.

6 A. A major indication that something has --

7 Q. Something has leaked or --

8 A. Contaminant.

9 Q. -- that an oil well has come between aquifer.

10 A. I was giving that some thought, and yes, you
11 get some leakage into the artesian. But it's so
12 permeable that you get an overall slightly degrading
13 depending how much has been released. So it's very --
14 you know, you didn't have early water quality data to
15 know what was there previously. And so you can continue
16 these low-quality changes until you substantially affect
17 the water quality.

18 Q. Do you or the Conservancy or anybody that you
19 know of monitor the overall water quality from year to
20 year?

21 A. I think the Conservancy District has been
22 monitoring for some period of time. I've kind of
23 forgotten how long on artesian water quality. And
24 they're more -- they're looking at chloride problems
25 from the eastern sections that we were talking about.

1 Q. Do you know what sort of changes occur over --
2 what time period we're talking about there that they may
3 have been monitoring that?

4 A. Oh, I think -- I can't remember for sure. It's
5 been a lot of years, quite a few years. I know when I
6 was there, we monitored those with the PVACD, when I was
7 with the State Engineer Office, and we used to map -- do
8 some chloride maps in that regard, which they quit
9 doing. And I'm not sure they're sampling everything
10 now.

11 But, you know, again, when you -- the
12 artesian is such a high permeability that it takes --
13 it'll disperse quickly across a large region, and you
14 may get a minor change in the water quality for a period
15 of time --

16 Q. Seasonal variations?

17 A. -- and it may keep building up for years.

18 Q. So you have an up-and-down drop. You see that
19 in the Ogallala, seasonal variations.

20 I guess what I'm asking you is there any
21 indication of a long-term trend in the direction of,
22 say, chlorides that would be perhaps an indicator?

23 A. Oh, you know, if -- you'll get times that it --
24 when you get a good recharge going on, that the
25 chlorides tend to recede, move back to the east to some

1 extent. And there is a good record of that.

2 But overall, the changes in water quality,
3 the data I don't believe is there to actually tell if
4 there's been a slight degrading off of the entire Basin
5 area.

6 Q. Inadequate data availability, or is it just
7 statistically insignificant?

8 A. Just not done. You know, not done over the
9 years to provide the data set that you need.

10 Q. Thank you.

11 CROSS-EXAMINATION

12 BY COMMISSIONER PADILLA:

13 Q. Good morning, Mr. Atkins.

14 A. Good morning.

15 Q. Thank you for your time.

16 A. Thank you.

17 Q. I wanted to follow up on Mr. Brooks' question
18 and just clarify what we're talking about.

19 Your impression of the water quality is you
20 said that the water quality on the western edge of the
21 artesian was 1,000 TDS or less, more or less?

22 A. Yes.

23 Q. And then the shallow aquifer is in the 1,500 to
24 2,000 TDS range?

25 A. Yeah. It can be even higher. If you notice,

1 you don't get into the shallow until you move further
2 east. What actually happens in the shallow, you get too
3 far east, then the evaporation occurs from the land
4 surface from the shallow aquifer because of the high
5 table. So you have that water quality by evaporation.
6 And then you also get some leaching through the basin
7 areas, you know, where you have water on top that's
8 moving downward.

9 Q. So you would say 1,500 to 2,000 TDS average?

10 A. Well, it could even be a little higher. It
11 could be higher depending on where you are.

12 Q. If I made you peg it, what would you say across
13 the aquifer?

14 A. Shallow aquifer, used TDS, it would be in the
15 range of 2,000 parts per million, maybe in that range.
16 Maybe a little less. I'm just kind of --

17 Q. I won't hold you to it, just as a ballpark.

18 Looking at your Exhibit 2, which is the
19 cross sections --

20 A. Yes.

21 Q. -- I had a follow-up to an earlier question. B
22 to B prime -- and I understand this isn't to scale, but
23 would this be one of those areas of naturally occurring
24 commingling that you were talking about through the red
25 bed?

1 A. No, not substantially. There is enough
2 separation in the Artesian Group in that area. Even
3 though it doesn't show up on the cross-section map, you
4 have -- you're able to -- if you look into the Welder
5 report and find the actual maps of -- you have a map of
6 the top of the red bed. You have a saturated thickness
7 map. You have a top of the San Andres map. And you can
8 use those numbers and come up with a thickness of the
9 red bed in that area. And you're, you know, we drilled
10 into it many times, and, you know, 50 to 100 in that
11 area, around Roswell.

12 Q. For the red bed, the separation --

13 A. Through the red bed, yeah, the red bed
14 thickness. And as you move west, of course, the San
15 Andres outcrops.

16 Q. But you don't think that's got a high
17 probability for commingling -- a point of commingling?

18 A. For what? I'm sorry.

19 Q. For commingling.

20 A. I don't know because the water quality is still
21 much -- much different --

22 Q. Harder to tell.

23 A. -- in those areas.

24 Q. Uh-huh. Okay.

25 You said that you were concerned about

1 water from the shallow aquifer being introduced into the
2 artesian. I would just like you to elaborate on that a
3 little more, because with that pressure differential
4 that you talked about in the artesian being -- having
5 more pressure than the shallow, I'm wondering how that
6 would be introduced downhole when you're -- when you're
7 dealing with lower pressure at the surface.

8 A. Well, when you go through a year's time, the
9 artesian water levels can be as much as 150 to 180
10 higher than they are in the winter than they are in the
11 summer. So what actually happens is the artesian head
12 rises over the shallow head, and many wells will flow at
13 land surface east of the Roswell and on down east. So
14 you have -- during -- in the pumping season, you're
15 pulled down to where the shallow will leak. You know,
16 the level water in the artesian in the pumping season,
17 you can go down 150 feet, and it'll be below the shallow
18 head. And so the leakage is downward from the shallow
19 to the artesian in the summer. In the winter, it's the
20 other way.

21 Q. But if your hole is cased, how does that play
22 into it?

23 A. Well, I'm just talking about a little bit of
24 red bed leakage, if your hole was cased and you had
25 channelling or if you had holes in the casing. There

1 are many, many wells that leak that way now, presently.
 2 The PVACD has been on a plugging schedule to try to fix
 3 those. But, you know, if you have something wrong with
 4 the casing or the cement, then -- then that can happen,
 5 that leakage both ways.

6 Q. Because of the pressure --

7 A. Pressure's different during the year, right.

8 Q. Right.

9 And that's just kind of a naturally
 10 occurring seasonal change?

11 A. Well, it can -- it can happen in wells that are
 12 not completed properly.

13 Q. No. I mean the --

14 A. Oh, the seasonal change. Yes. Yes.

15 Q. The differences in the heads.

16 A. Right. It happens every year.

17 Q. Okay.

18 A. Yeah.

19 Q. And then I want to go back through something
 20 Dr. Balch touched on, when you said that, you know,
 21 necessarily that upper aquifer is cased from the bottom.
 22 It's really a function of those well designs because --
 23 and correct me if I'm wrong here -- your target is the
 24 artesian. And in this case it's casing down, cementing
 25 and drilling back through?

1 A. Yes.

2 Q. Which would be pretty different from an oil
3 well that is continuing through the artesian --

4 A. That's correct.

5 Q. -- where you would have to have a casing
6 program extend past?

7 A. Past the artesian, yes.

8 Q. So really your -- for lack of a better term,
9 your casing of those wells is your entire production
10 casing, and you either leave the production zone, for
11 lack of a better term again, open hole or put a slight
12 liner for the water well, right?

13 A. Right.

14 Q. So by the nature of that design, that works for
15 those kind of water wells because of your target, and
16 you know you're able to naturally isolate with just one
17 string?

18 A. Right. But you don't drill into the production
19 string with that one string, though. You're not
20 drilling the producing zone with that one string.

21 Q. Right. But your producing zone is --

22 A. Yeah. So when you're drilling --

23 Q. You're able to leave an open hole, I guess is
24 my point.

25 A. Yeah. You drill and case everything off before

1 you go into the San Andres. The very upper portion of
2 the San Andres is impermeable, and it usually has very
3 little. So you don't -- you don't drill -- very small
4 amount into the San Andres --

5 Q. Right.

6 A. -- or else you can't -- you'll have all kinds
7 of problems. You'll have to plug the well back because
8 of the difference in permeabilities between the shallow
9 and artesian. So you don't just drill both -- down
10 through both. You drill into the very top of the
11 artesian and stop before you encounter any water zones.
12 It's basically the red bed.

13 Q. Would you agree with the assessment that
14 somebody made -- I think it was yesterday. The OCD -- I
15 can't remember which witness testified that the bottom
16 of the shallow aquifer was between 70 and 120 feet below
17 ground level?

18 A. Well, it just depends on where you are. It
19 varies across the Basin. Some areas, the base of the
20 shallow aquifer can be 300. Other areas it can be 100,
21 based on the mapping that was done by USGS and the well
22 logs that are available.

23 Q. So if the OCD were to require in those kinds of
24 cases where they've got good well control data, say a
25 200-foot surface casing --

1 A. Yes.

2 Q. -- to isolate that zone and continue down with
3 your single 7-1/2, 9-5/8, whatever you want to go down
4 further --

5 A. Yes.

6 Q. -- would that be sufficient?

7 A. Well, the first casing, if you drop into the
8 red bed below the base of the shallow -- I think they
9 had 50 feet -- then you're not running as much casing
10 through the shallow aquifer as you would think.
11 Sometimes it can be 200 feet to get to that point.

12 Q. Right. I mean based on those --

13 A. Or 100 feet, depending on the --

14 Q. -- three joints of tubing when you're there.

15 A. Sometimes it's not -- it's not a whole lot,
16 depending on where you are, not a long string or
17 anything.

18 Q. So you think -- I mean, what I'm trying to say
19 is the existing rule allows for that.

20 A. Yes.

21 Q. You think that's not adequate protection?

22 A. Well, I think -- you know, I think to be safer,
23 the casing needs to be there all the time and not
24 subject to discretion necessarily, who made that
25 decision or -- and I always thought that you should have

1 a witness there from the OCD or BLM, but it doesn't
2 happen many times.

3 Q. I think theoretically that's how it's supposed
4 to work, but in practice --

5 A. Yeah. That's one reason -- that's one reason I
6 support these rules. Just don't have the personnel to
7 go out there and stay there and monitor every little
8 thing done. So these rules give you an assurance that
9 you're getting that separation.

10 Q. I agree. But the only flip side that I would
11 say is that then you're waiting on the office to get it
12 done, and you've got a lot of people standing by
13 twiddling thumbs while we're doing it. So I see both
14 sides of that coin.

15 A. Right. Because of the cement, I guess.

16 Q. Right.

17 I mean, that particular tool, as it's
18 written, is kind of cumbersome, to me, from an
19 operational standpoint.

20 A. Well, I know there are additives that can go
21 into cement, have a quicker [sic] strength, and your
22 weight time for compressive strength needed for the
23 cement bond log is somewhat less. It could be -- I
24 believe the OCD testified that it could be 24 hours.
25 There are -- there are write-ups of programs available

1 that can -- the 72 hours is a rule of thumb. It's not
2 necessarily set in stone.

3 Q. It's not the setting time and the wireline time
4 that I'm concerned about. It's more the regulatory
5 time.

6 A. Analysis of the data.

7 Q. That's the question mark. But, again, 72
8 hours, if you're spending 50- or \$60,000 a day on a
9 drilling package, in addition to the extra drilling
10 cost, is going to be pretty onerous.

11 RE CROSS EXAMINATION

12 BY COMMISSIONER BALCH:

13 Q. One thing that we're tasked with doing is
14 preventing waste, and if -- if you have less -- if
15 you're spending more time with one rig on one well, then
16 there are less wells going to be drilled throughout that
17 year --

18 A. Yes.

19 Q. -- is the likely scenario.

20 COMMISSIONER PADILLA: Right.

21 I'll turn it over to you, Mr. Chairman.

22 CHAIRMAN CATANACH: Just a couple of
23 questions, Mr. Atkins.

24

25

1 CROSS-EXAMINATION

2 BY CHAIRMAN CATANACH:

3 Q. If you've got -- let me ask you this: On a
4 water well, your shallow surface casing is cemented back
5 to surface?

6 A. Yeah. Well -- yes, it is.

7 Q. The long string that goes into the artesian,
8 that doesn't have to be cemented?

9 A. No, it does not.

10 Q. Because that open hole --

11 A. Yes.

12 Q. Is that a casing -- do you have to set a casing
13 string in there?

14 A. Well, a lot of wells are just drilled open hole
15 because they're just open in the San Andres.

16 Q. Okay.

17 A. If they have significant shale sections that
18 tend to try to cave in and fill the hole up, then the
19 practice has been to run liners, you know, not a casing,
20 but it's actually a liner that goes in there, like a
21 line pipe perforated.

22 Q. Okay. Your experience with lost-circulation
23 zones in this area, do they extend through the Artesian
24 Group, or where do you think the lost-circulation zones
25 are?

1 A. Well, in these -- in these lost-circulation
2 zones that were plotted on the exhibit, we cover them --

3 Q. Well, in general.

4 A. Generally, it's the San Andres all the way
5 through. What actually happens is you get into
6 cavernous limestone. Hard to deal with.

7 And I notice that many, many of the wells
8 have dual casings that were on the list of one of the
9 exhibits. And this is kind of speculated. The reason
10 may be they're having so much trouble with maintaining
11 the hole and getting -- maintaining the circulation, is
12 that we cased that off, you know. But it's -- and the
13 other witness will get into the high permeability rates
14 of the San Andres and why it's hard to cement, hard to
15 drill through, causes lost circulation for sometimes a
16 long time, couple days or something. And we've drilled
17 in the San Andres top of it and lose circulation and
18 have major problems.

19 Q. Let me ask you this: If you have an oil
20 well -- I know we're not supposed to be talking about
21 oil wells, but -- that utilizes a single casing string
22 to seal off the shallow and the deeper aquifers and that
23 casing string is adequately cemented, you have a good
24 cemented place and no micro-annulus or anything like
25 that, what are your concerns with regards to the

1 communication between those zones?

2 A. If you -- if you -- when you're drilling
3 that -- that particular way, you run a big chance of
4 lost circulation in the artesian, for one thing. Then
5 when you're -- if that happens and you have
6 contamination, whatever was being used in the artesian.
7 If you drill on past that into the oil production zone
8 to land or you're running just one below the artesian,
9 and then if you didn't cement -- get it cemented
10 properly and not sure what happened, then you're at a
11 loss to know -- you can run a cement bond log.

12 Whether or not you can fix that -- you
13 know, that area where you lost that cement, the cement
14 part, you know, leads to problems where you could get
15 leakage between the two zones for sure and get leakage
16 behind the casing. So you're just much better off with
17 the casing and cement there. During the process itself,
18 you can lose circulation and cause a major problem.

19 Q. So that's the -- the major concern is during
20 drilling operations?

21 A. Well, it's even in the cementing -- casing and
22 cementing, too, you know, to make sure that you don't
23 have channels surfacing and leakage going on.

24 Q. Just one more question. You were around -- you
25 worked for the State Engineer back in the '70s?

1 A. Yes.

2 Q. Are you aware of any agreement between the
3 State Engineer and the OCD with regards to the annular
4 space?

5 A. Not -- basically, the State Engineer used to
6 assess the OCD back at that time, and they would sit on
7 some of the oil tests that were done around Roswell.
8 And they followed the same procedure that I'm talking
9 about, trying isolate with casing those zones -- aquifer
10 zones. Now, I'd have to look back at the data and see
11 precisely what was done, but the object was to case off
12 the upper water zones.

13 Q. But with regards to the annular -- the 2-inch
14 annular space, there's been some talk about an agreement
15 between the OCD and the State Engineer with regards to
16 that, the size of the annular space. You don't recall
17 that?

18 A. Oh, I don't know when that occurred. I'm not
19 sure. I may not have been there at that time.

20 Q. We can't seem to locate that, so I'm just --

21 A. Oh, okay.

22 CHAIRMAN CATANACH: That's all I have.

23 MR. OLSEN: May I have one or two on
24 redirect? If I may have one moment?

25

BY COMMISSIONER PADILLA:

You said that this water system has an infinite life expectancy. Is that basically due to the recharge coupled with proper management?

Q. Okay.

Q. So at that 500,000 acre-feet rate, you see this continuing perpetuity there?

Q. Even with the rebalancing that tends to --

Q. The seasonal rebalance, I guess --

**PAUL BACA PROFESSIONAL COURT REPORTERS
500 FOURTH STREET NW - SUITE 105, ALBUQUERQUE, NM 87102**

1 levels are shot full of pumping effects.

2 Q. Okay. Thank you.

3 CHAIRMAN CATANACH: Mr. Olsen?

4 MR. OLSEN: We'll pass the witness. No
5 redirect.

6 MR. FELDEWERT: I just have a couple of
7 questions arising out of --

8 RECROSS EXAMINATION

9 BY MR. FELDEWERT:

10 Q. Mr. Atkins, the debate here seems to be a
11 single string protection versus two string protection.

12 A. Yes.

13 Q. And if I'm understanding your testimony, your
14 concern is that if you don't have the two strings then
15 while drilling, there is a potential that the fluid from
16 the artesian -- or the shallow could migrate into the
17 artesian; is that right? That's your concern?

18 A. Yes. You can get intercommunication between
19 the aquifers, yes.

20 Q. And the shallow has lower quality than the
21 artesian?

22 A. Yes.

23 Q. And that's why you would have that concern?

24 A. Yes. That's one reason. Plus -- yes. That's
25 the main reason. Yes.

1 Q. And that the migration from the upper aquifer
2 to the lower aquifer that you're worried about, we're
3 talking about a fairly short period of time, because it
4 would only be while drilling until that single string is
5 cemented. We're not talking about a long period, only a
6 short period.

7 A. As far as the drilling procedure?

8 Q. Yeah.

9 A. Well, depending on what kind of problems they
10 have.

11 Q. Okay. And then what you added that I wasn't
12 aware of is that you'd also have that concern -- you not
13 only have a short period of time for drilling but there
14 is also a seasonal component to that because as you
15 pointed out, at least a large part of the time of the
16 year, the artesian is pressured up, and so wouldn't you
17 have that flow anyway?

18 A. Well, it's possible that the leakage would be
19 upward prior to drilling, yes, at times.

20 Q. And if this concern that you have, after
21 decades of drilling, was really occurring, wouldn't you
22 see an eventual degradation in the water quality on the
23 lower artesian aquifer?

24 A. If -- if you had leakage from the shallow to
25 the artesian significantly and, you know, you probably

1 struck [sic] up a little bit of it. It would be hard to
2 measure in the Basin.

3 Q. But eventually you'd see a degradation, right?
4 That's what you're concerned about?

5 A. Eventually, down the road, you can, yes.

6 Q. And your group has been monitoring the chloride
7 level in this Artesian aquifer, I think you said, for
8 years?

9 A. Well, yes. I used to look at that data, but
10 I'm not sure how it's -- when it was started or what
11 they're still doing on that for sure.

12 Q. There is no evidence that you're aware of to
13 indicate the artesian aquifer has shown any signs of
14 degradation with respect to chloride?

15 A. I don't have the data to tell you, to tell you
16 the truth.

17 Q. So I guess that comes into play when we're
18 trying to balance the waste issue that Mr. Balch talked
19 about here?

20 A. The waste -- waste issues?

21 Q. Okay. That's all the questions I've got.

22 CHAIRMAN CATANACH: Anything further of
23 this witness?

24 This witness may be excused.

25 So, Mr. Olsen, you have how many more

1 witnesses?

2 MR. OLSEN: One more, Roger Peery. I would
3 anticipate his direct from -- direct an hour, hour and
4 20 minutes.

5 CHAIRMAN CATANACH: Okay.

6 How many witnesses do we have on this side?
7 Four? Five?

8 MR. FELDEWERT: I have one.

9 MR. BRUCE: I have one.

10 MR. LARSON: I have two.

11 CHAIRMAN CATANACH: Four. Okay. We do
12 have time constraints that get into tomorrow. I think
13 Dr. Balch has to leave here --

14 COMMISSIONER BALCH: 3:45 tomorrow.

15 CHAIRMAN CATANACH: I think we can finish.
16 I'm hopeful.

17 MS. FOSTER: Are you planning to go into
18 Thursday?

19 CHAIRMAN CATANACH: No. We cannot go into
20 Thursday.

21 MR. BRUCE: For the record, Dr. Balch
22 (indicating).

23 COMMISSIONER BALCH: No. I plan on flying
24 to Florida on Thursday.

25 CHAIRMAN CATANACH: We had planned only on

1 three days for this hearing. We can stay --

2 COMMISSIONER PADILLA: Let's stay late.

3 CHAIRMAN CATANACH: We can stay late if we
4 have to.

5 With that, we'll break for lunch and
6 reconvene at 1:00.

7 (Recess 11:40 a.m. to 1:02 p.m.)

8 CHAIRMAN CATANACH: All right. Then we'll
9 resume the hearing at this time and turn it back over to
10 Mr. Olsen.

11 MR. OLSEN: Thank you, Mr. Director.

12 We would call Roger Peery.

13 ROGER PEERY,

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

16 MR. OLSEN: May it please the Director?

17 CHAIRMAN CATANACH: Please.

18 DIRECT EXAMINATION

19 BY MR. OLSEN:

20 Q. Please state your name.

21 A. Roger Peery.

22 Q. Mr. Peery, before proceeding, were you in the
23 audience yesterday, December 5, when all witnesses were
24 called to take the oath?

25 A. Yes, I was.

1 Q. And did you take the oath and offer an
2 affirmative response?

3 A. I did.

4 Q. Mr. Peery, please tell us, if you will, your
5 educational background.

6 A. I earned a bachelor's of science in geology in
7 1987 from UNM and a master's of science in resources
8 also from UNM in 1992.

9 Q. And since obtaining your MS in water resources,
10 have you done any postgraduate work? Any other
11 educational background?

12 A. No postgraduate work, but I've taken a number
13 of short courses through NGWA and other organizations.
14 I also have to go to conferences or teach classes or
15 attend short courses in order to keep my professional
16 licenses current, so I take annual courses or go to
17 conferences.

18 Q. Let's talk about your professional licenses.
19 Which licenses do you hold?

20 A. I have a license as a professional geoscientist
21 in the state of Texas and also Wyoming. I'm also a
22 professional geoscientist from the American Institute of
23 Professional Geologists. I also hold a GS-29 from the
24 New Mexico Construction Industries Division, which is an
25 environmental contractor's license.

1 Q. I'd like to talk a moment, if we may, about
2 your work history, so if you could give us a
3 background -- your professional background.

4 A. I've been with John Shoemaker & Associates a
5 little over 27 years now, and I've performed a number of
6 duties over the years. I'm currently the CEO of the
7 company and principal hydrogeologist there. I've
8 performed investigations of contamination, various kinds
9 of fuel hydrocarbons from leaky gas tanks, sulfate
10 plumes, things like that of mines -- copper mines, been
11 involved with those kind of investigations.

12 Also, I've performed a lot of well siting
13 study geologic work, hydrogeologic studies, served as an
14 expert witness in various water resources -- or water
15 rights hearings, done a lot of design of large-capacity
16 water supply wells and been involved with quite a number
17 of domesticized wells also. I've been involved with
18 various kinds of permitting with discharge permitting
19 through the Office of the State Engineer and other
20 things like that, and also been involved with the R0
21 concentrate of injection wells.

22 Q. We've marked as Exhibit 4 to -- PVACD's Exhibit
23 4 your resume, and I believe you have your resume also
24 before you. Is your resume current as of today?

25 A. Yes, it is.

1 Q. I'd like to address your expert testimony in
2 various settings. Your resume shows that you have
3 provided sworn expert witness testimony before the
4 Nuclear Regulatory Commission-Atomic Safety and
5 Licensing Board. Would you describe that for us,
6 please?

7 A. That testimony was related to -- at the time,
8 it was the proposed uranium enrichment facility over in
9 Eunice, Texas, near Andrews, Texas -- geologic and
10 hydrogeologic issues relating to the site of that
11 facility.

12 Q. Now, you also state that you've been recognized
13 or have testified in various administrative hearings
14 before the various agencies, and those are?

15 A. I've testified before the OCD, Oil Conservation
16 Division, on issues related to the geothermal power
17 plant, which at that time was proposed and subsequently
18 built over in the Lordsburg area. It's gone by a number
19 of names, Lightning Dock, Cyrq, Laser Tech. I don't
20 know what they currently call themselves. But I did
21 testify on that issue.

22 Also, I've testified before the New Mexico
23 Environment Department, and that was also related to the
24 uranium enrichment facility. I've testified before the
25 New Mexico Office of the State Engineer hearing

1 examiners on a number of water rights cases throughout
2 the state and testified before the New Mexico Second
3 Judicial Court on issues related to hydrogeology and
4 wells.

5 Q. And were you recognized as an expert in
6 hydrology and geohydrology?

7 A. Yes, I was.

8 Q. And have you offered testimony in those two
9 areas?

10 A. That's correct.

11 MR. OLSEN: Mr. Director, we would tender
12 Mr. Peery as an expert in the field of geology and
13 geohydrology.

14 CHAIRMAN CATANACH: Any objection?

15 MR. FELDEWERT: No objection.

16 MR. LARSON: No objection.

17 CHAIRMAN CATANACH: Mr. Peery is so
18 qualified.

19 Q. (BY MR. OLSEN) Mr. Peery, I'd like to start
20 your testimony. If you would, please, give us a
21 background with your experience in the Roswell Artesian
22 Basin in the geohydrology setting.

23 A. I think the first work I performed in the Basin
24 was actually related to investigating contamination at
25 the Giant Refining plant, looking for fuel, hydrocarbons

1 of various sorts over there. I've also been involved
2 with a number of well projects where I designed the
3 wells for Artesia -- completion for the city of Artesia,
4 ten wells, for the New Mexico Interstate Stream
5 Commission in the Seven Rivers area, three wells for the
6 New Mexico Interstate Stream Commission in the Lake
7 Arthur area. I also was the project manager for some
8 groundwater flow modeling our company did for the
9 New Mexico Interstate Stream Commission in the general
10 area of Seven Rivers and Lake Arthur.

11 Q. Tell us, if you would, please, what you have
12 done on the design work. Expand on that for us.

13 A. Well, what I do is I develop well drilling
14 specifications that specify the method that will be used
15 to drill the hole, whether it's using drilling fluids or
16 whether it's using area direct mud reservation, mud
17 shoes, the borehole diameter, the casing length and type
18 wall thickness that will go in there and annular
19 materials if they're needed, if a well screen goes into
20 place and well development and the test pumping and
21 water quality stamping procedures associated with that.
22 I do pretty much everything from start to finish with a
23 well before the final pump is put into it.

24 Q. Now, before proceeding any further, as part of
25 your registration and licensing, does the design of the

1 wells -- are you qualified to do that by virtue of your
2 registration and/or licensing?

3 A. I'm qualified to do that in the state of Texas
4 as part of my licensing. In New Mexico, it's a
5 different license for geologists or geoscientists. And
6 so I guess it depends where I am. If it's a well that
7 has to be -- that will be used in New Mexico for a
8 municipal water supply well, then the -- a professional
9 engineer will subsequently stamp the design. So
10 basically -- I'm not an engineer. I design the whole
11 project. They stamp it, and it goes to the Environment
12 Department for approval.

13 Q. Let's talk about John Shoemaker & Associates.
14 They have been around how many years?

15 A. Since 1973.

16 Q. And Dr. Shoemaker, in conjunction with you, has
17 conducted a number of studies and work in the Roswell
18 Artesian Basin over these many years; is that correct?

19 A. That's correct.

20 Q. What we've marked as Exhibit 5 to the PVACD
21 exhibits is a partial list of the large-capacity water
22 well projects. Can you explain this exhibit for us,
23 please?

24 A. This exhibit just summarizes what we call
25 large-capacity wells, which make, generally, you know,

1 close to 1,000 gallons a minute or higher in the various
2 places where these wells and the clients that were
3 performed for. It gives the depth that they were
4 drilled and year that they were drilled. And I would
5 say I was personally involved either as the person who
6 set the drilling rig and monitored the activities or did
7 the design work on the wells and maybe also set the
8 wells on at least two-thirds or more of these wells, I
9 would imagine.

10 Q. Now, I want to go specifically to those wells
11 that are identified within the exhibit, to areas in
12 southeastern New Mexico, Artesia -- starting on page 2,
13 City of Alamogordo, Artesia, Carlsbad, El Paso Natural
14 Gas; continuing to the third page, Town of Hagerman;
15 continuing to the next page, New Mexico Interstate
16 Stream Commission; next page, Village of Ruidoso. And
17 on projects identified in the exhibit, were you a
18 participant in the design and development of the wells?

19 A. I was except for the Town of Hagerman. I had
20 very little involvement with that. Except towards the
21 end of the project, I had some discussions with some
22 issues that went wrong. As I recall, Mr. Atkins
23 testified earlier that oftentimes the artesian aquifer
24 is left open, not a liner or casing put in there. And
25 on that well, the borehole had actually collapsed and

1 had to be redrilled out and a liner set in there, and
2 that was my only involvement, a discussion about how to
3 do that.

4 But other than that one, I believe I was
5 involved with every one you mentioned, either in the
6 design or helped with the field work.

7 Q. All right. Let's talk about the development
8 and design of the wells that were done in the RAB. When
9 you were developing, designing in the Roswell Artesian
10 Basin, what type of criteria would you establish as to
11 aquifers, location, type, what you were doing as far as
12 protection, those sorts of things?

13 A. Well, what we do as far as protection is we
14 would follow the requirements of the State Engineer's
15 Office. But in addition to that, as part of what I do
16 for the drilling specifications, I require conductor
17 pipe be set and cemented into place before drilling
18 begins. That way if anything happens, we can control
19 the flow at the surface.

20 Or the other reason is also to prevent the
21 shallow contamination, if something happens, from
22 getting down the annulus and contaminating an aquifer
23 below that cement in 13-3/8 API -- third couple casing
24 above the artesian aquifer and then using the
25 pump-and-plug method to circulate cement back to

1 surface. And then that way it seals off the ability for
2 the artesian aquifer to move upwards in the areas.
3 Where a shallow aquifer is present, it seals that off as
4 well so that one casing string seals off those two
5 issues. You'll have movement down from the shallow
6 aquifer, nor do you have movement from the artesian
7 aquifer upwards into the shallow. You get rid of that
8 entire potential.

9 Q. We've been talking about contamination of the
10 aquifers, and I want to address that issue with you for
11 just a few moments, if I may. The contamination of the
12 aquifer is -- is what? I mean, it's from multiple
13 sources or a single source?

14 A. Sure. I think in some of the testimony I heard
15 earlier today about contamination, one would be led to
16 believe it's only contamination of oil into an aquifer
17 system, but the contamination can also be an increase of
18 the total dissolved solids or salinity -- to degradation
19 of the water supply. So that is a contamination of the
20 aquifer.

21 Q. Can contamination of the aquifer come as a
22 result of drilling operations themselves?

23 A. Sure, particularly in the case where one would
24 be wanting to drill below artesian aquifer because the
25 artesian aquifer has a really high transmissivity, a

1 code word in our business. Water transmits really
2 easily through it. Water moves quickly through there.
3 So that's often a zone where lost circulation can occur
4 in and also a zone that would be very hard to cement up
5 properly. And you can eliminate contamination, whether
6 it's salinity below that moving up -- don't into that
7 aquifer degrading the water quality.

8 Q. We've had discussions about the water quality
9 of the shallow aquifer and the artesian aquifer within
10 the RAB. I'd like to talk about the shallow water
11 quality for just a moment, and there's been some
12 discussion that it ranges 1,500, plus or minus. Is that
13 consider potable water?

14 A. 1,500 TDS water is routinely served up in
15 municipal systems in New Mexico. So 2,000 is not
16 generally used as potable water, but oftentimes up to
17 1,500 is actually used for potable water supplies.

18 Q. Do you know if the shallow water aquifer in the
19 RAB and any areas that have been outlined in previous
20 exhibits contain -- contain segments of potable water in
21 the shallow?

22 A. Yes. As described by the previous people that
23 have testified, Mr. Atkins and Mr. Goetze particularly,
24 where the shallow aquifer is recharged to the western
25 part of the Basin, that's where the water is generally

1 fresher as the recharge occurs right in that area. And
2 then the water quality varies throughout the shallow
3 aquifer system where there are pockets of worse water
4 quality that goes into the 1,500, 2,000-plus that Jack
5 was talking about, Mr. Atkins was talking about earlier.

6 Q. The artesian aquifer, likewise, is that
7 considered a potable water flow?

8 A. Yes, it is. It's the potable water for the
9 major municipality of Roswell, Artesia and Lake Arthur
10 and others.

11 Q. Do you know if Artesia -- the city of Artesia
12 has a water supply with a higher TDS?

13 A. I believe the TDS is a little bit higher in
14 that area. I don't recall off the top of my head what
15 it is, but it is a little higher.

16 Q. I'd like to talk for just a moment now, if we
17 can, about a thing in the water business that is talked
18 about called flow velocity transmissivity. If you could
19 tell us your -- what you know about the transmissivity,
20 the volume -- the flow volume of the aquifer from north
21 to south.

22 A. Okay. Well, the transmissivity or the ability
23 of the artesian aquifer to transmit water depends
24 largely on if you have fractures -- if you have
25 fractures in caverns. It really depends on the nature

1 of the rock there. But regardless, it has a very high
2 capacity to move and produce water. Pumping grades from
3 the artesian aquifer range from nearly 1,000 to over
4 2,000 gallons per minute. It's a really important
5 aquifer system. I have it in one of my exhibits.

6 Q. I think that will be Exhibit 6, that one that
7 you have in front of you now.

8 A. So it's probably the lower portion of the
9 exhibit that you have that shows the different range in
10 transmissivities throughout the artesian aquifer and the
11 Roswell Artesian Basin. This information comes from the
12 New Mexico State Engineer's Office Administrative Model.
13 And the transmissivities at the top of that, as you see,
14 range from 380 feet squared per day down to a low of
15 about 14,000 feet squared per day, so really quite high.
16 Water moves through this area very fast.

17 And if you take this information and you
18 say, How fast can contamination move in the aquifer, we
19 can look at what's called the Darcy velocity, which
20 takes the hydraulic properties of the aquifer, the
21 gradient of the aquifer and the storage capacity of the
22 aquifer, assumed to be 1 percent for the artesian
23 aquifer. The rate at which a contaminant could move
24 using a Darcy velocity ranges from about 6,400 per year
25 in the Artesia area, when you get up here around Lake

1 Arthur, and about 17,000 feet per year closer to Dexter,
2 where the gradient's a little bit shallower and the
3 water table isn't as deep, 2,200 feet per year. And an
4 average number for the shallow aquifer velocities --
5 contamination would be 1,500 feet per year.

6 Q. So what does that mean if, for example, we
7 have -- and for purposes of this part of the discussion,
8 I would ask you to assume that there is drilling taking
9 place -- oil well drilling and circulation is lost
10 and -- in the Artesian with fluids, drilling fluids, et
11 cetera. How fast would that water or that contaminant
12 move from that location, assuming it was in the area
13 where it moves 7,000, plus or minus?

14 A. Well, what I just described would be the
15 minimum rate at which a contaminant would move in the
16 natural aquifer system. Now, what we have to do is
17 couple that with the influences of man's activity.

18 So I think Mr. Atkins described earlier
19 that the amount of water that comes into the Roswell
20 Artesian Basin, both the shallow and artesian aquifer,
21 on average is 500,000 acre-feet per year. So I think in
22 2014, the quantity of the water pumped out of the
23 shallow aquifer primarily for agricultural uses was
24 17,000 acre-feet. Although there are water-quality
25 problems associated with the shallow, it's not as though

1 it's not used for anything. And out of the artesian
2 aquifer, at the same time, the pumping was about 210,000
3 acre-feet for that year. So if we wanted to put that
4 into units that people in the oil and gas industry
5 understand, that's 4.2 billion barrels of water. So
6 it's a big number.

7 So once we have the tracer velocity just
8 what would -- under the aquifer without pumping, then if
9 they have a nearby pumping center near a contamination
10 point, it can draw the contamination toward it at a
11 faster rate. It can draw it in within its capture zone.

12 Q. So the ability to determine that a
13 contamination even occurred at a point in time, in this
14 case, and then to pinpoint it to that location, how
15 difficult would that be?

16 A. Well, as it currently sits, it's quite
17 difficult. When you look at potential contaminant
18 sources throughout New Mexico, how they're regulated --
19 how any potential contaminant source is regulated, it
20 requires a monitoring well. So in a dairy, you have to
21 have monitoring wells to prove you haven't contaminated,
22 and if you did, then you could proactively figure out
23 how to clean that, you know, before it gets too part
24 discharge plants.

25 For the small communities like Rancho de

1 Chimayo, I believe they have a discharge plant because
2 of the number of people, mining companies, same thing,
3 discharge plants that require a monitoring well network
4 and sampling to see what the background is and if the
5 water quality changes over time. So it's incumbent on
6 the person or company or business or whatever that has
7 the potential to contaminate to actually show whether
8 they haven't. That's how it works in the other
9 industries. There was a lot of talk this morning that
10 that's not the way it's happening with the oil and gas
11 industry, but that's the way it normally happens.

12 Q. So if a contamination event occurred, it
13 would -- at least in oil and gas drilling, it would be
14 incumbent upon the operator to report that event,
15 correct?

16 A. Yes.

17 Q. I want to talk about again -- and now we're
18 talking about a contamination event from hydrocarbons in
19 a drilling setting -- oil and gas drilling setting.

20 MS. FOSTER: Mr. Chairman, I'm going to
21 object to this line of questioning. Again, the witness
22 is not a petroleum engineer. He's not in the oil and
23 gas industry. In fact, the last question he asked is
24 way out of line, and I think this line of questioning
25 he's starting is also going to be well out of bounds.

1 MR. OLSEN: My question was going to be --

2 MS. FOSTER: The question you just asked,
3 sir, you talked about in terms of the oil and gas
4 industry, and this gentleman is not an expert in oil and
5 gas.

6 MR. OLSEN: Again, Mr. Director, the
7 question of the witness was going to be if he could
8 describe how hydrocarbons move throughout the aquifer in
9 the RAB.

10 CHAIRMAN CATANACH: Move through which
11 aquifer?

12 MR. OLSEN: Well, move from throughout the
13 aquifer itself. In the event of a contaminant event,
14 how hydrocarbons -- if they move slow or faster than,
15 for example, the salt that moves. So if he can answer
16 the question, and I believe he's qualified by virtue
17 of --

18 CHAIRMAN CATANACH: I think we'll allow
19 that question, but be careful.

20 MR. FELDEWERT: Hold on. What's the
21 question?

22 Q. (BY MR. OLSEN) The question was: In the event
23 there was a hydrocarbon contaminant, how would it move
24 through the artesian aquifer, i.e., timing, speed?

25 A. So a hydrocarbon release to the artesian

1 aquifer would move slower than those rates I previously
2 described, and there are a number of reasons for that.
3 Hydrocarbons can get -- the movement gets retarded by
4 their attachment to different sorts of grained sediments
5 within the system. Also, there's biologic activity that
6 can work on the hydrocarbons. It slows down their
7 advance. So the movement of poor-quality water,
8 particularly like chloride, would be at a much faster
9 rate than the movement of the hydrocarbon through an
10 aquifer.

11 Q. Okay. I'd like to now deal with the -- we
12 talked about the design -- your background in design of
13 drilling water wells. I'd like to now address the
14 construction of the well itself. And assume for
15 purposes of this line of questioning that you'll be
16 drilling an artesian well in the Roswell Artesian Basin
17 where there is an overlying shallow aquifer.

18 A. Okay. Well, the State Engineer's rules are
19 really the same whether there is a shallow aquifer
20 present or there isn't one present. It basically
21 requires casing to be set above the top of the artesian
22 aquifer and cement to be circulated to the surface using
23 pump-and-plug methods. So it's a catchall. You get a
24 seal all the way to the surface, and it doesn't matter
25 if there is a shallow aquifer there or not. It's sealed

1 off all the way, one string of pipe. And once that is
2 cemented in place, it's pressure tested and then drill
3 out below it into the artesian aquifer. So there really
4 isn't a need oftentimes for a second string of pipe
5 because we're just producing out of the upper 2- to 300
6 feet of the artesian aquifer.

7 So most farmers, for instance, will leave
8 an open borehole. Some municipalities -- and -- or if
9 you have trouble with the borehole falling in, we'll put
10 a string of just perforated mill-slotted pipe or
11 something in there just to keep the rocks from falling
12 in and cutting off the flow. But really there is only
13 one string of pipe, and that recovers everything from
14 the top of the artesian to the ground surface, seals it
15 off.

16 Q. When you do that, do you require the cement to
17 be circulated to the top?

18 A. Yes.

19 Q. And why?

20 A. To make sure that there is a good seal all the
21 way to the surface that prevents any kind of upward
22 leakage or downward leakage, whether the leakage is from
23 a shallow aquifer or some sort of surface contamination.

24 Q. Is there -- in your design of the well, do you
25 establish the distance between the -- the casing and the

1 collar and the borehole?

2 A. Yes. The State Engineer's regulations, as were
3 discussed earlier today, require a minimum of -- a
4 minimum borehole size to be 3 inches bigger than the
5 casing, and so that would be 2 inches bigger than at the
6 collar -- the casing collars. So that -- that's what is
7 talked about that are the OCD regulations now. It's the
8 same thing, 2-inch -- the hole is 2 inches greater than
9 at the casing collars.

10 The new -- the proposed OCD regulations are
11 actually contemplating a borehole that's 3 inches larger
12 than at the casing collars.

13 Q. Those rules have not been --

14 A. No. They haven't been promulgated.

15 Q. I'm going to move to another topic dealing with
16 permeability, issues of various aquifers and areas.
17 First, if you would, tell us, please, about the
18 permeability of the Roswell Artesian Basin. What --
19 what is unique about it?

20 A. Well, what's unique about it, it's the only
21 major artesian aquifer with readily definable boundaries
22 that recharges at the rate it does in this state. I
23 mean, this a very arid state, and to have an aquifer
24 system that recharges where you can produce 300,000 or
25 more acre-feet per year through proper management for

1 the foreseeable future is quite remarkable. It's a very
2 high -- very high amount of recharge that is received in
3 this aquifer, and it can be readily used because of the
4 fractured nature of the rock that recharge kicks in very
5 quickly.

6 Q. In preparing for the hearing, did you consider
7 the permeability of the Roswell Artesian Basin, areas of
8 permeability associated with the drilling of oil and gas
9 wells?

10 A. Yes, we did. The previous exhibit I was
11 talking about --

12 Q. And that would be Exhibit 7.

13 A. -- Exhibit 7, had the transmissivity values on
14 it. The upper part of that table provides data on the
15 horizontal permeability.

16 Q. I'm sorry. That's 6. I think that's Exhibit
17 6.

18 A. Mine isn't marked.

19 Q. I'm sorry. It's Exhibit 6.

20 MR. FELDEWERT: It's the one you were
21 previously referencing, right?

22 THE WITNESS: Yes, sir.

23 MR. OLSEN: Yeah.

24 THE WITNESS: It provides data on the
25 horizontal permeability of the various areas in the

1 Roswell Artesian Basin for the geologic units tapped by
2 oil and gas industry. And this data comes from Ron
3 Broadhead -- from the Atlas of Rocky Mountain Gas
4 Reservoirs 1973 and from Rod Broadhead, New Mexico
5 Bureau of Geology & Mineral Resources 2016.

6 So what we can see here is that the flow
7 capacity of the formations that the oil and gas people
8 complete their wells in as opposed to the flow capacity
9 of either the shallow or artesian aquifer are just
10 hugely different. So at the -- at the least, the flow
11 capacity of the artesian aquifer is thousands of times
12 greater than that in the oil and gas industry, and in
13 some cases, it's millions of times larger. And those
14 values are provided on the column second from right for
15 both the oil and gas producing areas and for the
16 transmissivity values that I showed for the artesian
17 aquifer. So we're just -- it's very different. And
18 that's why I'm really concerned about the loss of fluids
19 or a poor seal across the artesian aquifer.

20 Q. (BY MR. OLSEN) I'd like to direct your
21 attention to what has been marked as Exhibit 7 to PVACD,
22 which is an example of the oil and gas wells within the
23 area of the Roswell Artesian Basin shallow aquifer. Do
24 you see that? Do you have that document before you?

25 A. Yes, sir.

1 Q. Explain to the Commission, please, if you
2 would, the relevance of this -- of Exhibit 7 to your
3 analysis and to your testimony.

4 A. Well, Exhibit -- Exhibit 7 shows a number of
5 lease names, and it indicates that prior to 2006, it was
6 fairly commonplace to set two strings of casing, one
7 through the shallow aquifer and one through the artesian
8 aquifer.

9 MR. FELDEWERT: Let me stop you right here.
10 I think we need a foundation laid on this exhibit before
11 he can start testifying about what he purports this
12 exhibit to show. And I have yet to hear any foundation
13 as to where this came from, how it was put together, et
14 cetera.

15 MR. OLSEN: Okay. I can do that.

16 CHAIRMAN CATANACH: Okay.

17 MR. OLSEN: Thank you.

18 Q. (BY MR. OLSEN) In preparing for the hearing and
19 doing your research, did you consider wells -- and,
20 again, I'm talking about oil and gas wells drilled
21 within the boundaries of the Roswell Artesian Basin.
22 Did you consider wells that have been -- again, I'm
23 talking about -- on gas wells that have been drilled
24 where there were single and/or two string casing
25 utilized in the drilling of the well?

1 A. Yes, sir.

2 Q. Where did you obtain that data?

3 A. The data is available on various sites. The
4 Oil Conservation Division maintains some of this
5 information, and the New Mexico Bureau of Geology &
6 Mineral Resources maintains some of this information.

7 Q. Why would you want to consider the historical
8 background of the installation of single versus two
9 string casing and the drilling of oil and gas wells in
10 the Roswell Artesian Basin?

11 A. Well, given the light of the new regulations
12 and the fact that two strings hadn't been set for some
13 number of years with any regularity, I thought it was
14 good to do some research and see what had happened
15 historically. And it does indicate that historically
16 the shallow aquifer and the artesian aquifer had casing
17 strings each -- a casing string for the shallow aquifer
18 and artesian aquifer set and cemented in place. After a
19 period of time, 2006 or so, that doesn't appear to be as
20 common as it was earlier on.

21 MS. FOSTER: Mr. Commissioner, I would
22 still object to this line of questioning because I
23 believe the witness for the OCD, Mr. Kautz, did testify
24 it's not in the well files. It's not specific for one
25 or two strings.

1 CHAIRMAN CATANACH: Well, I believe it is
2 in the well files.

3 MS. FOSTER: Not with a regular basis. I
4 think that's what he testified to.

5 MR. BROOKS: That's not my recollection of
6 his testimony, Mr. Commissioner.

7 MR. OLSEN: That's correct. I believe the
8 testimony has been based upon the research and the data
9 they reviewed and where it was obtained from. I think
10 it's clear, the validity of the data.

11 CHAIRMAN CATANACH: Well, let's proceed,
12 then.

13 Q. (BY MR. OLSEN) I'd like to go to through --
14 behind you you have a board, and it's been marked as
15 Exhibit 8 to the PVACD exhibits. And I'd like to go
16 through it with you for the moment and ask you first why
17 did you prepare Exhibit 8. Or, first of all, did you
18 prepare Exhibit 8?

19 A. Yes.

20 Q. Second, why did you prepare Exhibit 8?

21 A. Well, Exhibit 8 was just to show the outline of
22 the artesian aquifer and -- which is in blue and the
23 extent of the shallow aquifer. Now, you will note that
24 this doesn't have the irregular lines that you've seen
25 on the previous exhibits. So as Mr. Goetze pointed out

1 earlier, when you're putting rules and regulations
2 together, it's easier to follow sections and things like
3 that that have a north-south, east-west boundary to them
4 so you end up with straight lines rather than the
5 irregular shape that you saw on the outline of the
6 shallow aquifer and the artesian aquifer. And this
7 shaded area that's supposed to be light blue and A.J.
8 thinks it looks light green is areas where it's oil and
9 gas development within that subject area.

10 Q. I'd like to have you -- have you review the
11 proposed regulations, which are attached to -- attached
12 as Exhibit A to the Fifth Amended Application for
13 Rulemaking.

14 A. Yes, I have.

15 Q. And I'd like to ask you some questions about
16 your opinions only as to the shallow and the artesian
17 aquifer.

18 A. Okay.

19 Q. One, do you have an opinion whether or not the
20 proposed rule provides sufficient protection to ensure
21 the -- the stability of the two aquifers and ensure
22 their present makeup, if you may?

23 MS. FOSTER: Objection. The answer
24 requires him to be a drilling engineer.

25 MR. OLSEN: I didn't hear the objection.

1 MS. FOSTER: To be able to answer the
2 question, he has to be a drilling engineer.

3 MR. OLSEN: Try it again.

4 MS. FOSTER: To be able to answer your
5 question the way you phrased it, Mr. Olsen, your witness
6 needs to be a petroleum engineer or at least know how to
7 drill a well.

8 MR. OLSEN: Well, I guess my argument would
9 be what is the difference -- what disqualifies Mr. Peery
10 from being able to address the question based upon his
11 education, training and experience and professional
12 associations? What would be your argument that would
13 preclude him from answering that question?

14 MS. FOSTER: This witness has testified to
15 the migration in water and talked about flow, but he has
16 not talked about -- in order to be able to answer that
17 question, you need to talk about drilling because that's
18 what the rule is about.

19 MR. OLSEN: I understand. But he's
20 testified as to the design, development of water wells,
21 and my question was limited solely to the shallow and
22 artesian waters. It had nothing to do with the drilling
23 of the wells below the artesian, so I believe that he's
24 certainly qualified to answer the question.

25 CHAIRMAN CATANACH: I'll allow the

1 question. Go ahead.

2 THE WITNESS: Okay.

3 MS. FOSTER: Mr. Commissioner, the rule
4 pertains to oil and gas, and he has testified to water
5 wells.

6 CHAIRMAN CATANACH: But he's talking about
7 the oil of the water well drilling portion -- the
8 portion of the rule that addresses the aquifers. I
9 think we're safe there.

10 MR. FELDEWERT: May I suggest something?

11 MR. OLSEN: Sure.

12 MR. FELDEWERT: And that is that I think
13 the way you phrased your question, that you kind of
14 lumped the whole rule --

15 MR. OLSEN: Well, I did.

16 MR. FELDEWERT: -- into one question.

17 MR. OLSEN: I could have gone through each
18 section, but I was trying to expedite this a little bit.

19 MR. FELDEWERT: Well, I agree. Perhaps
20 maybe you can identify what aspect of the rule you think
21 he's qualified to testify to.

22 MR. OLSEN: Okay.

23 MS. FOSTER: Thank you, Mr. Feldewert.

24 Q. (BY MR. OLSEN) Mr. Peery, I'd like to start and
25 direct your attention to paragraph C of the proposed

1 rule.

2 A. Yes, sir.

3 Q. Now, do you have an opinion whether or not,
4 under paragraph C(1), if that would make that
5 requirement -- would ensure the makeup of the shallow
6 aquifer?

7 A. It's my opinion that setting conductor pipe and
8 cementing it in place helps prevent contamination of the
9 shallow -- of surface spills along the annulus, behind
10 the conductor pipe. It needs to be cemented in place.

11 Q. As to paragraph C(2), do you have an opinion
12 regarding the requirement of setting a surface
13 string -- surface casing string at least 50 feet below
14 the base of the shallow?

15 MR. FELDEWERT: So let me stop there. So
16 he would be able to testify with respect to drilling a
17 water well, correct?

18 MR. OLSEN: Correct.

19 MR. FELDEWERT: With respect to a water
20 well, that would be his opinion?

21 MR. OLSEN: Correct.

22 MR. FELDEWERT: Understood.

23 THE WITNESS: So yes. I agree that setting
24 a string of surface casing below -- at least 50 feet
25 below the shallow aquifer and cementing it in place is

1 protective of the shallow aquifer from the commingling
2 from deeper water, from -- from a water well or from any
3 kind of other contamination moving downward.

4 Q. (BY MR. OLSEN) As to paragraph C(3), do you
5 have an opinion whether or not the set -- setting the --
6 or that the 1,200 feet below the surface is a reasonable
7 depth for the artesian in the San Andres?

8 MS. FOSTER: I would object.

9 MR. FELDEWERT: Let me --

10 MS. FOSTER: Mr. Feldewert, you can go
11 ahead.

12 MR. OLSEN: I asked whether or not 1,200
13 feet was a reasonable depth.

14 MS. FOSTER: But that's not what the
15 paragraph says. You're talking about into the San
16 Andres.

17 MR. OLSEN: What it says is "an
18 intermediate casing string...at a depth of 1200 feet."
19 I guess I could say do you find that reasonable.

20 MR. FELDEWERT: Well, here's the problem.
21 Okay? Here's the problem.

22 And you've changed it a little bit.

23 The problem is this gentleman has never set
24 an intermediate casing string. He's never been involved
25 in setting any casing below -- below the -- into the --

1 below the artesian aquifer. Okay? Now, if he wants to
2 ask him if a 1,200-foot depth is sufficient to identify
3 the artesian aquifer, fine. But he's got no experience
4 in setting any casing.

5 MR. OLSEN: Michael, again, I should
6 have -- I could have stopped. I'll ask the witness --

7 Q. (BY MR. OLSEN) Mr. Peery, do you have
8 experience in setting casing -- intermittent casing at
9 depths below 1,200 feet?

10 MS. FOSTER: For water wells.

11 Q. (BY MR. OLSEN) For water wells?

12 A. For a -- set an intermediate casing string -- I
13 don't remember the exact depth, but it was quite a bit
14 deeper than 1,200 feet for an injection well for the
15 reverse osmosis concentration that I described earlier.
16 There was an intermediate on that -- on those four
17 wells.

18 Q. So you do have experience with that?

19 A. Yes, sir, I do.

20 THE WITNESS: So am I allowed to answer the
21 question?

22 CHAIRMAN CATANACH: Yeah. Let's go ahead.

23 THE WITNESS: Okay. The only way to seal
24 off an aquifer -- make sure you seal off an aquifer from
25 commingling -- with this artesian aquifer, the only way

1 to seal it off from commingling with the shallow aquifer
2 is to set a string of pipe in it and cement it in place.
3 That also give us the added protection of any borehole
4 that may be drilled below that either during the
5 drilling process or subsequent leak in the casing or a
6 bad seal or something like that. It helps prevent any
7 contamination from those deeper zones, which have even
8 higher pressure, from coming in and contaminating that
9 water-producing zone. So it's the most protective we
10 can get for a highly fractured solution cavern, high
11 transmissivity water-producing zone.

12 MR. OLSEN: You have to -- you have to
13 appreciate having help (laughter).

14 Q. (BY MR. OLSEN) Ms. Mitchell would like me to
15 ask you (laughter): Do you agree that setting two
16 strings is the best option for protecting the aquifer?

17 A. I do believe so.

18 Q. Do you believe that the approval of the
19 proposed regulation is in the -- would protect the
20 shallow and artesian groundwater in the RAB?

21 A. Yes, both in terms of quality and lots of
22 pressure to the artesian aquifer. That's correct.

23 MR. OLSEN: Mr. Director, thank you very
24 much. We'll pass the witness.

25 CHAIRMAN CATANACH: Thank you.

1 Mr. Brooks, do you have any questions?

2 MR. BROOKS: I have no questions.

3 If I may be permitted to make a practice
4 pointer here to counsel who has not practiced before the
5 Commission that it is customary in Commission practice
6 to tender one's exhibits if one wishes them to be
7 admitted into evidence before passing the witness.

8 MR. OLSEN: I intended to do that and I was
9 overcome with happiness.

10 (Laughter.)

11 MR. BROOKS: That, I can readily
12 understand.

13 MR. OLSEN: You'd think after 33 years of
14 doing this I'd remember to tender my exhibits.

15 MR. BROOKS: Well, it's done differently in
16 district court in Texas than my experience in district
17 court in New Mexico.

18 MR. OLSEN: Counsel, likewise, with your
19 permission, I would like to tender Exhibits 1 through 8
20 of PVACD exhibits.

21 MS. FOSTER: I would object.

22 CHAIRMAN CATANACH: I'm sorry?

23 MS. FOSTER: I said I would object to one
24 of the exhibits. Exhibit 3, I believe it is, which is
25 the diagram.

1 CHAIRMAN CATANACH: Your objection is to
2 Exhibit Number 3; is that correct?

3 MS. FOSTER: I believe it was a schematic
4 drawing, yes.

5 CHAIRMAN CATANACH: What is your objection,
6 Ms. Foster?

7 MS. FOSTER: The title is -- as per
8 Mr. Feldewert's argument, the title to the diagram
9 really should be entitled "PVACD Proposed Oil Well
10 Completion Diagram" as opposed to "Typical Oil and Gas
11 Well Diagram." I think the testimony was very clear
12 that this was not a typical oil and gas well diagram, in
13 fact more closer to a water well. So I don't believe --
14 and I think the testimony was presented that really this
15 exhibit is --

16 MR. OLSEN: I would have no objection to
17 striking the word "typical" and inserting the word
18 "proposed" if that would lead to the introduction of the
19 exhibit. And as to witness' testimony regarding the
20 exhibit, I think it was limited strictly to drilling
21 water wells.

22 MR. FELDEWERT: Mr. Examiner --
23 Mr. Chairman, I think the problem with this exhibit --
24 fundamental problem with this exhibit is that it
25 contains a lot of information and it contains a lot of

1 statements, and it contains a lot of numbers. Okay?
2 And they have no one that can substantiate most of the
3 data and information on this exhibit. Now, he used it
4 demonstratively to try to identify how he would drill a
5 water well, but it certainly is not the type of exhibit
6 that has been authenticated and for which a foundation
7 has been laid by a competent witness for admission into
8 evidence. They got to use it to help explain, but it
9 hasn't been supported for admission into evidence. And
10 that's a big distinction because it goes into the
11 record, and it goes into the record as is.

12 So if you don't have a witness that can
13 substantiate the elements on this exhibit, it cannot go
14 into the record, and so that's why we do object to this
15 exhibit. And I think it is the right objection. They
16 used it. That's fine. They've got his testimony, but
17 the exhibit cannot go in.

18 CHAIRMAN CATANACH: Mr. Feldewert, even
19 though his testimony was limited to those parts of the
20 exhibit which would be associated with a water well?

21 MR. FELDEWERT: Well, how do you try to
22 parse it out? Take the exhibit and try to parse it out.
23 That's the problem. They didn't present a diagram of
24 just the water well. The elements of the water well, he
25 could authenticate. They're trying to present a

1 witness -- or an exhibit through a witness that is not
2 qualified that deals with much larger issues and much
3 more detailed issues and hence the problem. So they
4 don't need it. They got the testimony. But you can't
5 let it in the record because it's completely misleading
6 and it has not been authenticated.

7 CHAIRMAN CATANACH: Mr. Olsen, the points
8 that your witness made with respect to this exhibit are
9 basically contained within the State Engineer rules,
10 correct? I mean the --

11 MR. OLSEN: I think that's a fair
12 statement.

13 CHAIRMAN CATANACH: -- various aspects of
14 this exhibit?

15 MR. OLSEN: That's a fair statement.

16 CHAIRMAN CATANACH: So we could look at the
17 regs for the State Engineer to determine -- ascertain
18 the casing and cementing requirements?

19 MR. OLSEN: And we can remove Exhibit 3
20 from the record. We're fine with that.

21 CHAIRMAN CATANACH: Okay.

22 MS. FOSTER: With that, Mr. Commission, I
23 no objection to the other exhibits.

24 CHAIRMAN CATANACH: All right. Exhibits 1,
25 2, 3 -- I'm sorry -- 1, 2, 4, 5, 6, 7 and 8 will be

1 admitted.

2 (PVACD Exhibit Numbers 1 and 2 and 4
3 through 8 are offered and admitted into
4 evidence.)

5 CHAIRMAN CATANACH: And you have no
6 questions, Mr. Brooks?

7 MR. BROOKS: I have no questions of this
8 witness.

9 CHAIRMAN CATANACH: So turn it over to
10 Mr. Feldewert.

11 CROSS-EXAMINATION

12 BY MR. FELDEWERT:

13 Q. Mr. Peery, I'm looking at your Exhibit Number
14 7.

15 A. I apologize. My exhibits aren't numbered, so
16 could you help me out here?

17 Q. I've kind of been writing it down as I go
18 through as well. Do you have a set? This is your
19 example of an oil and gas well (indicating), and I'm
20 going to -- do you have a copy of Lime Rock Exhibit
21 Number 1 that has been proffered to the Commission prior
22 to this hearing?

23 A. I don't have it in front of me, but I have
24 looked at it.

25 MR. FELDEWERT: May I approach?

1 CHAIRMAN CATANACH: Please.

2 MR. FELDEWERT: Thank you.

3 Q. (BY MR. FELDEWERT) All right. Now, I'm looking
4 at your Exhibit Number 7, and I'm also looking -- having
5 him look at what is Lime Rock Exhibit Number 1, which
6 is --

7 CHAIRMAN CATANACH: Hang on. Hang on a
8 sec, Mr. Feldewert.

9 MR. FELDEWERT: It should look like this
10 (indicating). Okay?

11 Q. (BY MR. FELDEWERT) And, Mr. Peery, I'm going to
12 represent to you --

13 CHAIRMAN CATANACH: Hang on. Hang on.

14 MR. FELDEWERT: Okay.

15 COMMISSIONER PADILLA: Got it.

16 Q. (BY MR. FELDEWERT) Okay. Now, I'm going to
17 represent to you that this Lime Rock Exhibit Number 1,
18 that all of the black dots on here represent oil and gas
19 wells drilled in the subject area. Okay?

20 A. Okay.

21 Q. All right. Now, as I look at your Exhibit
22 Number 7 that you put together here, the first thing I
23 notice is that it would appear to me that your Exhibit
24 Number 7 only relates to a very small area of this
25 subject area, correct?

1 A. That's correct.

2 Q. Primarily Range 26 East?

3 A. Yes.

4 Q. And just some of the townships in 26 East?

5 A. Correct.

6 Q. Which would be in the area where we have an
7 overlap of the two aquifers, right, part of the area?
8 Could you point on your map the area it would include?

9 A. So this is 26 East, which is on the right side
10 of this image.

11 Q. Hold on. So you're referring to your Exhibit
12 Number --

13 A. 8, I believe.

14 Q. -- 8.

15 Thank you. Okay.

16 A. So it covers some of that. So 26 East kind of
17 moves back and forth through here a little bit, but
18 starting at Township 13, heading southward to Township
19 19.

20 Q. Okay. So that entire area.

21 Now, if I look at Lime Rock Exhibit Number
22 1, there are a lot black dots in there, right?

23 A. Yes.

24 Q. Including in the area where you have purported
25 to have conducted your study?

1 A. Oh. Yes.

2 Q. Okay. And if I did my -- and I'm doing rough
3 numbers here. How many wells do you list on your
4 Exhibit Number 7?

5 A. I would have to count them.

6 Q. 40? 30?

7 A. Oh, I'd say on the order of 30, it looks like,
8 but I don't know for sure.

9 Q. So you didn't do any kind of a study of all of
10 the wells that are within the area that you chose to
11 review?

12 A. No. It certainly wasn't an exhaustive survey
13 of what appear to be quite a few more wells in the
14 area --

15 Q. That's what I think.

16 A. -- but it's a sampling of things that have
17 happened in that area historically.

18 Q. Did you put this exhibit together?

19 A. It was put together in our office. Primarily,
20 Dr. John Shoemaker was the primary author of this
21 exhibit.

22 Q. You didn't put this together.

23 Do you know what criteria he used to
24 determine what wells he would put on here and what wells
25 he didn't put on here?

1 A. No, I don't.

2 Q. Do you know where he obtained his data?

3 A. I think I mentioned earlier that he would have
4 used both the -- our office would have used both the OCD
5 records and the records from the New Mexico Bureau of
6 Geology & Mineral Resources.

7 Q. Do you know what he used?

8 A. No. I don't know for a fact.

9 Q. All right. And do you know whether he examined
10 why there would be certain wells that had what purports
11 to be two strings and certain wells that have only one
12 string?

13 A. Oh, I couldn't answer definitively about that.

14 Q. So you don't know why there would be some wells
15 that had two strings here?

16 A. Oh. I'm sorry. I probably misunderstood.

17 Yeah, the two strings -- you can see the
18 exhibit shows the depth to the bottom of the shallow
19 aquifer and the depth of the shallow casing was landed,
20 so it does indicate that the strings -- the shallow and
21 the intermediate string covered the shallow aquifer and
22 the artesian aquifer.

23 Q. I think you misunderstood my question. You
24 don't know why -- in the circumstances where you show
25 two strings, why there were two strings in place?

1 A. No, I don't know.

2 Q. Okay. And you, yourself, haven't examined to
3 determine the date at which any of these wells were
4 drilled, correct?

5 A. Not myself. But this table indicates the spud
6 date on there. So it shows the years starting -- I
7 think as early as 1975 is the first one through -- there
8 are some wells through 2016.

9 Q. Okay. But it looks like the sampling was more
10 favored towards later years than the earlier years,
11 correct?

12 A. No. I wouldn't say that's correct.

13 Q. Okay. All right. Now, I want to look at the
14 exhibit that shows the cross sections. So that would be
15 Exhibit 2, Pecos Valley Exhibit Number 2.

16 A. Okay. Would you mind if I grabbed the exhibit
17 board that Mr. Atkins used to refer to that?

18 Q. Sure. That's fine.

19 MR. FELDEWERT: Before I forget, can I
20 sneak up there and get my Lime Rock exhibit back?

21 COMMISSIONER PADILLA: Maybe.

22 THE WITNESS: That shows the figure.

23 Q. (BY MR. FELDEWERT) Yes. Thank you. Thank you.

24 Now, the shallow aquifer shows up, I guess,
25 for the first time in the second one down, B to B prime,

1 roughly, right?

2 A. Yes, sir.

3 Q. Now, is that the area where the shallow
4 aquifer, as you put it, is recharged?

5 A. There is some recharge associated with the
6 surface water system, but the recharge I was referring
7 to is more on the western side of the Basin.

8 Q. Okay. Isn't that about the --

9 A. Yeah. It would be the -- the western --
10 western side.

11 Q. Okay. So the recharge area is about the area
12 where the two aquifers are closest together, correct?

13 A. From that recharge source, from the western
14 recharge source, yes.

15 Q. Okay. Where there is arguably -- I mean, I
16 know it's a matter of opinion, but arguably where there
17 is less confinement between the two aquifers; isn't that
18 right?

19 A. The thickness, as I recall Mr. Atkins
20 testifying to, was 50 to 100 feet in that area. But
21 what I think we have to remember -- or maybe we don't
22 remember it because I didn't say it yet -- is that when
23 we look at the hydraulic properties of that aquifer --

24 Q. Let me ask -- my question, sir, is the area of
25 recharge --

1 A. Yes, sir.

2 Q. -- okay, is roughly the area where the two
3 aquifers are closest together?

4 A. Yeah, on the western extent of that.

5 Q. Okay. All right. Now, my next question to you
6 is I want you to focus on the area, D to D prime. Okay?
7 So what's that, the fourth one down? And do you see
8 there that there is some separation between the two
9 aquifers? Right?

10 A. There is a -- there is a greater amount of
11 separation there.

12 Q. Okay. And I heard what you said about drilling
13 the water well. And I just want to make sure I
14 understand it, and I want to make sure I understand it
15 in this kind of a geologic scenario. All right? So
16 take a look -- let's use, for example, that D to D prime
17 area. There is a nice, little dotted line kind of right
18 in the middle. Do you see that? Can you point to it?

19 A. Are you talking about the dotted line at the
20 base of the shallow aquifer?

21 Q. Go to the right.

22 A. (Witness complies.)

23 Q. Right there. Hold on. Right there. See that
24 little dotted line?

25 A. Yes, sir.

1 Q. I can't read that. It's Section F to F prime?

2 MR. FELDEWERT: May I approach? May I
3 approach?

4 CHAIRMAN CATANACH: Uh-huh.

5 Q. (BY MR. FELDEWERT) So let's talk about -- I
6 want to use this little dotted line right here. Okay?

7 A. Okay. The vertical line, sure.

8 Q. I'm going to pretend. I'm just going to
9 pretend that that's an area where you're going to drill
10 a water well. Okay?

11 A. Yes.

12 Q. So you're going to drill that water well
13 through the shallow aquifer. You're going to go through
14 some confining beds, right?

15 A. Yes.

16 Q. And you're going to penetrate the deeper
17 artesian aquifer?

18 A. Well, first off --

19 Q. Is that right?

20 A. No, not exactly. First off, we're going to
21 stop our casing string above the top of the artesian
22 aquifer. We have to stop there, and we have to cement
23 that in place and circulate it back to surface before
24 we're allowed to drill into the artesian aquifer.

25 Q. So your testimony is that's what you do?

1 A. That's what the State Engineer requires us to
2 do, seal off the artesian aquifer, and that's how we do
3 it.

4 Q. Okay. And you're representing to the
5 Commission that that is articulated in their rules?

6 A. I believe it is.

7 Q. So somewhere in the rules it says that you have
8 to set a -- if you're drilling in the artesian aquifer,
9 that you have to stop drilling and set a casing string
10 through the shallow aquifer and cement that casing
11 string and then continue drilling? Is that what you're
12 saying that says?

13 A. I testified about this earlier. What the rules
14 say is that you set the casing string above the top of
15 the artesian aquifer, and then you have to circulate
16 cement back to the surface. By the very nature of doing
17 that, you seal off the shallow aquifer if it's there.
18 If it's there, it seals off. It doesn't specifically
19 say that. But the regs also do not allow the
20 commingling of water, so you can't let the artesian
21 aquifer go into the shallow aquifer.

22 Q. I think you've answered my question.

23 A. Okay.

24 Q. Because I've been through the regs, and I don't
25 see anywhere in the regs where it comes and says if

1 you're drilling a well in this scenario, a water well,
2 that when you get through that shallow aquifer, that you
3 have to stop, put your protection string in there,
4 cement it to surface and then continue drilling. I
5 don't see that anywhere in there.

6 A. It's inherently covered because you've already
7 sealed off the confining beds and, therefore, all the
8 way to the surface, which covers the shallow aquifer if
9 it exists there.

10 Q. Or, alternatively, you can continue drilling
11 and then put your casing --

12 A. No.

13 Q. -- protective casing and put the cement behind?

14 A. No. You can't do that. You're not allowed to
15 do that.

16 Q. But you'll agree with me, though, that there is
17 nothing in the regulations that states anything like we
18 see here in the Division rules, where you would stop
19 drilling at that shallow aquifer, put in a protective
20 string, cement it, do a cement bond log, wait for that
21 cement bond log to be approved and continue drilling?
22 There is nothing in the State Land Office -- or the
23 State Engineer's regulations?

24 A. The State Engineer regulations require, as I
25 mentioned earlier, the setting of the conductor above

1 the top of the artesian aquifer, cement to surface. A
2 48-hour wait period and pressure testing is what the
3 Office requires be done as well before drilling out
4 below that.

5 Q. You're saying that's in the regulations?

6 A. I believe the 48-hour set time is in the
7 regulations unless an accelerant is used, and then it
8 can be reduced to 24 hours.

9 Q. Okay. They can look at them.

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

12 MR. LARSON: I don't have any questions for
13 this witness.

14 MR. BRUCE: No questions.

15 CHAIRMAN CATANACH: Ms. Foster?

16 MS. FOSTER: Yes, I have questions.

17 CROSS-EXAMINATION

18 BY MS. FOSTER:

19 Q. So, Mr. Peery, Mr. Olsen asked you about
20 discharge regulations for different agencies, different
21 industries. Do you remember that line of questions?

22 A. Yes, ma'am.

23 Q. And I believe that your last point on that
24 question was that you think the oil and gas industry
25 needs to report discharges into the aquifer?

1 A. I believe anybody that has the potential to
2 contaminate the aquifer should have an obligation to
3 report it.

4 Q. Okay. And is that required in the OCD
5 regulations?

6 A. I'm sorry? Required by the OCD?

7 Q. Is that required in the OCD regulations for any
8 wells drilled in this area?

9 A. I would have to refer to that to see. I don't
10 know off the top of my head. I'd have to re-read them.

11 Q. Have you reviewed the regulations in
12 preparation of this hearing?

13 A. Absolutely. You heard me talk about it
14 earlier.

15 Q. Well, if you're talking about discharge, have
16 you reviewed the discharge regulations?

17 A. Like I said, I'd have to review them again. I
18 did review them as part of this hearing, but it's
19 slipped my memory. We can pull them out and read them
20 if you'd like.

21 Q. No.

22 So in the last line of questions that you
23 had, pertaining to the questions that Mr. Feldewert
24 asked you about, the second string of casing needing to
25 seal off these shallow aquifers, you're not able to

1 point to the regulation as to where -- the State
2 Engineer regulation as to where it requires that, can
3 you?

4 A. The State Engineer requires cementing from
5 above the top of the artesian aquifer to the ground
6 surface. So it just --

7 Q. I believe you stated --

8 A. -- it covers it.

9 Q. -- sir, that you believe it covers it and it's
10 inherent, I think is the word that you used, but you
11 don't believe it's in the regulation?

12 A. If the shallow --

13 Q. Is that not what you said?

14 A. -- aquifer extends below the ground surface,
15 obviously by its very nature of bringing cement up to
16 the surface, you've covered it.

17 Q. But you can't point to the regulation that says
18 that?

19 A. I can't make it any more clear than what I've
20 said.

21 Q. I'm just asking you where it is in black and
22 white in the regulation.

23 A. Cement to ground surface, so --

24 Q. Can you find it in the regulation for me?

25 A. It says you have to cement to ground surface,

1 the pump and plug method, cemented to ground surface. I
2 can find -- if you hand me a set of the regulations,
3 I'll show you.

4 Q. Okay. Well, we're talking about the casing.
5 Okay?

6 A. Uh-huh.

7 Q. Okay. I'll be happy to show you the
8 regulation.

9 MS. FOSTER: May I approach the witness?

10 CHAIRMAN CATANACH: Yes.

11 MS. FOSTER: "G. Annular space...
12 requirements."

13 COMMISSIONER BALCH: "Annular space
14 cementing requirements."

15 THE WITNESS: So under -- so item G
16 requires "cement slurry acceptable to the" State
17 Engineer's Office.

18 And then if we go under item H(2),
19 "Pressure grout method: The neat cement slurry shall be
20 pumped down the inside of the casing, through the float
21 shoe...." It goes through all of that. The last
22 sentence says: "The neat cement slurry shall be pumped
23 to fill the annular space from [sic] the well" -- "of
24 the well from the top of the competent cement grout to
25 land surface." That's what I was referring to.

1 Q. (BY MS. FOSTER) Okay. So you're talking about
2 cement grout?

3 A. Yeah. It's a cement that you pump behind
4 the -- behind -- whether it's the first casing, the
5 intermediate casing. It's the cement that you pump and
6 circulate back around to the surface up the annulus.

7 Q. That's talking about one string?

8 A. Well, the reason only one string is required
9 here is because we're only sealing off everything above
10 the artesian aquifer. And the artesian aquifer is the
11 production zone, so we certainly don't want to -- when
12 we're using it for a water supply, we don't want to seal
13 that off. We want to produce out of it, so we just
14 drill into it. So that's why you have one string.

15 Q. Okay. And now you talk about cement grout.
16 That's for water well rules and it's not -- it's a
17 different type of cementing, right, than for oil wells?
18 I mean, it's a grout, which means it's more of a fill
19 situation than straight cement?

20 A. I'm not sure I follow you.

21 Q. Isn't grouting for water wells different than
22 for oil wells?

23 A. No. No. This pressure grout method is also
24 known as the Halliburton method or the pump-and-plug
25 method. It's the same method that's used by running the

1 cement from the inside of the casing, up the annulus,
2 back up to surface. In this case that I'm talking
3 about, it's the same methodology.

4 Q. Okay. You actually run cement to surface?
5 It's actually straight cement? It's not -- it's not a
6 grout or fill system when you're going to surface?

7 A. I'm still not sure I follow you. I mean, if I
8 was doing this like I did at the seven -- those ISC
9 wells I described I worked on, we called out a cementer
10 that would normally do work in the oil and gas industry,
11 Schlumberger or BJ Services. They were named that at
12 the time. And they brought out their cementing trucks,
13 and they did a pump-and-plug method by pumping down the
14 center of the casing like you do in the oil and gas
15 industry and circulating back up the back side.

16 Q. That was for the OSC wells?

17 A. That was for the OSC wells -- the ISC wells --
18 I'm sorry -- for the Seven Rivers wells and the Lake
19 Arthur wells that I worked on earlier.

20 Q. Okay.

21 A. That's how we did the casing that was set above
22 the artesian aquifer.

23 Q. Okay. All right. I have no further questions,
24 if I could get that back.

25 A. (Witness complies.)

1 Q. Thank you.

2 A. Thank you.

3 CHAIRMAN CATANACH: Mr. Bruce, do you have
4 anything?

5 MR. BRUCE: No.

6 CROSS-EXAMINATION

7 BY COMMISSIONER BALCH:

8 Q. Well, good afternoon.

9 A. Good afternoon.

10 Q. Just a couple of questions.

11 A. Yes, sir.

12 Q. Seems like the biggest point of concern for you
13 in particular is that high transmissivity of the
14 aquifers zones would magnify any sort of leakage that
15 would get into there --

16 A. That's correct.

17 Q. -- and make it more dramatic?

18 But I am looking at that Lime Rock Exhibit
19 1, with the 9,000 wells, and there is a concentration to
20 the north of the Basin -- Roswell Artesian Basin --

21 A. Yes.

22 Q. -- and kind of a large concentration to the
23 south. So it seems to me that if there were some kind
24 of a systematic problem with the way those wells were
25 drilled, as far as protecting the groundwater and

1 considering the gradients of the flow and the shallow
2 aquifer generally north-south and in the artesian
3 aquifer west to east and then turning south, then that
4 southern end of the aquifer, for all those wells, that
5 there should be some noticeable difference in water
6 quality in that case.

7 A. Well, I think you make a really great point.
8 And my answer to that is that since there is no
9 requirement for the oil and gas industry to put in any
10 monitoring wells, we don't know what's happened
11 historically to the water quality in either the shallow
12 or deep aquifer. There is no monitoring network in
13 place to see if there's been a slight increase, no
14 increase, a huge increase. We really don't know.

15 Q. But, I mean, here -- so Pecos Valley, I mean,
16 they do monitor the water quality.

17 A. Well, what they do is they monitor an area on
18 the northeast part of the Basin -- my map's not there --
19 northeast part of the Basin. And what they're really
20 monitoring is the natural changes that occur between the
21 artesian aquifer and the shallow aquifer to see what the
22 salinity change has been. They've been monitoring
23 for -- my understanding is for decades. And what they
24 told me is they haven't seen any real impact in that
25 area and that it just sort of naturally swings back and

1 forth without any major change in water quality in that
2 area. But that's -- they told me that's the only
3 monitoring network that they have, is in the northeast
4 part of the Basin.

5 Q. So nobody monitors -- this is a USGS --

6 A. No, sir. Nobody monitors anything.

7 Q. USGS doesn't track --

8 A. Not that I'm aware of.

9 Q. -- any chemistry at all? How about the
10 Ogallala?

11 A. Yeah, the Ogallala. You know, like, they call
12 it the race to the bottom. It may be a little more
13 important over there since there is so little water, but
14 I don't think they -- and I may be mistaken, but I don't
15 think they have a big network to monitor water quality
16 out there.

17 Q. What about City of Artesia? That's their
18 primary water supply?

19 A. Presumably, if they do their annual
20 water-quality monitoring for the New Mexico Environment
21 Department, generally that doesn't require that you turn
22 anything in related to total dissolved solids. So it
23 would require contaminants of concern that are health
24 hazards initially rather than the total dissolved solids
25 concentration. That data historically hasn't been

1 turned in by most municipalities.

2 Q. They may have it in their data?

3 A. It's possible that they have it.

4 Q. A few years ago, in another hearing, we had an
5 expert on risk in the room, Dr. Thomas, I believe, and
6 he elaborated to me on the difference between risk and
7 hazard. So a risk is you're going to cross the street,
8 and you can get hit by a bus. A hazard comes in -- if
9 the bus is 50 feet away, there is a high hazard. If the
10 bus is a mile away, there is virtually no hazard,
11 correct?

12 A. Correct.

13 Q. So we have to weigh -- weigh that risk or
14 reward sort of a scenario for our decisions.

15 A. Sir, if I may add something anecdotal to all of
16 this. I described the wells I've been involved with and
17 just, I guess, the relatively few wells I have been
18 involved with, when you compare that to 9,000 wells in
19 the Basin -- for instance, the Lake Arthur wells, we've
20 described what the procedures are for the State
21 Engineer's Office, where they have to cement --
22 circulate cement to surface. Before we did our well
23 project out there, we videotaped three of the existing
24 wells we ended up replacing. And even with those
25 regulations and unbeknownst to PVACD or the owners of

1 the well or to the Interstate Streams Commission at that
2 time, one of the wells had a big hole in the casing.
3 And when we videoed it, I mean, the camera literally
4 stuck over to the side of the casing. And what was
5 happening was the artesian aquifer, at least at that
6 particular window in time, was pushing a bunch of water
7 into the shallow aquifer. So --

8 Q. This is a water well?

9 A. This was a water well. You know, it was
10 intended and had sealed off the shallow aquifer at one
11 time. And also --

12 Q. If you have a pressure problem like that in an
13 oil well, you have to remediate that.

14 A. Yeah. Well, I guess my point is just with my
15 limited experience, in water wells, whatever it is, 12
16 or 15, and I saw that happen, if there are 6,000 wells,
17 the chances that there is something leaking somewhere
18 are fairly high, it would seem to me. Something is
19 leaking somewhere. I'd be surprised if it wasn't.

20 Q. I think you also testified, though, that it
21 would be very hard to detect that if it was occurring.

22 A. Yeah. It was unable -- we were -- no one
23 detected that leak that I'm describing until a camera
24 was run down there. No one knew that there was a
25 problem. It was just -- the pressure was just coming

1 out of the deep aquifer -- the artesian aquifer and the
2 shallow aquifer, and there was no way to tell until you
3 camera-ed it.

4 At this point it's the same for oil and gas
5 wells. How do you know if you have a leak up the back
6 side, the back annulus, if you have a bad cement job?
7 You don't know. But there can't be 6,000 perfect
8 completions.

9 Q. I think conversely, though, it's hard to prove
10 that it's not occurring.

11 A. That's true.

12 Q. And these wells are monitored. They usually
13 have a pressure sensor release on top, pressure changes.
14 I mean, you know what's going on with your well. And
15 it's a very common occurrence to have to repair a well
16 in an oil field because something happened to the
17 casing. That's why -- that's why they have cement jobs
18 and -- and squeeze jobs. You want to perf -- pump
19 cement out to fix up the problem.

20 So my concern is that if you overregulate
21 and you get to a place where you maybe don't allow a
22 best practice that's been developed already in the well
23 industry for a long time, then you can end up with an --
24 with an impact on people that are doing the production.
25 So the thing that comes to my mind would be B, B prime.

1 If you follow the letter of the proposed regulation,
2 regulatory change, and you have those two aquifers that
3 are basically the red beds there, I think must be --
4 must be the layer between the artesian and the shallow
5 aquifer.

6 A. Right.

7 Q. So how are you going to get 50 feet into that
8 and know that you haven't already targeted the artesian
9 when you're getting ready to seal off that shallow
10 aquifer with a casing and a cement job? So there's a
11 lot of -- if you're really specific about a depth of
12 1,200 feet, a depth of 50 feet below the surface,
13 there's going to be places in this area where those
14 numbers aren't going to fit right.

15 A. Oh, I agree.

16 Q. So you have to be able to allow best practices
17 to a well-formed rule.

18 A. Yeah. I think that because of the depth to the
19 top of the artesian aquifer varies and then it seemed to
20 me that the provision 50 feet above the first show of
21 gas covers -- covers the other end of the spectrum. So
22 there's a lot of data out there, as Mr. Atkins described
23 from Welder. And I'm sure the oil and gas industry has
24 some pretty great geophysical logs that they can dial
25 into with the top of that pretty well, too.

1 Q. In your -- in your business with John
2 Shoemaker, do you tend to run cement bond logs?

3 A. We have -- we don't do it with a lot of
4 regularity, but we certainly do run them on occasion.
5 Our primary thing is cementing back to surface. You
6 know, if we get returns to surface, everybody usually
7 considers that pretty good.

8 Q. Thank you very much.

9 A. And then if you have -- if you have lost
10 circulation and you don't get it, well, then, obviously
11 you want to know what happened, if you've got one void
12 or two voids or a big void. But we do run them on
13 occasion.

14 Q. So it's situational?

15 A. Yes, sir.

16 Q. Thank you very much.

17 A. You're welcome.

18 CROSS-EXAMINATION

19 BY CHAIRMAN CATANACH:

20 Q. Mr. Peery, with respect to the artesian
21 aquifer, is that -- is that -- is there a direction of
22 that groundwater flow in that aquifer?

23 A. Yes, sir. We were just talking about it, as a
24 matter of fact. So the artesian aquifer flows generally
25 from east to west from those recharge areas, east to

1 west, and then things just kind of push off to the
2 south.

3 COMMISSIONER BALCH: West to east.

4 THE WITNESS: I'm sorry. Is there a
5 hydrologist in the room (laughter)?

6 Yes, west to east.

7 Q. (BY CHAIRMAN CATANACH) So your constant -- your
8 most -- biggest concentration of wells appear to be to
9 the south end of the Basin. So that water is still
10 flowing to the south and east or just to the east?

11 A. Yeah. Towards the southern end of the Basin,
12 things start to discharge off off to the south.

13 COMMISSIONER BALCH: Seems like
14 everything -- once it hits the Pecos Valley, that's the
15 dominating control of the flow.

16 THE WITNESS: Yes, that's correct.

17 Q. (BY CHAIRMAN CATANACH) What effect would -- is
18 that a great amount of water that is flowing through
19 that aquifer?

20 A. Yeah. So if we're talking about 500,000
21 acre-feet a year more or less coming in, depending on
22 precipitation and whatnot in a given year, and more or
23 less 300,000 is taken out, we've got a couple hundred
24 thousand acre-feet a year discharging to the south.

25 Q. What effect do you think that dissolution of

1 any contaminants has on that system in that area?

2 A. Oh, I would suspect that with the high
3 transmissivities throughout there, things will get
4 diluted -- can get diluted to some degree. And it can
5 also get drawn over to a pumping center, too. So you'd
6 have a lot of mixing.

7 Q. I have no further questions.

8 CROSS-EXAMINATION

9 BY COMMISSIONER PADILLA:

10 Q. Thanks for your time.

11 You talked early on about contamination
12 relating to mixing of different -- of water with
13 different constituents and things of that nature. But
14 so far it seems to me like we're talking about very
15 closely related waters here. Is there -- I mean, the
16 highest TDS I've heard so far is 2,000 for the shallow
17 aquifer, and the artesian, 1,000 and down. Is there
18 some reason to believe there is some really, really high
19 saline or high chloride waters that someone hasn't put a
20 number on yet? When you mentioned -- you know, I
21 understand the protectable waters, and we should have
22 these segregated fields for them. But I'm wondering
23 what the point and what the overarching goal pointing
24 that out to us was when you're talking about a pretty
25 narrow bond width there.

1 A. Well, I don't think I got into this very well,
2 but --

3 THE WITNESS: Is this Exhibit 6?

4 MR. OLSEN: That was 6.

5 MS. MITCHELL: Yes.

6 THE WITNESS: Exhibit 6.

7 So the top half of Exhibit 6, the far right
8 column provides salinity data for the different
9 producing zones that the oil and gas industry targets.

10 The bottom of that exhibit shows the
11 salinity concentrations for various wells in the
12 artesian aquifer. So what we see in the deeper
13 formations that are either -- I guess either targeted or
14 that the boreholes pass through, the salinities we see
15 there range from 35,000 up to 130,000, so quite a bit
16 higher than what we have in the artesian aquifer.

17 And that's where the concern lies, because
18 we're also talking about these deeper zones having a
19 higher artesian pressure than what we keep referring to
20 as the artesian zone. So they have the ability to come
21 up. If there is a bad cement seal and the artesian
22 aquifer isn't sealed off well, this high salinity water
23 has the opportunity to get in and contaminate the
24 artesian aquifer. So that's why I think it's important
25 to make sure that there is a really good seal on the

1 artesian aquifer as well.

2 Q. (BY COMMISSIONER PADILLA) So isn't the seal --
3 whether we have 1 string or 100 strings, whatever that
4 outer seal is, isn't -- isn't completely -- there is no
5 integrity there. You've still got the same problem.
6 Doesn't it come down to the quality of the cement job in
7 all of these cases?

8 A. I'm not really sure -- I think if you -- if you
9 have a single string where the shallow aquifer is
10 present and you don't get a good cement job that
11 isolates what we call the artesian aquifer for water
12 production, then you also don't have the seal between
13 the artesian aquifer and the shallow aquifer. So not
14 only do you have then the capability to have these
15 higher TDS waters from below the artesian aquifer --
16 going to the artesian aquifer, but we're also losing
17 pressure from the artesian aquifer up the wellbore
18 annulus into the shallow aquifer. So I think that with
19 one string, you're putting all your eggs in one basket,
20 and if something goes wrong, you potentially have two
21 problems instead of just one.

22 Q. So you see that second string as kind of a
23 redundancy of the first --

24 A. I see it as a way to make sure that the shallow
25 aquifer is protected regardless of what happens if you

1 get a bad cement job on the second. But I think it's
2 really needed for that reason.

3 Q. Assuming you get a good one on the first one.

4 A. Well, that one's pretty shallow. It should be
5 easy to get a good one on that one.

6 Q. You talked about the discharge and lack of
7 reporting for discharge in the oil and gas industry.
8 Are you referring to lost circulation specifically as
9 being discharge incidents?

10 A. Well, I guess -- I guess by reporting -- maybe
11 that got turned a little bit from what I tried to --
12 what I was trying to say was that other industries in
13 New Mexico that even have the potential to make -- to
14 contaminate, whether it's surface water or groundwater,
15 are required to have some monitoring in place of the
16 water system. So if you have a wastewater treatment
17 plant, you have to monitor the outflow in potentially
18 certain reach of a river system. If you have a dairy or
19 if you're a mining operation or you have a big septic
20 system that has to be permitted, then the State requires
21 you to put in monitoring wells to assess what the
22 background concentration is in the aquifer of concern
23 and then to monitor periodically to make sure that you
24 haven't impacted it.

25 So my point was that with regard to

1 potential changes in the water quality as a result from
2 something that may leak in the oil and gas industry,
3 there is not a monitoring network in place to see what's
4 happening in the shallow or the artesian aquifer.

5 Q. Okay. So you weren't -- I think maybe that got
6 a little convoluted in regards to lost circulation.

7 A. Yeah. I apologize.

8 Q. You're just talking about operations overall
9 and the potential for -- whether it be lost circulation,
10 you want a way to recognize it? Whether you go out into
11 the system or if you have a well integrity problem or
12 you have --

13 A. Yeah, whatever it is.

14 Q. -- just everything -- any and all
15 possibilities, that's what you're --

16 A. Yeah. There is no monitoring network to see if
17 anything has happened.

18 Q. Do you see the potential for the mixing of,
19 say, the artesian aquifer, as we're calling it, and the
20 shallow aquifer, the potential for that commingling as a
21 bigger threat, or the contamination from oil and gas
22 operations is a bigger threat?

23 A. Well, I think that if the -- if the artesian
24 aquifer and the shallow aquifer are in communication, I
25 don't really see that as a contamination issue, although

1 water quality can change to some degree. But the water
2 is still usable between the artesian aquifer and the
3 shallow for agricultural uses. I think the biggest
4 issue is the decrease in pressure over time from the
5 artesian aquifer.

6 So as it was described earlier, during the
7 winter, everybody stops -- well, not everybody.
8 Municipalities don't stop, but ag stops pumping. And
9 agricultural produces 91 percent -- or uses 91 percent
10 of the water, approximately. So when they stop pumping,
11 that artesian pressure comes back up.

12 So if there is leakage up numerous areas
13 between the artesian aquifer and the shallow aquifer
14 over time, what happens is the pressure reduces in the
15 aquifer. So when they start to pump, the pumping levels
16 will be lower. So that means it's going to cost them a
17 lot more energy to produce the same amount of water
18 because they're going to have to either put in bigger
19 pumps, they're going to have to pump longer or set their
20 pumps deeper and pump with bigger pumps to make the same
21 amount of water because the water level will be lower.
22 And so now they've got to pump harder and deeper so it
23 takes more energy to get that water to surface. So the
24 loss of pressure is a big deal.

25 Q. Do you think any of that loss of pressure is

1 related to oil and gas operations in the area?

2 A. I would suspect so. As I said earlier, I just
3 can't imagine that -- knowing that some of these oil and
4 gas wells have had lost-circulation zones, haven't been
5 able to circulate cement back to surface that you can
6 have whatever the number is, 6,000 perfectly completed
7 strings without any communication. I just -- it just
8 doesn't seem logical that that's not a possibility. So
9 some of them have to be.

10 Q. To an extent, it would disrupt the pressure of
11 the overall RAB?

12 A. Oh, sure. Yeah. When we look at the hydraulic
13 properties of that confining bed, water moves through
14 that four to -- roughly four to six times slower than
15 the water moves through the aquifer horizontally. So
16 that vertical movement of water is pretty slow, four to
17 six times -- I mean four to six orders of magnitude, not
18 times, orders of magnitude. So water doesn't move
19 through there readily, but if you put a hole through
20 that and the water can come straight up between a
21 borehole and casing, it moves up pretty good. I've seen
22 it on a well that was completed in the artesian aquifer
23 back probably in the 1930s. And the water started
24 coming up the back side of the casing, and I would guess
25 it was coming up at hundreds of gallons a minute. So

1 it's not only the wasted water to the surface, but it's
2 the reduction in pressure associated with that water
3 coming out.

4 Q. Let me rephrase that in a different way. What
5 specifically do you base the idea that the oil and gas
6 is contributing to a pressure differential,

7 A. Oh, because when they don't cement back to
8 surface without a perfect seal behind the artesian
9 aquifer and the shallow aquifer, you have that happen.
10 And they have had -- I heard Mr. Kautz testify this
11 morning that they don't always circulate back to
12 surface, so there are problems with getting a good
13 cement job on some wells.

14 Q. Realistically, that's, you know, a
15 regulatory -- I don't want to say oversight, but that's
16 something that the regs already deal with.

17 A. Well, and -- and maybe that's a perfect case
18 where a cement bond log would be appropriate. If they
19 don't cement back to surface, then run a bond log to see
20 what's going on and target some remediation or P and A
21 and move over, something that would be appropriate that
22 could at least be detected.

23 Q. Maybe CBLs would be more appropriate because
24 there are cost concerns.

25 A. I think so. I think that if cement is

1 circulated back to surface, my opinion is that it's
2 really fine. If cement doesn't circulate back to
3 surface, a bond log is appropriate to see what's going
4 on, and I don't think it's an undue burden.

5 Q. No. I think it's far less burdensome than the
6 way everyone's doing it now.

7 A. Yeah.

8 The problem I have is if it doesn't
9 circulate back to surface and you 1-inch it in -- you
10 know, there was a lot of discussion of borehole
11 diameters, allowable and this and that. But just in the
12 simplest terms, if the borehole now is 2 inches bigger
13 than the casing, which makes it only 1 inch bigger than
14 where the collars are, and you assume that you actually
15 have -- the engaged hole is actually the same size that
16 you drilled it, which maybe it is, maybe it's not, a
17 1-inch pipe can't go down very far without getting hung
18 up because you only have a half-inch running clearance,
19 unless your pipe is stuck to the bore-head wall and you
20 run along the edge. So you can't count on running
21 1-inch tubing very far if you don't circulate back to
22 surface. I think if it doesn't circulate to surface,
23 it's time for a bond log.

24 Q. Okay. I think I've used up all my time. Thank
25 you.

1 A. Thank you.

2 CHAIRMAN CATANACH: Anything further of
3 this witness?

4 MR. OLSEN: We have no further questions.

5 CHAIRMAN CATANACH: Okay.

6 MR. OLSEN: And being as Mr. Brooks helped
7 me ensure that I got my exhibits introduced, I believe
8 it's fair for us to pass and rest.

9 CHAIRMAN CATANACH: Okay. All right. So
10 you're going to put your first witness on?

11 MR. FELDEWERT: Yes, sir.

12 CHAIRMAN CATANACH: Let's take a ten-minute
13 break here and start up again.

14 MR. OLSEN: Can my witness be excused?

15 CHAIRMAN CATANACH: Yes.

16 (Recess 2:47 p.m. to 3:12 p.m.)

17 CHAIRMAN CATANACH: Let's call the hearing
18 back to order and at this time turn it over to
19 Mr. Feldewert.

20 MR. FELDEWERT: Yes. We will call our
21 witness here, Mr. Carl Bird.

22 CARL BIRD,
23 after having been previously sworn under oath, was
24 questioned and testified as follows:
25

1 DIRECT EXAMINATION

2 BY MR. FELDEWERT:

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

5 A. My name is Carl Bird. I am employed by Concho,
6 and I'm a drilling engineer.

7 Q. How long have you been a drilling engineer?

8 A. I've been a drilling engineer for 39 years.

9 Q. All in the Permian Basin?

10 A. That's correct.

11 Q. Do you hold an engineering degree?

12 A. I do.

13 Q. From where?

14 A. I -- I graduated from Texas A & I -- A & I.

15 Q. And, Mr. Bird, you have previously testified
16 before this Commission as an expert in petroleum
17 engineering and drilling. Correct?

18 A. That's correct.

19 Q. And your credentials were accepted and made a
20 matter of public record?

21 A. That's correct.

22 Q. Are you familiar with the special rules that
23 are proposed by the Division for what they call the
24 designated area?

25 A. I am.

1 Q. Do you have experience in drilling oil and gas
2 wells?

3 A. I do.

4 MR. FELDEWERT: I would tender Mr. Bird as
5 an expert in petroleum engineering.

6 CHAIRMAN CATANACH: Any objection?

7 MR. OLSEN: No objection.

8 MR. LARSON: No objection.

9 CHAIRMAN CATANACH: The witness is so
10 qualified.

11 Q. (BY MR. FELDEWERT) Mr. Bird, you are familiar
12 with the fact that a number of companies that really are
13 an employee of COG Operating, LLC filed modifications to
14 the proposed rules?

15 A. Yes.

16 Q. If you turn to what's been marked as
17 Respondent's Exhibit Number 2, is that a depiction of
18 the well design contemplated by the filed modifications?

19 A. I think so. Let me get to it. I can just
20 answer yes.

21 Q. No, you can't.

22 A. No?

23 Yes.

24 Q. Okay. All right. Now, would you -- is this
25 a -- this exhibit here, a historical two-string design?

1 A. Yes.

2 Q. Would you just walk us through this? What is
3 this two-string design?

4 A. This two-string design is an 11-inch hole
5 drilled to the bottom of the -- of the lower aquifer,
6 8-5/8 casing set, cemented to surface, 7-7/8 hole
7 drilled to the TD, cemented to 500 feet above the TD of
8 the previous casing.

9 Q. All right. And is this a type of well design
10 that operators have historically used for wells in the
11 designated area?

12 A. Yes, it is.

13 Q. There are some operators that take their
14 production casing cement all the way to surface, right?

15 A. That's correct. We do, typically.

16 Q. Around the modifications, you've agreed with
17 the Division's proposal that it go 500 feet above the
18 casing shoe of the protective string?

19 A. Yes.

20 Q. When have operators, in your experience, used
21 two protective strings through the aquifers in this
22 area?

23 A. Two protective strings are when -- the second
24 string is to solve drilling problems. It can be for
25 when there is a salt section, when there's an

1 overpressured zone, an under-pressured zone, when
2 there's incompetent zones that need to be covered, any
3 other -- maybe sugar sands, swelling clays. There could
4 be any number of reasons for setting a second protective
5 string. It's for drilling reasons.

6 Q. But the general design out there that's been
7 used for decades is to use a single protective string
8 unless you have these types of issues?

9 A. That is correct.

10 Q. Okay. Now, you had provided to the Commission
11 earlier a reference to what is known as Lime Rock
12 Exhibit Number 1 that showed all the dots in the area.
13 Okay?

14 A. Yes.

15 Q. You've seen that exhibit before?

16 A. Yes.

17 Q. Are you generally -- now, you said you're
18 familiar with the drilling history in the area. Are
19 most of those black dots -- based on your experience,
20 would they be two-string designed wells?

21 A. Yes. They're two strings.

22 Q. Unless they had some of the problems that you
23 referenced?

24 A. Yes. According -- some of them are really old,
25 and some of those might be three strings.

1 Q. Okay. Given this decades of drilling
2 experience with the single protective string, are you
3 aware, Mr. Bird, of any instance of migration of fluids
4 or contamination of groundwater in the subject area from
5 wells with these two-string designs?

6 A. No.

7 Q. Were you here when Mr. Peery was talking about
8 his Exhibit 6?

9 A. Yes.

10 Q. Do you remember how he made reference to the
11 fact that we need to isolate from the aquifers the
12 salinities that are shown in the top half of this
13 exhibit from the lower formation?

14 A. Yes.

15 Q. Okay. The single protective string that has
16 been used for decades, does that isolate the aquifers
17 from these lower zones with higher salinity fluids?

18 A. Yes.

19 Q. Okay. Would you then take a look at what's
20 been marked as Respondent's Exhibit Number 3? Is this a
21 depiction that you assisted in putting together that
22 identifies the design that is mandated by Rule C of the
23 Division's proposed rules?

24 A. Yes.

25 Q. Okay. And it mandates two protective strings,

1 right?

2 A. It does.

3 Q. And then it changes the -- it provides for the
4 annular spacing to be 2 inches from the couplings rather
5 than the casing, right?

6 A. Yes, it does.

7 Q. We're going to get to that subject a little bit
8 later, so let's put that aside for a minute.

9 And then in conjunction with this exhibit,
10 you have identified under the third major bullet point
11 some of the problems that are imposed by this mandated
12 design. Do you see that?

13 A. Yes.

14 Q. Would you just walk the Commission briefly
15 through those issues?

16 A. Sure. When you -- when you mandate this
17 three-string design, there are quite a few requirements
18 that this brings up.

19 First of all, what we do with the
20 two-string design, you know, we're starting with an
21 11-inch hole with 7-5/8-inch casing. So adding this
22 third string is 13-3/8 casing set at 450 feet in a
23 17-1/2-inch hole. Well, that 17-1/2-inch hole, it's a
24 150 percent more volume than that 11-inch hole. Well,
25 that doesn't sound like that big a deal, right? Except

1 that that's 150 percent more water that you've got to
2 buy. It's 150 percent more diesel that you've got to
3 burn to drill that hole. It's 150 percent more carbon
4 dioxide. It's 150 percent more rock that you've got to
5 grind up and dispose of. It's 150 percent more
6 everything, and we're going to spend over \$100,000 to do
7 that. And that doesn't sound like all that much now,
8 does it, not to a rich oil company? But we rig release
9 on these horizontal wells right at \$700,000. So you're
10 talking about 15 percent more. You know, that's a lot
11 of money at my house. And when we actually did this --
12 when we were forced to do this because we had a drilling
13 rig waiting, it cost us over \$300,000.

14 Q. Now, is it also -- this proposed design
15 mandated by the rule, does it create some operational
16 problems?

17 A. It does.

18 Q. Like what?

19 A. Well, handling that bigger casing might require
20 you to use a bigger drilling rig than you would if it
21 was optimized for the smaller sizes. It would require
22 you to handle that bigger casing, which leads to other
23 safety issues. Of course, the bigger hole size. You're
24 grinding up more rock. It takes longer to drill. You
25 have -- like I said, you've got -- you've got to buy

1 more water. You're going to have 150 percent more water
2 you've got to buy. You know, we're drilling these
3 with -- we're buying the freshest water we can buy
4 because it's also the lightest water that we can buy.
5 You lose less of it. And it's also expensive. So you
6 have -- you know, you have all kinds of difficulties
7 that each individually is not that onerous, but taken as
8 a whole, it adds up to quite a burden.

9 Q. Let me ask you about your drilling -- COG's
10 experience in drilling using the single protective
11 string. And I think I can run through these a little
12 quicker than I anticipated because of the testimony
13 already. But if I look at Respondent's Exhibit Number
14 4, this is the area we've been talking about today,
15 correct?

16 A. Uh-huh.

17 Q. And there is an A, A prime in here?

18 A. Uh-huh.

19 Q. I think that corresponds with some of the other
20 maps that we've seen, D to D prime?

21 A. Uh-huh.

22 Q. Okay. So let's skip this a minute and go to
23 Exhibit Number 5 because that corresponds with the A to
24 A prime.

25 A. Okay.

1 Q. And it shows kind of a different depiction,
2 something we've already seen.

3 A. Uh-huh.

4 Q. But what I want to focus on here is COG's
5 experience in what is shown on here as the Lakewood
6 area.

7 A. That's correct.

8 Q. All right. And the Lakewood area, where you
9 have your drilling experience, has circumstances where
10 you have kind of an overlapping aquifer, right?

11 A. That's correct.

12 Q. And then you have circumstances where you've
13 just got one aquifer?

14 A. Uh-huh.

15 Q. And then you have circumstances where you're
16 not quite sure how far the aquifer goes out, right?

17 A. Yeah. Actually, we've got all three
18 circumstances in the Lakewood area, where we have --
19 both aquifers, we might penetrate with one well, just
20 one aquifer, and in some wells neither aquifer.

21 Q. Okay. And that's based on the State Engineer's
22 map, right?

23 A. That's correct.

24 Q. And we're all working off of their maps?

25 A. And we see it in the wells when we drill.

1 Q. Okay. Now, in the company's experience in
2 drilling in this area with a two-string design, it's
3 worked in all three scenarios?

4 A. It's worked in all three scenarios.

5 Q. If I turn to what's been marked as Respondent's
6 Exhibit Number 6, is this a diagram of the Bradley well?

7 A. That's correct.

8 Q. And was this drilled in an area that according
9 to the State Engineer's map would have two -- would have
10 the overlying aquifers?

11 A. Probably, yes.

12 Q. Okay. And did you -- this identifies in more
13 detail your typical two-string design, right?

14 A. Correct.

15 Q. Protective string through the deepest aquifer
16 and cemented all the way to surface?

17 A. Correct.

18 Q. Okay. And in your opinion, has that
19 effectively sealed off the aquifers and prevented
20 migration?

21 A. Yes.

22 Q. Then if I go to what's marked as Respondent's
23 Exhibit Number 7, does this depict for the Commission
24 three additional wells in the Lakewood area that show
25 different geologic circumstances based on their location

1 within the State Engineer's map?

2 A. Yes.

3 Q. Okay. And, again, you use the same design --
4 two-string design?

5 A. Yes.

6 Q. Always making sure that the protective string
7 extended to the deepest aquifer?

8 A. Yes.

9 Q. And that it was cemented to surface?

10 A. Correct.

11 Q. Now, the Grave Digger, for example, is shown in
12 an area where the State Engineer is not quite sure if
13 there is an aquifer there?

14 A. Well, the best you can tell from the State
15 Engineer maps, neither of the aquifers exists in the
16 location of the Grave Digger.

17 Q. And that's why you've got question marks there
18 next to the --

19 A. Well, the question marks correspond to the
20 squiggly lines on the State Engineer's map.

21 Q. Okay.

22 A. And it pretty much corresponds to what we see
23 in the wells. It pretty much matches.

24 Q. All right. And the company has been drilling
25 wells in the Lakewood area for how long?

1 A. Since about late 2011.

2 Q. Okay. And has the company observed any fluid
3 migration or groundwater issues associated with using a
4 single protective string in this area?

5 A. No.

6 Q. Now, there's been some questions particularly
7 from some of the Commissioners about lost-circulation
8 issues.

9 A. That's correct.

10 Q. You've been here for that?

11 A. Yes.

12 Q. Generally, as you're drilling across this area,
13 is there -- what's the nature of the lost circulation?
14 I mean, do you always see it? Do you sometimes see it?

15 A. We sometimes see it.

16 Q. So is it spotty?

17 A. It's spotty. I wouldn't characterize it as --
18 as common, but it's almost common, and I would have to
19 assume that it's probably into the aquifers.

20 Q. Okay. When you experience these
21 lost-circulation issues, what have you observed about
22 the aquifers? Do they flow?

23 A. No. Never, ever, never.

24 Q. Never seen a flow?

25 A. Never have seen a flow.

1 Q. And if you had a lost-circulation issue in the
2 lower artesian aquifer, aside from the fact that you've
3 never seen a flow, why shouldn't the Commission be
4 concerned about migration up to the shallow aquifer?

5 A. Well, the first thing that should calm them
6 would be that we've never seen them flow. The second
7 thing is that when we see lost circulation in what I
8 would assume to be the upper aquifer, it generally gets
9 healed. There are several hundred feet between them in
10 the location where we drill. So when we lose
11 circulation in what I assume is the upper zone and the
12 upper aquifer, the natural cuttings from drilling -- we
13 dry drill when we lose circulation, and it usually heals
14 the -- the lost returns in the upper aquifer. So we get
15 returns back eventually.

16 Then if we lose returns again in what I
17 would assume would be the lower, if it ever did flow,
18 which we've never seen it flow, then it's healed because
19 we got returns back before we got that lost circulation
20 from the bottom one. So it's already protected.

21 But we've never -- I have to stress we've
22 never seen a water-flow from either of the aquifers.
23 We've never seen a water-flow in what we would call the
24 surface hole. So --

25 Q. All right. Then I want to wrap this portion up

1 by going to the modifications that we have filed with
2 the Commission. Okay?

3 MR. FELDEWERT: And do you have a copy up
4 there, Chairman Catanach? It's the one where we blew up
5 the pipes and the --

6 CHAIRMAN CATANACH: Got it.

7 Q. (BY MR. FELDEWERT) All right. First off, I
8 want to go lawyer here on you. And I want you to look
9 at those modifications, and I want you to look at page
10 2. Okay? And I want you to go to the top. And the
11 reason I want you to go there is because you'll see
12 we've -- at the top portion of these modifications, we
13 did not change the legal standard that is identified by
14 the Division associated with these rules. Okay?

15 A. Okay.

16 Q. At the top, if you look at that, the legal
17 standard that is used -- it's one, two, three, four,
18 five lines down -- are the rules reasonably sufficient
19 to prevent fluid movement into or out of the wellbore
20 from or to either designated operator -- aquifer. Okay?
21 Now, I want you to keep that in mind as we move through
22 these modifications. Okay?

23 Are you -- if I look at the modifications
24 to C(2), we've modified that to require the protective
25 string to go through either the deeper aquifer or not

1 more than 50 feet above the first show of hydrocarbons.

2 Do you see that?

3 A. Uh-huh.

4 Q. And there's been testimony here from Mr. Kautz
5 about that 50-foot point.

6 A. Uh-huh.

7 Q. And it's also the -- it also requires that the
8 cement be circulated to surface. Okay?

9 A. Okay.

10 Q. And the other modifications that we've seen on
11 here relate to the diagram that we saw earlier, right,
12 Respondent's Exhibit Number 2?

13 A. Uh-huh.

14 Q. In your opinion, are these changes to their
15 proposed rules reasonably sufficient to prevent fluid
16 migration into or out of the wellbore from or to either
17 aquifer?

18 A. More than reasonably sufficient.

19 Q. And we have also been modified, Rule D, have we
20 not, to provide the district supervisor with the
21 discretion, as is in the current rules, to require an
22 additional protective string if necessary, right?

23 A. That's correct.

24 Q. So if you have a drilling hazard, if you
25 have -- if you have a drilling problem, under our

1 modifications, they can require a second string --

2 A. Yes.

3 Q. -- just like they can under the existing?

4 A. Yes.

5 Q. Okay. And you've looked at their proposed well
6 diagram, and when you look at that and take into account
7 the additional costs, are those additional costs and
8 drilling risks associated with that second string, are
9 they necessary to provide a reasonable protection to the
10 groundwater?

11 A. No. In fact, they're counterproductive.

12 Q. That's my next point. The company has been
13 aware, have they not, Mr. Bird, of these proposed rules
14 for some time now?

15 A. That's correct.

16 Q. Okay. And has even the proposition of
17 requiring -- of mandating that the company put in two
18 protective strings in this area caused the company to
19 reconsider its drilling plans for this area?

20 A. It has.

21 Q. Can you explain to the Commission what it has
22 done?

23 A. I can. We started drilling in this area in
24 late 2011, best I can recall. We drilled a few hundred
25 wells in this area. This came up, what, in March? And

1 since this came up, we've drilled five wells in this
2 area, and the budget money from -- for the wells that
3 didn't get drilled went to Texas. I'm a drilling
4 engineer, and my livelihood depends on wells to drill.
5 It really bothers me, and I don't want to have to go to
6 drilling wells in Texas. New Mexico wells are more --
7 there's more variety, and they're more challenging.
8 They're more fun to drill. So --

9 Q. So, Mr. Bird, let me interrupt you because I'm
10 going to push things along here.

11 A. I'm sorry.

12 Q. In your experience, 35 years of experience in
13 the Permian Basin, drilling in --

14 A. 39.

15 Q. I'm sorry?

16 A. 39.

17 Q. 39. Excuse me.

18 Drilling in various geologic scenarios
19 there where we have both aquifers or we have one
20 aquifer, in your expert opinion, are the costs that are
21 associated with the second string proposed by the
22 Division necessary to protect those aquifers?

23 A. No.

24 Q. All right. Now I want to move to the next
25 topic, and that is the CBL requirements. There's been a

1 lot of testimony about that. And it's encompassed
2 within the proposed Rule C(4). Okay? Now, as proposed
3 under Rule C(4), it requires the company to have some
4 interruptions in the drilling process, right?

5 A. Yes.

6 Q. Okay. Are there costs associated with these
7 interruptions?

8 A. Absolutely.

9 Q. All right. And, secondly, the interruptions
10 are caused by the idea of having a cement bond log even
11 if the cement circulated to surface under their proposed
12 rule, right?

13 A. That's correct.

14 Q. In your opinion, does it make any sense to have
15 this cost increase if you have cement circulated to
16 surface?

17 A. No.

18 Q. Okay. Then let's talk first about the costs
19 that are associated with that. I want you to turn to
20 Respondent's Exhibit Number 8. And we have their
21 proposed Rule C(4) up top. That's the one we've put red
22 lines through in our modifications.

23 A. Uh-huh.

24 Q. Would you walk the Commissioners through the
25 cost increases that are associated with this proposed

1 Rule C(4)?

2 A. Sure. You're going to have -- the proposal is
3 for a CBL on every casing string. And this cement's not
4 any different from pouring a foundation for your house.
5 You can walk on it in a few hours. But you don't start
6 building that house that first day. You've got to wait
7 awhile while that cement cures. And it's no different
8 with a CBL. You can -- you can go about your business
9 of drilling, but that CBL is not going to see cured
10 cement for 72 hours or longer.

11 Q. Why is it important that the cement be cured?

12 A. Because the CBL is going to lie to you in a
13 shorter time and cause you to do something wrong. It'll
14 cause you to -- well, it's like the Hippocratic oath,
15 "first do no harm." And that CBL is going to cause you
16 to do some harm.

17 Q. And so we have on here -- and I think you
18 emphasized it in red, that you need a minimum of 72
19 hours to wait for that cement to cure, right?

20 A. And you're spending a couple thousand dollars
21 an hour minimum on that drilling rig. And if you're
22 just sitting there waiting on that CBL so that it
23 doesn't lie to you and cause you to do something
24 damaging to that well, then you're going to spend
25 \$144,000 doing nothing except idling and causing some

1 C02 emissions.

2 Q. So in your expert opinion, if you're going to
3 have a CBL and have it be effective, you've got to wait
4 for that cement to cure properly?

5 A. That's absolutely right.

6 Q. So you have a cost number associated with a
7 minimum of 72 hours of 2,000 an hour. Where did that
8 come from?

9 A. That comes from what the -- what the drilling
10 rig and the associated equipment costs.

11 Q. Okay. And then you've got the cost of the bond
12 log, right?

13 A. That's the cost of the bond log. They don't
14 give them away.

15 Q. And then you have this line item of operational
16 time to rig up and run a log?

17 A. You have to run it. You can't just wave it by
18 the well.

19 Q. And then we had this entry here, "district
20 office time to review and approve the CBL." Do you see
21 that?

22 A. Yes, I do.

23 Q. And Mr. Kautz, bless his heart, who works 100
24 hours a week, said that he thought they could do a quick
25 turnaround.

1 A. And sometimes they might. But all the cement
2 jobs that I do are on late Saturday night, into Sunday
3 morning. Cement doesn't cure except at night.

4 Q. All right. So we don't know what to put in
5 there, but it's probably some other number, right, than
6 zero?

7 A. Yeah.

8 Q. So you came up with at least \$162,000 of
9 additional costs to run this cement bond log in
10 circumstances where the cement is already circulated to
11 the surface?

12 A. That's right.

13 Q. And that is for each string; is it not?

14 A. That's for each string.

15 Q. So if you're going to have two strings out
16 there -- you're going to mandate two strings and you're
17 going to mandate CBLs on both those strings, you've got
18 to double that number, right?

19 A. That's right.

20 Q. Because you're doubling your wait time?

21 A. That's right. You're going to spend \$350,000
22 for nothing, and it might cause you to do something to
23 harm that well.

24 Q. All right. Now, there's been -- I think we're
25 at a point here, and I didn't know if we were going to

1 get to it. But it sounds like we're at a point, based
2 on the witness testimony that's been presented, that
3 everybody kind of agrees, I think, that you don't need
4 CBLs if you've got this cement circulated to surface.
5 Do you agree?

6 A. I'm scared that the CBLs are not only going to
7 cost you-all this money, but they're going to cause you
8 to do something that you really shouldn't do.

9 Q. Okay. Now let's talk about what CBLs are
10 supposed to do. Okay? We've got cement circulated to
11 surface, so we don't need a CBL to determine the top of
12 cement, correct?

13 A. Uh-huh.

14 Q. All right. And then is the quality of the
15 cement, is that an issue that the Division should be
16 concerned about with a CBL?

17 A. No.

18 Q. Why is that?

19 A. You've pumped the cement. You've circulated it
20 to surface. You can witness the cement job. You can
21 see what the quality of that cement is when it comes
22 out. You can catch a sample of it, and then you can see
23 what the quality of that cement hardens to after that
24 cement sets. I mean, you can judge -- it turns into
25 sidewalk. I mean, you can judge all that for yourself.

1 You can witness it with your eyes.

2 Q. And the witness by the OCD?

3 A. You can witness it by the OCD, the BLM, the
4 State Engineer. It's -- it's -- if you -- if you pumped
5 it all the way down, back up and to the surface, you
6 don't have to wonder.

7 Q. Are there also cement standards in place that
8 ensure the quality of the cement?

9 A. Yes, there are.

10 Q. All right. So let me ask you this: In your
11 opinion, will the proposed Rule C(4) increase the cost
12 of the drilling wells in the area?

13 A. As proposed, yes.

14 Q. And given that -- in a circumstance where the
15 cement is circulated to surface, as is required by
16 modification and which is required by the Division by
17 the existing rules, in your expert opinion, do CBLs
18 provide any meaningful data when it's circulated to
19 surface?

20 A. No, on the contrary.

21 Q. Okay. And are the drilling the delays and the
22 costs associated with this proposed C(4) necessary to
23 provide a reasonable level of protection to groundwater
24 in this area?

25 A. No.

1 Q. Now, one minor point, if I turn to Rule C(6),
2 they made some modifications there, correct?

3 A. I assume so. I'm not there yet.

4 Q. Proposed modifications attachment C(6) at the
5 bottom. It was their C(6). It's now our C(4). See
6 that attachment down there at the bottom?

7 A. Okay.

8 Q. Okay?

9 We modified it to say that "if cement is
10 not circulated to surface on the production casing" --
11 now we're talking about the production casing.

12 A. Production casing.

13 Q. -- "the operator," and we put in "at its option
14 shall perform a temperature survey or cement bond log."

15 A. Uh-huh.

16 Q. So we're dealing with the circumstance where
17 the cement and the production string is not circulated
18 to surface. Okay?

19 A. Uh-huh.

20 Q. For the same reasons you just discussed, is
21 there any reason to have a cement bond log if the
22 production casing string has cement circulated to
23 surface?

24 A. No.

25 Q. All right. And if the cement does not

1 circulate to surface on the production string and it
2 follows the 500-foot overlap that the Division has
3 proposed, will either a CBL or a temperature survey give
4 you the top of that cement?

5 A. Yes.

6 Q. Are you familiar with temperature surveys?

7 A. Yes.

8 Q. What advantages do they have over a CBL to
9 determine the top of cement, where it's at?

10 A. They're actually more definitive on top of
11 cement. They're more timely. You can run them -- you
12 can get the information much sooner. And a temperature
13 survey does not rule out a CBL at a later time if you
14 choose to do that.

15 Q. All right. So in a circumstance where cement
16 is not circulated to surface for that production string,
17 in your opinion, does a temperature survey provide a
18 good option for determining the top of that cement?

19 A. Yes. And I also didn't mention that a
20 temperature survey is much cheaper.

21 Q. Okay. All right. Then I want to deal with
22 this issue of annular space. Okay? All right. I look
23 at their proposed Rule F, Mr. Bird, and it mandates that
24 the annular space is measured 2 inches greater than the
25 diameter of a coupling. Are you familiar with that

1 proposal?

2 A. Yes.

3 Q. Okay. First off --

4 A. First off.

5 Q. -- does that standard, measuring the
6 couplings --

7 A. No.

8 Q. -- does that -- now let me finish my question.

9 A. Okay (laughter).

10 Q. Does that comply with the historical designs
11 used out there?

12 A. No.

13 Q. Are you aware of any circumstance where it
14 makes sense to measure it off the coupling rather than
15 the casing?

16 A. No.

17 Q. Now, I want to go to what is Respondent's
18 Exhibit Number 9. Is this a diagram that shows the
19 annular space that has been traditionally utilized by
20 the industry for drilling in not only this area but
21 other areas of New Mexico?

22 A. That is correct.

23 Q. And it shows the distance that is provided by
24 the Division, 2 inches from the outer diameter casing to
25 the outer diameter of the hole, correct?

1 A. That's correct.

2 Q. And this distance for oil and gas drilling, has
3 that evolved over decades?

4 A. It has evolved over decades.

5 Q. And in your experience, has it evolved to the
6 point that you know now that that's what works?

7 A. That's what works for a lot of reasons. We
8 have to do a lot of things besides just drill these
9 wells, run pipe in them. I mean, we -- we have to put
10 wellheads on them. We have to -- we have to put BOPs on
11 top of them. We have to test them. We have to find
12 bits to fit inside them. We have to put fishing tools
13 over them when we drop casing or drop drill pipes in
14 them or whatever we drop in them. We have to fit all
15 this stuff together. It's a puzzle that we build all
16 along.

17 And we start actually designing the well
18 from the finished product that we want, and we design it
19 backwards. And this is all standard stuff that we try
20 to buy off the shelf. We don't want to buy custom stuff
21 because that costs more. You have to buy centralizers
22 to go on this casing to fit standard hole sizes. And
23 it's all -- it's all a puzzle that we put together, and
24 we try to put it together out of standard pieces, with
25 standard bit sizes, standard casing sizes, standard

1 centralizers sizes. And it all evolves around
2 essentially what's slightly larger than a 2-inch over
3 the casing body size, and it's essentially so that you
4 can get turbulence over the whole casing.

5 I agree with what you (indicating) said.

6 It's so you get turbulence over the entire
7 casing body, and yet you still have room for a fishing
8 tool if you drop the casing.

9 You don't want just turbulence over the --
10 over the coupling. You just don't want little doughnuts
11 of bond every 45 feet because that's -- this casing that
12 we buy now is so regular. It's all 45 -- 44- to 45-foot
13 joints, and you want it bonded the entire length. And
14 you need that turbulence to clean the hole and the
15 casing and get good bonds. I've had to wash over casing
16 that was cemented this way, and that cement stuck like
17 glue.

18 Q. All right. So let's break that down. Okay?
19 This 2-inch spacing that you just identified here, it
20 allows you to use centralizers that are standard out
21 there?

22 A. That's correct.

23 Q. Does it allow you to run 1-inch pipe if you
24 have a cement problem?

25 A. You know, yes, it does. And I was astounded

1 when the earlier witness said you couldn't because we do
2 it pretty regularly without any trouble.

3 Q. Well, he wasn't a drilling engineer for oil and
4 gas wells.

5 All right. And then does it allow you to
6 use tools off the shelf?

7 A. It allows us to use tools off the shelf.

8 Q. Including fishing tools?

9 A. Including fishing tools.

10 Q. Because stuff happens.

11 A. Stuff happens.

12 Q. Now, if I go to Respondent's Exhibit Number 10,
13 does this depict what happens when you start measuring
14 that 2 inches from the outer diameter of the casing
15 instead of -- as opposed to the outer diameter
16 couplings?

17 A. Yes.

18 Q. And you have on here that measuring from the
19 couplings adds at least 1 inch to the hole size, right?

20 A. Yeah, it does.

21 Q. Is that a big deal?

22 A. No.

23 Q. Is it a big deal when you've got an additional
24 1-inch space that's added?

25 A. It is a big deal. You lose that turbulence.

1 And that may be why he had trouble getting a cement job
2 on the -- he was probably applying water well drilling
3 rules. And he probably just used one pump truck and
4 didn't get the turbulence that he needed. And if you
5 don't understand turbulence, you really do and you just
6 don't realize it.

7 When your spouse sends you out to wash the
8 grass off the sidewalk or wash the mud off your truck
9 and you go out there with a garden hose, what do you do
10 with that garden hose (demonstrating). You put your
11 thumb over the end of it, don't you? And you don't
12 increase the volume of water coming out by doing that.
13 You don't increase the pressure of the water coming out
14 because it's just spraying out in the air and the
15 pressure's regulated by the water tower. All you're
16 doing is increasing your velocity. But if you don't do
17 it, you don't get the job well enough to suit your
18 spouse, do you?

19 So it's exactly the same thing here. That
20 annulus size is what regulates the velocity. The only
21 way to increase that velocity is to get another pump
22 truck and run them both.

23 Q. All right. So you got ahead of me a little
24 bit.

25 A. Sorry.

1 Q. That's all right.

2 A. Sorry.

3 But y'all follow me now, don't you?

4 Q. Larger than the annular space -- I'm sitting
5 here as an attorney. Okay?

6 A. Sorry.

7 Q. And I see a difference here of 1 inch between
8 what the Division proposes and what has traditionally
9 been used in the industry. Okay? Aside from
10 turbulence -- and I want to get back to that. Why is
11 that a big deal?

12 A. Because if you don't have turbulence, you don't
13 have cleaning.

14 Q. Put turbulence aside. Is there any other
15 reason it's a big deal if you change that -- if you
16 increase the hole by 1 inch?

17 A. Sure.

18 Q. Does it create operational problems?

19 A. Sure, it does. If you start getting too big --
20 I don't see anybody in here with a -- with a soda glass
21 with a -- with a straw. But if you -- if you drop -- if
22 your straw is shorter than your glass and you drop that
23 in there and it leans over to the side, how are you
24 going to pick it up? But if that -- if that glass -- if
25 that straw is pretty close -- fairly close to the same

1 diameter, you can grab the top of it, can't you? You're
2 not going to have any trouble getting it.

3 It's the same thing with -- with these hole
4 sizes. If you get too big a diameter difference, you're
5 not going to be able to grab that if you drop it in
6 there. And there are other considerations like that,
7 too. The hole size differences and pipe size
8 differences that we've got have been arrived at over
9 decades by people having boo-boos. You know, we've
10 solved problems to arrive at this. We're going to
11 create problems if we change this.

12 Q. Does it increase the volume of the material you
13 have to move out of the hole?

14 A. It absolutely does.

15 If you think about this, if you -- we've
16 got 8-5/8 and we set it in an 11-inch hole. The next
17 hole size up -- now, let me think about this for a
18 minute. We're going -- you buy a bigger trailer and
19 you've got a half-ton truck. You don't go down to the
20 Ford dealer and say, I want a 9-1/16 truck. You're
21 going to get a 3/4-ton truck, aren't you, because that's
22 the next standard size up?

23 Well, the next standard size up from 11
24 inch is 12-1/4. So that doesn't sound like that big of
25 a difference, now does it? But going from 11 inch to

1 12-1/4, that's 25 percent more hole volume because the
2 diameter -- because hole volume goes up with diameter to
3 the square. And so that results in 25 percent more rock
4 that you've got to grind up. Well, that doesn't sound
5 like that big of a deal. But you've got to -- you've
6 got to use 25 percent more of that precious water to
7 drill that hole. You've got to the dispose of 25
8 percent more cuttings. You've got to burn 25 percent
9 more diesel to do that. It's going to take you 25
10 percent longer to drill that hole. You're going to have
11 25 percent more carbon dioxide for burning that diesel
12 that's going to go up into the atmosphere. It's just 25
13 percent more pain in the butt.

14 Q. Okay. Now, you've got that 25 percent more --
15 25 percent more pain. I'm leaving it at that. And if
16 I'm understanding you, you're adding those problems, and
17 at the same time, you risk losing the turbulence you
18 need, correct?

19 A. You've hurt yourself. You haven't helped
20 yourself.

21 Q. Okay. Let's go to Respondent's Exhibit Number
22 11. Did you help put this together?

23 A. Yes.

24 Q. Did you depict for the Commission what could
25 happen if we change from measuring 2 inches from the

1 outer diameter of the casing to the outer diameter of
2 the couplings?

3 A. Yes.

4 Q. Okay. The one on the left-hand side where you
5 show your turbulent flow is 1.1/8-inch up there, what
6 does that represent? What measurement does that
7 represent?

8 A. That represents the difference between the
9 casing body and the hole size with 8-5/8 casing body and
10 11-inch hole size.

11 Q. Okay. And if I go to the right-hand side where
12 we see a greater distance, 1.8125, is that what you get
13 when you start measuring that distance off the
14 couplings?

15 A. If you have to put -- make that -- if you have
16 to have 2-inch diameter from the couplings, then you
17 have to go to 12-1/4, and then suddenly you've got
18 1.18 -- 1.8125 from the pipe body to the hole, and
19 you've lost your turbulence, unless you get two pump
20 trucks out there. And even if you do, then you're
21 liable to lose one, because they're not going to send
22 you their best two trucks. They're going to send you
23 one good and one that was kind of extra.

24 Q. Okay. All right. Have you been drilling out
25 there for a long time?

1 A. Yeah.

2 Q. Okay.

3 A. That's how I know that.

4 Q. You want to ensure that you've got the right
5 turbulence, correct?

6 A. That's correct.

7 Q. Because at the end of the day, what do you want
8 with respect to your cement? Do you want a big ol' wide
9 sheet of cement, or do you want a thinner sheet of
10 cement --

11 A. You want the right size. You want the
12 turbulent one. You want good cement that's put in there
13 that's turbulent that had the opportunity to clean the
14 hole and bond to both the casing and the hole size and
15 then set.

16 Q. And you want it to bond to the casing, right?

17 A. You want it to bond to the casing and to the
18 hole.

19 Q. Were you here when Commissioner Padilla was
20 talking about why worry about the couplings? We should
21 be worried about the casing?

22 A. Yes. And I agree with him completely.

23 Q. And that's why, in your expert opinion, you
24 need that 2 inches measured from the outer diameter of
25 the casing and not the couplings in order to get that

1 turbulence?

2 A. That's right. We want the turbulence at the
3 casing, not just the couplings.

4 Q. In your expert opinion, will the rule as
5 proposed by the Division appropriate effective drilling?

6 A. As proposed --

7 Q. By the Division.

8 A. No.

9 Q. And will the increase in the annular space
10 proposed by the Division create operational problems
11 for --

12 A. Yes, it will.

13 Q. And will the increase in annular proposed by
14 the Division promote effective hole cleaning and cement
15 bonding?

16 A. No.

17 Q. All right. And in your opinion, will the
18 increased annular space proposed by the Division provide
19 more or less protection to the ground -- to the
20 aquifers?

21 A. Less. And the way the previous witness
22 testified actually verifies that. He talked about how
23 they didn't get good bond. I'm assuming they used their
24 bigger hole sizes, and he didn't probably put the bigger
25 pump -- or extra pump trucks out there that he needed,

1 and he was surprised that he didn't get the cement jobs
2 that he wanted. If he had asked an oil and gas driller,
3 he probably would have gotten better advice.

4 MR. OLSEN: We tender an objection to the
5 speculative nature of the witness as to the previous
6 witness' testimony. The previous testimony did not
7 state the facts as the witness is presenting them today.
8 So to that extent, we'd ask that that part be stricken
9 from the record.

10 CHAIRMAN CATANACH: I would agree to that.

11 Q. (BY MR. FELDEWERT) Do the modifications that we
12 have proposed to Rule F, shown on Attachment A, does
13 that bring that spacing in line with the oil and gas
14 drilling practices proven to be effective over the years
15 in the Permian Basin?

16 A. Yes.

17 Q. I'm not talking about water wells. I'm talking
18 about oil and gas wells.

19 A. Yes.

20 Q. And that's the distance that works for oil and
21 gas wells?

22 A. Yes.

23 Q. Given all the nuances that are involved with
24 the oil and gas wells?

25 A. Yes.

1 MR. FELDEWERT: All right. Mr. Examiner, I
2 would move admission into evidence Respondent's Exhibits
3 1 through 11.

4 CHAIRMAN CATANACH: Any objection?

5 MR. OLSEN: No objection.

6 CHAIRMAN CATANACH: Exhibits 1 through 11
7 will be admitted.

8 (COG, OXY and Fasken Exhibit Numbers 1
9 through 11 are offered and admitted into
10 evidence.)

11 MR. FELDEWERT: That concludes my
12 examination of this witness.

13 CHAIRMAN CATANACH: Mr. Brooks?

14 MR. BROOKS: Thank you.

15 CROSS-EXAMINATION

16 BY MR. BROOKS:

17 Q. Good afternoon, Mr. Bird.

18 A. Hi.

19 Q. Certainly you've had a lot of experience
20 drilling wells?

21 A. That's all I've ever done and all I ever wanted
22 to do.

23 Q. Well, just one or two things I wanted to get
24 some clarification on. You said -- you used the term --
25 when you said you've had lost circulation, you indicated

1 that you had lost circulation in what you believed to be
2 the aquifer areas? Is that --

3 A. Yeah. It's not labeled, but yeah, I think it
4 was probably the aquifers.

5 Q. And although that's not usual in the sense of
6 you expect it in every well, it's something that has
7 occurred numerous times --

8 A. Yes.

9 Q. -- in the large amount of drilling you've done,
10 right?

11 A. Uh-huh.

12 Q. And you said that you had never observed a
13 flow. Now, what does that mean?

14 A. It never flows. Never flows. Never, ever
15 flows.

16 Q. Do you mean you're not getting formational
17 water coming up to the surface in that instance? Is
18 that what that means? I just don't know what that
19 means, so I'm asking you to clarify for an attorney what
20 that means.

21 A. That's correct.

22 Q. Okay. Well, my guess was a pretty good one.

23 And you said if you continue drilling
24 without fluid, that then you recover circulation?

25 A. On the upper -- what I assume to be the

1 aquifer. If we lose returns to the upper aquifer,
2 continue drilling, that it heals, and we regain returns.

3 Q. Okay. And why would that happen?

4 A. Because it -- it -- you generate cuttings, and
5 the cuttings from below where you're losing returns make
6 it up to that lost zone and go into it. They stick to
7 it.

8 Q. They seal off the voids that are causing the
9 water -- the drilling mudflow out of the hole?

10 A. Right there at the wellbore, they seal that off
11 and stop the losses.

12 Q. Okay. Now I'll get to another basic issue
13 that's another -- a related conception that's perhaps
14 even more basic to what we've talked about here. Mainly
15 the concern that has been articulated is about having
16 only one casing string to seal off two separate aquifers
17 that need to be segregated. I don't think there is any
18 dispute in the testimony that there is a need, from an
19 environment and water source protection standard, to
20 separate these two aquifers. But the main concern is
21 that there will be communication during the drilling
22 process because after you set the intermediate casing,
23 then there is not going to be communication, unless the
24 intermediate casing is leaking -- unless there is a leak
25 in the casing or the cement. We would all agree to

1 that; would we not?

2 A. I guess. I assume so.

3 Q. Okay. But is it your opinion that there is not
4 a danger of communication between the aquifers while
5 you're drilling out below the upper one and through the
6 lower one?

7 A. No, there is not.

8 Q. And why is that?

9 A. Well, first of all, when I see those two
10 aquifers, they're only lost zones.

11 Q. They're only what?

12 A. They're only lost zones. They never -- they
13 never flow.

14 Q. Okay.

15 A. Okay. The upper zone heals and seals. And if
16 we see the lower zone -- and sometimes we don't even see
17 the upper zone. It may not be present.

18 Q. Right.

19 A. The lower zone -- and sometimes we don't see
20 the lower zone. It may not be present.

21 The lower zone, when we lost -- when we
22 lose returns, when we see it, we TD the well about an
23 hour later. In fact, the whole hole section, when we --
24 when we drill it, when we set casing about 1,200 feet,
25 we drill it, case it and cement it in less than a day.

1 The drilling part of it is less than 12 hours. So
2 that -- that --

3 Q. That is the drilling down to the surface casing
4 point, 1,200 feet?

5 A. Yes.

6 Q. Okay. Go ahead.

7 A. So that -- that -- that bottom aquifer is open
8 about an hour, and we're running casing and cement.
9 Okay? Now, we've circulated cement. We have cement to
10 surface on every well, or we were not allowed to
11 proceed.

12 Q. Correct.

13 A. I'm somewhat arrogant, but I take great pride
14 in the way I drill wells.

15 Q. Yes, sir.

16 Well, you would -- is the way you drill
17 wells typical of what is done by most of the operators
18 in that area?

19 A. I can't speak to that.

20 Q. Okay. Would there be a hazard if somebody less
21 picky than you was to drill an oil well?

22 A. I can't speak to that.

23 Q. Okay. Let me ask about the word
24 "counterproductive." I may have had a lapse of
25 attention in that area, and that would not be surprising

1 given my age and other considerations. But what I heard
2 you say is that the rule may be -- the two-string casing
3 rule may be counterproductive, and that was separate
4 from what was said about the annular spacing issue.

5 A. That was counterproductive, too.

6 Q. Well, I understand that, and I understand why
7 you think that, I think. But I'm not sure what I heard
8 you say about the -- about the two-string rule, that
9 it's going to be counterproductive, and then the next
10 thing I heard you say was it's going to make the
11 drilling a lot more expensive and you may have to move
12 to Texas to drill wells. Well, I may have missed
13 something.

14 In terms of water protection, do you
15 believe that the proposed two-string design is
16 counterproductive? Do you believe it actually increases
17 the danger of water problems -- water pollution
18 problems?

19 MR. FELDEWERT: Hold on, Mr. Brooks. There
20 might be some confusion here between the two-string
21 design and a three-string design.

22 MR. BROOKS: Ah. Okay.

23 MR. FELDEWERT: I used the --

24 MR. BROOKS: The two-string design is one
25 surface string, and the three-string design is --

1 MR. FELDEWERT: Two protective strings.

2 MR. BROOKS: -- two protective strings.

3 Okay. Then I'll clarify.

4 Q. (BY MR. BROOKS) Do you believe the three-string
5 design, as Mr. Feldewert has used these terms, is
6 counterproductive in the sense that it has a tendency to
7 actually increase the danger -- the hazard to the
8 freshwater zones?

9 A. The way it's counter -- besides the extra cost,
10 extra disposal that it incurs, the extra freshwater that
11 you use to drill the larger hole sizes, the extra money,
12 time, carbon footprint, all that stuff, it is
13 counterproductive because if you ever want to make a
14 shallow water well out of that three-string design, you
15 ain't going to do it.

16 Q. Okay. Now, that was mentioned in the
17 cross-examination of another witness yesterday, and
18 that's something I don't understand. So could you
19 please explain?

20 A. You can -- you can perforate two strings of
21 pipe if you have to. You cannot perforate three strings
22 of pipe. Now, when you have the three-string design,
23 which is two protective strings, then you'd have three
24 strings across that shallow water zone. It will never
25 be a shallow water well.

1 Q. But it still could be a water well in the deep
2 zone --

3 A. Possibly.

4 Q. -- based on what you're saying?

5 A. Possibly. Not for sure, but possibly. You're
6 going to have to have bigger perforating charges, and
7 it's -- it's not guaranteed, but it's a definite maybe.

8 Q. Okay.

9 A. Now, if you're going out there to plug that
10 well and you don't have any choice, you're going to go
11 out there and load it for better [sic]. And yes, you
12 can perforate it. But if you're just going out there
13 and hoping to have a cheap water well that you're
14 converting from a former oil well, I'm not going to
15 promise it.

16 Q. Okay. Thank you.

17 Now I want to talk about the cement bond
18 log.

19 A. Let's talk about it.

20 Q. If you can see the cement at the surface, you
21 know the quality of the bonding you've got at the
22 surface. Does that assure you that you do not have
23 voids in the cement further down that could be
24 problematic?

25 A. If you've had turbulence, then yes.

1 Q. It does assure you of that?

2 A. Yes, if you have had turbulence.

3 Q. And how do you know if you've had turbulence?

4 A. If you've got the right hole size and you've
5 pumped a decent rate, you've had turbulence.

6 Q. Okay.

7 A. You've had your thumb on the end of that garden
8 hose and you've seen it.

9 Q. So in your opinion, cement sets well at the
10 surface and you've got those factors that you mentioned,
11 then that assures you that you do not have problems with
12 the cement down the hole, and you do not need a cement
13 bond log? That's your testimony?

14 A. In these shallow casing strings, yes.

15 Q. Okay. Why is that different than somewhere
16 else?

17 A. Well, if it's -- if it's -- say it's the
18 production string --

19 Q. Yeah.

20 A. -- then you -- you have transited your cement
21 across the productive oil and gas -- the hydrocarbon
22 zone and you could have contaminated your cement
23 possibly. That's not the case here.

24 Q. There are some shallow oil formations -- there
25 are some shallow oil indications at least --

1 A. I'm so glad you brought that up.

2 Q. Okay.

3 A. When you do that, when you encounter these
4 shallow hydrocarbon zones, you have changed your water
5 well into an oil well.

6 Q. And what consequence does that have?

7 A. It becomes under the purview of the OCD.

8 Q. Well, now you're talking about if you set out
9 to drill a water well?

10 A. Uh-huh.

11 Q. But if you set out to drill an oil well, does
12 that change what you need to do in terms of --

13 A. No. If you're drilling an oil well and you
14 encounter oil, then you just need to proceed with what
15 you're doing.

16 With a water well, once you encounter oil,
17 it's become an oil well.

18 Q. Okay. Now, you do agree with the proposition
19 that a temperature survey is only, according to
20 Mr. Kautz' testimony and I believe yours confirmed that,
21 for the purpose of determining the top of cement and
22 does not necessarily determine the quality of the
23 cement?

24 A. That's correct.

25 Q. Okay. Thank you. I think that's all the

1 questions I have.

2 CHAIRMAN CATANACH: Mr. Olsen?

3 MR. OLSEN: Thank you very much.

4 CROSS-EXAMINATION

5 BY MR. OLSEN:

6 Q. Good afternoon, sir.

7 A. Oh, I'm sorry.

8 Q. That's fine.

9 You use some dates that I find of interest.
10 I think you said you started drilling in the Lakewood
11 area in 2007?

12 A. '11.

13 Q. I'm sorry. 2011.

14 Who is "we"?

15 A. Concho, me.

16 Q. Prior to 2011, have you been overseeing the
17 drilling of wells in the Lakewood area?

18 A. Have I?

19 Q. Yes.

20 A. In the Lakewood area?

21 Q. Yes.

22 A. No.

23 Q. So 2011 is your first experience in the
24 Lakewood area drilling oil wells?

25 A. No. I've been drilling in New Mexico ever

1 since I start drilling.

2 Q. My question is the Lakewood area.

3 A. Well, I've drilled in the Lakewood area before.

4 Q. Okay. Let's talk about the before. You said
5 you started drilling in 2011, Concho. I want to go back
6 when you first started drilling in the Lakewood area.

7 A. Okay.

8 Q. When?

9 A. I guess probably the first well I drilled was
10 probably '81, maybe.

11 Q. And between 1981 and 2011, how many oil wells
12 did you oversee being drilled in the Lakewood area?

13 A. Can we include gas wells?

14 Q. Sir?

15 A. Can we include gas wells?

16 Q. No. I'd prefer to talk about oil wells for the
17 time being.

18 A. A dozen, maybe.

19 Q. So let's start with the number 12. Okay? A
20 dozen, 12.

21 A. Okay.

22 Q. Okay. Now, are you familiar with the
23 regulations in place today by the Division involving the
24 drilling of oil wells in the protection of strata or
25 protection of water?

1 A. Yes, sir.

2 Q. Okay. In the Lakewood area, when you drilled
3 your first well, how many water strata did you identify?

4 A. Probably just one.

5 Q. Okay. And what was the first depth -- or what
6 was the depth of that first strata that you identified?

7 A. I really don't remember.

8 Q. All right. Let's fast-forward to 2011. When
9 you drilled your first well in 2011 in the Lakewood
10 area, how many water strata did you identify?

11 A. I don't -- you know, I'd have to say just two.

12 Q. Is that what we have been referring to as the
13 shallow and the artesian?

14 A. Probably. You have to understand, they're not
15 really labeled for me. I have to assume that's what
16 they are.

17 Q. Is that because you're a -- I think I looked at
18 your -- you're a petroleum and drilling engineer by
19 title. Are you not interested in identifying the water
20 strata where you're going to drill an oil well?

21 A. Oh, no, I am. It's just -- it's how they
22 present themselves to me.

23 Q. Okay. Now, let's go back to the regulation
24 again, and I'm going to make reference to what has been
25 marked as Respondent's Exhibit Number 1.

1 MR. FELDEWERT: These are the existing
2 regulations?

3 MR. OLSEN: Sir?

4 MR. FELDEWERT: Existing regulations?

5 MR. OLSEN: Yeah. Uh-huh.

6 MR. FELDEWERT: Okay.

7 THE WITNESS: Okay.

8 Q. (BY MR. OLSEN) Ready? Take a look, if you
9 would -- excuse me -- and I believe it's highlighted in
10 the exhibit, Section 19.15.16.9, "Sealing off strata."
11 Do you see that, sir?

12 A. I do.

13 Q. Now, the Section A --

14 A. Uh-huh.

15 Q. -- what does that require the operator to do as
16 to water strata?

17 A. It requires you to -- to -- "shall seal and
18 separate the oil and gas and water strata above the
19 producing or injection horizon to prevent the contents
20 from passing into other strata."

21 Q. Okay. Let's go to paragraph B.

22 A. B. Okay.

23 Q. Now, what does B require the operator to ensure
24 about the freshwaters? What does that require the
25 operator to do?

1 A. "Confined to their respective strata and are
2 adequately protected by Division-approved methods."

3 Q. And I'd ask you to continue the next sentence.
4 What does that require the operator to do?

5 A. "Shall take special precautions by methods
6 satisfactory to the Division in drilling and abandoning
7 wells to guard against loss of artesian waters from the
8 strata in which it occurs and the contamination of
9 artesian water by objectionable water, oil or gas."

10 Q. All right. Now, in 2011, when you started
11 drilling wells in the Lakewood area, I think -- are
12 you -- I want to make sure I understand. You identified
13 two stratas of water, what we call the shallow and the
14 artesian?

15 A. Uh-huh.

16 Q. Okay. I want -- you testified that when you
17 designed the well, you design it the way you want it to
18 end up and then go backwards?

19 A. That's right. And that's for the sizes.

20 Q. At what point in time do you as the -- and my
21 question is: Are you the person who designs the well?

22 A. Yes.

23 Q. Okay. At what step do you decide what steps
24 are necessary to separate those strata as required by
25 the rule when you're designing this well?

1 A. Well, it's before you drill it.

2 Q. Okay. But you're designing the well. My
3 question is: Do you identify that there are two water
4 strata before you start designing the well, or do you
5 just start designing the well and maybe yes, maybe no
6 two stratas of water?

7 A. I'm not following your question.

8 Q. Okay. Well, let me try it this way. You've
9 talked about two strings, but now we're talking about
10 three strings, right?

11 A. That's what you're talking about.

12 Q. Okay. So how are you going to separate the
13 shallow strata from the artesian strata in the design of
14 your well?

15 A. It's separated by cement.

16 Q. Okay. Do you set a certain size casing from
17 the top to the depth of the shallow into the red bed?
18 How do you do that?

19 A. No. And, furthermore, we don't typically see
20 red bed. We see it occasionally, but not -- go ahead.

21 Q. My question is: How do you separate per the
22 rule?

23 A. Well, we separate them with cement.

24 Q. How do you decide where you're going to
25 separate the shallow from the artesian?

1 A. They don't require separating any more than
2 cement.

3 Q. Okay. Well, let me continue then. You've
4 testified that you acknowledge that you lose circulation
5 in the artesian?

6 A. Uh-huh.

7 Q. And I think you've testified that it heals
8 itself, and you let it go the -- you let the lost
9 circulation continue until you get to the bottom at
10 1,200 feet and then you seal it off?

11 A. Uh-huh, which is about another hour. And
12 typically we're drilling these with the best water we
13 can buy, which is usually artesian water.

14 Q. Well, my question is --

15 A. Sometimes.

16 Q. -- how much water is lost -- how much artesian
17 water is mixed -- or how much contamination takes place
18 during this period of time of -- of materials into the
19 artesian while you're waiting to get to the bottom?

20 A. None.

21 Q. I see. You measure that?

22 A. How are you contaminating it with the same
23 water?

24 Q. Well, my question is: Losing circulation, are
25 you not putting materials into the aquifer?

1 A. How -- what materials are you putting in that's
2 not there?

3 Q. That's my question. You're the one that has
4 designed the well. I'm asking the question: How do you
5 assure that you're not contaminating the source while
6 you're healing?

7 A. Well, you're putting artesian water and
8 artesian rock into the artesian aquifer. So --

9 Q. Let me continue.

10 A. Okay.

11 Q. This healing, how long does it take to occur?

12 A. Well, I've testified that it takes less than 12
13 hours to drill the whole thing, and the healing occurs
14 on the upper one, and there is no telling what occurs on
15 the bottom one.

16 Q. Okay. So when you're setting this -- when
17 you're setting the concrete in the bottom of the
18 artesian --

19 A. Uh-huh.

20 Q. -- how long does that take place?

21 A. How long? Couple of hours. It turns into
22 sidewalk.

23 Q. I want to go back. How many wells have you
24 personally drilled from Artesia down to the Lakewood
25 area?

1 A. A few hundred.

2 Q. Over how many years?

3 A. From 2011 until now.

4 Q. Okay. With the exception of some in the '80s?

5 A. Yeah.

6 Q. Several hundred or 200 or how many?

7 A. More than 200 and probably less than 300.

8 Q. Okay. Of this range, how many two-string
9 versus three-string wells have you drilled?

10 A. All but one was two-string.

11 Q. All but one. Okay.

12 And in all of these wells but one, did you
13 detect how many shallow aquifers and how many were just
14 an artesian aquifer?

15 A. I don't know. Like I said, they're not
16 labeled.

17 Q. Where are they not labeled?

18 A. Anywhere.

19 Q. I see.

20 Are you testifying today that the aquifers
21 are not labeled in any data -- data centers, either at
22 the New Mexico State Engineer's Office or the office of
23 the -- the district office of the OCD in Artesia? Is
24 that your testimony today?

25 A. No. The rock's not labeled.

1 Q. Is it your testimony that you do not review the
2 data available either through the New Mexico State
3 Engineer as to the depth to the aquifers?

4 A. Not anymore.

5 Q. When did you start and when did you stop?

6 A. Well, I started in 2011, and I stopped when we
7 got a program that -- that circulates cement and covers
8 up both aquifers with cement.

9 Q. So I want to go back to your design of the
10 well. When do you make a decision whether to utilize a
11 two- or three-string casing?

12 A. When I'm forced on that one well to run three
13 strings.

14 Q. So unless you encounter a problem during the
15 drilling, you do not consider using a three-string
16 casing?

17 A. No. When I was forced by the OCD to run three
18 strings.

19 Q. So that's the only time you've considered to
20 use it?

21 A. Yeah. And it cost over \$300,000 to do it.

22 Q. When you say that you -- and I'll use your
23 words, I think, they don't flow -- drilling a well,
24 don't flow.

25 A. They don't flow.

1 Q. Isn't that dependent, sir, upon the pressure of
2 the aquifer whether or not there is flow or not?

3 A. I would assume so.

4 Q. So do you measure the pressure of the water
5 that you're encountering?

6 A. No. But they're open to flow.

7 Q. In the southern Eddy County area that has been
8 discussed, where there is artesian and the shallow
9 aquifers, have you drilled any wells on BLM lands?

10 A. Yes.

11 Q. On the BLM lands, have they required you to
12 utilize what has been referred here to as a three-string
13 casing?

14 A. No.

15 Q. Never?

16 A. No.

17 Q. Okay. You've talked in great deal about the
18 cost associated -- cost associated with having to comply
19 with the proposed new rule, and some of those numbers
20 intrigued me. Are you the one responsible for setting
21 the costs of drilling at the same time you're designing
22 the well? Is that you, or is that somebody in another
23 department of the company?

24 A. Are you talking about the cost estimate
25 beforehand?

1 Q. Yes.

2 A. Yes. Yes.

3 Q. That's you?

4 A. Yes, sir, I did.

5 Q. Do you consider, when you're designing a well,
6 other cost factors such as human welfare factors if
7 there is a contamination of the aquifer?

8 A. No. The welfare factor -- I don't contaminate
9 aquifers. The welfare factors that I consider -- like,
10 the rigs that I use are local rigs, and they involve 25
11 families per rig. And, you know, when we -- when we
12 just drill -- and, you know, the cementing company that
13 I use is a local company. And when we go from, say, 70
14 wells per year in an area to five, then we're talking
15 about people that you probably go to church with, and
16 their kids and their grandkids go to school with your
17 kids and your grandkids. And I'm really more concerned
18 with that human factor. But I don't -- you know, I come
19 from a ranching family, and I'm really more concerned
20 with water quality than you may give me credit for.

21 Q. Well, I guess my -- again, I'm going back to my
22 question. When you're designing the well and you're
23 talking about all these extra costs or the costs of the
24 well, my question is what about the human factor, the
25 people that live in the area if that water's

1 contaminated. What are their costs? Do you consider
2 that when you design the well?

3 A. You know, if I thought that something that I
4 was going to do was going to impact the water quality or
5 the people that lived around that well, I wouldn't allow
6 it to be drilled, at least not that way.

7 Q. So I guess the answer is no, you don't consider
8 that human factor --

9 MR. FELDEWERT: Object to the form of the
10 question. He's answered the question. I know he didn't
11 like the answer, but he's answered the question.

12 THE WITNESS: I consider it every time.

13 Q. (BY MR. OLSEN) What role did you play in the
14 proposed amendments in the Respondent's Joint Notice of
15 Modifications to Special Rules? What modifications did
16 you specifically provide input on?

17 A. Well, I'm not much of a wordsmith, but I
18 probably helped a little bit. I don't know that I
19 helped with any specific parts.

20 Is it okay to ask if I helped?

21 Q. Sir?

22 A. Is it okay to ask?

23 Q. No, sir. You've answered my question.

24 A. Okay.

25 MR. OLSEN: We'll pass the witness.

1 CHAIRMAN CATANACH: Are there any further
2 questions from this side?

3 Mr. Larson?

4 MR. LARSON: I do not have any questions.

5 CHAIRMAN CATANACH: Okay.

6 Mr. Bruce?

7 MR. BRUCE: Yeah. I do have a couple of
8 questions.

9 CROSS-EXAMINATION

10 BY MR. BRUCE:

11 Q. Mr. Bird, this is the first time we've been on
12 the same side of a case together. This is noteworthy.

13 A. You don't know what to do, do you?

14 Q. I don't.

15 (Laughter.)

16 Q. Mr. Brooks asked you a question and I didn't
17 write it down, but I think the gist of the question is
18 if you do do a three-string casing, it certainly won't
19 harm the aquifer. Is that a fair way of saying it?

20 A. Which aquifer?

21 Q. Well, whichever one, you know, the deep or the
22 shallow?

23 A. I wouldn't -- I'm pretty sensitive to
24 unintended consequences --

25 Q. Okay.

1 A. -- and I don't think so.

2 Q. Okay. But you testified that you and COG have
3 drilled a couple hundred-plus wells to the Yeso in this
4 area?

5 A. Uh-huh.

6 Q. And you have seen no aquifer issues in the
7 wells as drilled?

8 A. No.

9 Q. And there are other operators in the Lakewood
10 area, too?

11 A. That's right.

12 Q. If I could name a couple: Cimarex --

13 A. Yes.

14 Q. -- Mewbourne.

15 A. Yes.

16 Q. And they've drilled a lot of wells, too?

17 A. Yes. Yates.

18 Q. Yates.

19 As part of what you do as a drilling
20 engineer at COG, do you keep your eye on wells drilled
21 by your competitors on offsetting acreage?

22 A. Yes.

23 Q. Do you look at the well design, the drilling,
24 the completion?

25 A. Yes.

1 Q. And the results they get from those wells?

2 A. Yes.

3 Q. And COG's a good operator, but sometimes you
4 might learn something from Yates?

5 A. Yes. I hate to admit that part, but yes.

6 Q. Most operators do (laughter).

7 But to the best of your knowledge, have the
8 other operators been successfully drilling wells to the
9 Yeso with a two-string design without an adverse effect
10 on the aquifers?

11 A. Yes.

12 Q. So based on that, COG's results, but [sic] the
13 results of the other operators, there really is no net
14 benefit to drilling with the three-string casing?

15 A. No.

16 Q. One final issue: Drilling these hundreds of
17 wells, you and COG have a good handle on well costs?

18 A. Yes.

19 Q. Excellent handle?

20 A. (Indicating.)

21 Q. So that the \$300,000 figure you gave about the
22 adverse economic effect on the proposed rule, that's a
23 real firm number?

24 A. That happened to us, yes.

25 Q. Thank you.

1 CHAIRMAN CATANACH: Okay. I've got a
2 couple of questions.

3 CROSS-EXAMINATION

4 BY CHAIRMAN CATANACH:

5 Q. Mr. Bird, when you're drilling these wells with
6 the surface casing, what type of drilling mode are you
7 using? Are you just using freshwater?

8 A. Yes.

9 Q. With no additives?

10 A. No. We -- we're not using any additives.
11 We're --

12 Q. During -- no additives at all?

13 A. No. Well, we'll -- if we have to add
14 lost-circulation material, then we'll add a little bit
15 of freshwater gel, which is clay, to help carry that
16 lost-circulation material to the lost -- to the lost
17 zone.

18 Q. When you're drilling through the upper
19 formations, do you believe that you're picking up any
20 salts or any other kind of --

21 A. We don't pick up salts because there's no salt
22 section, which is the reason that we're able to drill
23 with just the two-string design.

24 Q. Are you picking up anything in those upper
25 formations that would change the quality of that

1 freshwater?

2 A. We pick up dirt.

3 Q. No chemicals?

4 A. No. Now, we start off with 8-3 pound per
5 gallon, which, you know, it's just water. It's the
6 cleanest water we can get. Sometimes that's Artesia
7 city water. Sometimes it's their -- you know, if it's
8 available, we get the -- the -- the artesian, you know,
9 well water. But as soon as you circulate -- as soon as
10 you're drilling, it picks up dirt.

11 Q. So during your drilling operations, is the
12 weight of that fluid column in the wellbore sufficient
13 to prevent any inflow from the artesian aquifer?

14 A. It's always losses. So yes, to answer your
15 question.

16 Q. So you are losing some fluid in the artesian
17 aquifer?

18 A. Yes. Not all the time.

19 Q. Sometimes?

20 A. Sometimes.

21 Q. Sometimes.

22 But that fluid, again, is just freshwater?

23 A. It's -- yes, just -- it's the cleanest water we
24 can buy, about \$1.00 a barrel.

25 Q. During your drilling operations, how do you

1 identify when you drill through a freshwater zone?

2 A. Like I said, it's not labeled. The best we can
3 tell, it's where we lose circulation.

4 Q. So that's where you're stopping your drilling
5 operations and are --

6 A. No, we don't stop. We keep going. We dry
7 drill.

8 Q. Drill past that --

9 A. Drill past it, and then in the cuttings from
10 below and whatever lost-circulation material that we add
11 that heals that upper. The bottom zone, we're setting
12 pipe right underneath it, so in less than an hour,
13 we're -- we're done.

14 Q. Are you encountering any hydrocarbons above
15 those lost-circulation zones?

16 A. No.

17 Q. No hydrocarbons?

18 A. No. We've never encountered hydrocarbons above
19 1,250 feet.

20 Q. So you're confident that you're not drilling
21 into any hydrocarbon zones?

22 A. We are confident of that.

23 Q. So you believe -- as far as the annular
24 turbulence, you believe that you need an additional pump
25 to have sufficient pressure to cause the velocity that

1 you need?

2 A. If you increase the hole size, if you increase
3 the annulus size, yes, you'll need a bigger -- you'll
4 need more pump rate, because you have to substitute that
5 for putting your thumb over the hose. As it is now with
6 the standard hole sizes and casing sizes that we have,
7 one pump can do it. One pump truck can get four to five
8 barrels a minute. They can pump a little faster than
9 that, but they can't mix and pump faster than that. I
10 may be giving you more than you want.

11 Q. How many of these wells do you successfully
12 circulate to surface --

13 A. Well --

14 Q. -- on the -- on the water string?

15 A. You mean on the primary job without 1-inching?

16 Q. Yes. Yes.

17 A. Well, it's over 90 percent. We don't have to
18 1-inch very often anymore.

19 When we lose circulation, whether it's on
20 the upper or lower or either one, I immediately add what
21 I call my lost-circulation blend. It's several blends
22 that we've come to over time. We developed them up in a
23 different area, in Eddy County, where it's pretty
24 successful at healing lost circulation. It involves
25 some -- pardon me -- some thixotropic cement and some

1 really fast-setting cement. When it turns sideways into
2 the lost zone, it starts setting as soon as it stops.
3 It's pretty much a right-angle set. It develops gel
4 strength, and it allows the normal cement job behind it
5 to keep coming so we can maintain our regular rate, and
6 we almost always circulate cement to surface.

7 So I'm going to say that it's in the 5 to 8
8 percent of the time. And when we do have to 1-inch,
9 then the top of cement is really pretty high. Usually
10 we can see it with a mirror and a flashlight. We'll go
11 ahead and tag it either with a steel line and a bump or
12 with the 1-inch itself, because we need to have that
13 measurement to report where the top of cement was. But
14 we'll 1-inch it to the surface then.

15 Q. So it's pretty close to the surface?

16 A. Yeah.

17 Q. On all -- on all --

18 A. Yeah. And we -- we -- we set our conductor at
19 80 feet now just as a rule, and we cement all the
20 conductor pipes. Yeah. I may be over-answering your
21 question.

22 Q. Let me ask you a little bit about -- you use
23 centralizers on your casing string?

24 A. Yes.

25 Q. How often or at what distance?

1 A. I'd have to -- I think it's every third joint.
2 We do it according to the BLM rules. I just drill -- I
3 just do all my wells, whether they're state or federal,
4 according to the BLM rules. And I'd have to go to the
5 truck to quote you the -- the -- to quote you the rule,
6 but I can do that for you if you'd like.

7 Q. That's okay.

8 The amount of cement in a standard hole
9 size, I believe it's 1 inch of -- the cement sheet is
10 1 inch?

11 A. Yes. Well, slightly more on the pipe body and
12 slightly less on the coupling.

13 Q. How much on the coupling?

14 A. Well, it's like three-quarters of an inch,
15 maybe. Now, you've got to understand, it's not -- it's
16 concrete. When you get through, it's sidewalk.

17 Q. Do you ever have instances where that pipe is
18 laying flat against the hole and you're not going to
19 have any cement?

20 A. Yeah, occasionally. Sure. Every couple
21 hundred feet, it's going to have a little spot.

22 Q. But in your opinion, that's not going to result
23 in a channel?

24 A. No. That's not going to be a channel. That's
25 going to be a spot. No. You've got turbulence if

1 you've got the right combination of rate and -- and pump
2 size -- and annulus size and you've got good-quality
3 cement. If you've got good-quality cement, then your
4 geology helps you, too.

5 Q. Besides the 1-inch circulation to surface, have
6 you -- have you guys had to do any other remedial cement
7 operations on that surface string?

8 A. Besides 1 inch?

9 Q. Yeah. Have you had to do any kind of squeeze
10 work or anything like that?

11 A. Oh, goodness no.

12 Q. Mr. Bird, a temperature survey, in your
13 opinion, that's not -- that's going to tell you the top
14 of the cement?

15 A. Uh-huh.

16 Q. That's not going to tell you the quality of the
17 cement or the bonding to the pipe or to the hole?

18 A. No. Now, I should add, we do occasionally run
19 a temperature survey. If you can't see it or if you're
20 not confident of your tag, you'll run a temperature
21 survey. We do that once in a great while. We'll
22 occasionally run a temperature survey when we don't
23 circulate.

24 Q. Mr. Bird, what are the target formations in
25 this area you're producing from?

1 A. It's Yeso.

2 Q. Yeso.

3 A. Uh-huh.

4 Q. Okay. You're not producing from the San Andres
5 in this area?

6 A. No. But there is some San Andres production in
7 the area.

8 Q. Not by Concho?

9 A. No.

10 Q. Are those horizontal San Andres?

11 A. No.

12 Q. Vertical?

13 A. Yes, they're vertical. There are not any
14 horizontal San Andres that I'm aware of in the area.

15 CHAIRMAN CATANACH: Do you have some?

16 COMMISSIONER PADILLA: Sure.

17 CROSS-EXAMINATION

18 BY COMMISSIONER PADILLA:

19 Q. Mr. Bird, thank you for your time.

20 A. Sure. Thank you.

21 Q. I just have a couple of questions for you.

22 Looking at your Exhibit 11 and going back
23 to this turbulence that we spent some time on --

24 A. Uh-huh.

25 Q. -- you go from a 1.18 inches to 1.8125 inches

1 in those two diagrams. You talk a little bit about --
2 we've talked about the time to set quite a bit already,
3 but that obviously increases your time to set when you
4 increase your cement volume by 35, 40 percent?

5 A. It doesn't have to. It doesn't have to
6 increase your set time.

7 Q. How about cost?

8 A. Oh, of course it increases your cost.

9 Q. But as far as -- you're going to have to put
10 more additives in the cement?

11 A. You don't have to put more additives in it.
12 You have to put more volume.

13 Q. So that volume doesn't increase your set time?

14 A. No. No, it doesn't have to.

15 Q. Why not?

16 A. Well, it's the same cement. Now, you can
17 change the rheology of it. If you make it thinner, you
18 can -- it's easier to make it turbulent. Now, that will
19 increase your set time. So -- it'll also make it more
20 expensive. Won't necessarily make the cement better.

21 Q. By making it thicker?

22 A. By making it thinner. Thinner would increase
23 your turbulence.

24 Q. Right. Right. I think we're saying the same
25 thing.

1 A. Yeah, we are.

2 Q. With the three-string proposal, how much do
3 you -- how much detriment have you spent time again on
4 this turbulence? Do you think three strings, with that
5 loss of turbulence, would do to well integrity if you
6 have to say three strings but also say we're going to
7 say 2 inches from the annulus? Is that detrimental?

8 A. It is absolutely detrimental. If you don't
9 keep your awareness up, then you're going to -- you're
10 going to lose turbulence. And, of course, then you've
11 also increased your hole size unnecessarily, and you've
12 done all those other bad things, your unintended
13 consequences, your -- you know, more water to drill it,
14 more time, you know, more cuttings to dispose of,
15 more -- more carbon footprint, more diesel to drill it.

16 Q. I guess what I'm getting at is you can -- I
17 think you're degrading -- excuse me. You're degrading
18 the quality of the cement by adding that extra space.
19 Do you agree?

20 A. Yes. You gain nothing. And you -- if you
21 don't -- if you don't pay attention to what you're
22 doing, you are going to do a worse job.

23 Q. Okay. What is the temperature survey cost?

24 A. Oh, it -- you need to bid them, but --

25 Q. Ballpark.

1 A. -- 8- to \$1,200.

2 Q. So lot less than a CBL?

3 A. Much less than a CBL.

4 Q. So based on these numbers, Concho is drilling
5 these wells for about 48 grand a day all in?

6 A. Yeah, that's about right.

7 Q. Pretty -- pretty lean and mean these days?

8 A. We are TD'd in slightly under eight days.

9 Q. What does a well in this area complete AFE
10 generally go for?

11 A. \$2.7 million. That's fracked and everything.

12 Q. So if you're adding \$300,000 on to that, you're
13 well under 10, 11 percent?

14 A. Yes. The uncertainty is what --

15 Q. Does that put these wells out of economic
16 feasibility on the Concho drilling schedule?

17 A. No. But these have to compete with other
18 wells.

19 Q. I guess the cap X schedule is really where
20 it --

21 A. Yeah. And so if they were slightly better than
22 other wells and this puts them slightly under those,
23 then that money flows to those wells that it made them
24 slightly under. That's what happened. It flowed to
25 Wolfberry [phonetic; sic] or whatever.

1 Q. That's all I have. Thank you.

2 A. Thank you.

3 CROSS-EXAMINATION

4 BY COMMISSIONER BALCH:

5 Q. Good afternoon, Mr. Bird.

6 A. Hi.

7 Q. Following on Mr. Padilla's train of thought, a
8 quick calculation, if you're drilling eight-day wells,
9 that's 43 a year?

10 A. With one rig?

11 Q. One rig, yes. And if you're drilling 12-day
12 wells, you're looking at more like 30?

13 A. (Indicating.)

14 Q. That's an opportunity cost as far as being able
15 to develop resources?

16 A. (Indicating.)

17 Q. The drilling company, they don't care --

18 A. Yeah. There's --

19 Q. -- how many wells are drilled; they just care
20 how many days they're on a well?

21 A. Well, they want to be -- they want to be
22 competitive so that they get to stay. But yes, I see
23 your point.

24 Q. All right.

25 A. All things being equal, they're there the

1 same -- you know, if they're there all year, they're
2 there all year, whether they're on 30 wells or 40
3 something.

4 Q. So 40 times \$150,000, that's getting up to 8 to
5 \$10 million of extra drilling budget?

6 A. Uh-huh.

7 Q. In that Lakewood area, 12 oil wells, how many
8 gas wells?

9 A. For us?

10 Q. Uh-huh.

11 A. None.

12 Q. None.

13 And in the entire area, you testified over
14 300 wells probably you've drilled personally?

15 A. We aren't drilling any gas wells.

16 Q. Not oil and gas. Just wells. Doesn't matter.
17 Wells you've drilled for hydrocarbons in the Roswell
18 Artesian Basin.

19 A. Well, in what we call the shelf, I've drilled
20 over 2,000. But in this Lakewood area, it's between 2-
21 and 300.

22 Q. Okay. And I think you testified that you never
23 had a problem so bad you had to go to a third casing
24 string?

25 A. No.

1 Q. Except for when you were told to?

2 A. Except for that one well I was forced to.

3 Q. How about other operators? Do you have any
4 anecdotal evidence for Yates, or do you know of anybody
5 else?

6 A. No, not that they've had a problem that forced
7 them to go to three strings.

8 Q. And you say about 92 to 95 percent of the wells
9 you can circulate cement to the surface?

10 A. Yes.

11 Q. And the ones that don't, you --

12 A. We wanted to.

13 Q. You wanted to.

14 Any wells you had to give up or move on,
15 redirect?

16 A. No.

17 Q. You were able to fix all of them?

18 A. (Indicating.)

19 Q. That's all my questions. Thank you.

20 CHAIRMAN CATANACH: Any redirect?

21 MR. FELDEWERT: No, sir.

22 MR. OLSEN: No.

23 CHAIRMAN CATANACH: Okay. What's the
24 pleasure of the Commission?

25 MR. FELDEWERT: I have no further witnesses

1 at this point.

2 CHAIRMAN CATANACH: So you have,
3 Mr. Larson?

4 MR. LARSON: I have two. Mr. Bruce has
5 one. If I can confer with him -- are you going to
6 continue this afternoon?

7 CHAIRMAN CATANACH: I think that's what
8 we're trying to figure out.

9 COMMISSIONER PADILLA: Three total?

10 MR. LARSON: Yes.

11 (Pause in proceedings.)

12 CHAIRMAN CATANACH: Mr. Larson, what did
13 you come up with?

14 MR. LARSON: If we continue this afternoon,
15 we would call Mr. Mullen. Mr. Bruce would call his
16 witness tomorrow morning, and I would also call
17 Mr. Maxey tomorrow morning, again, depending how long
18 you want to go.

19 CHAIRMAN CATANACH: What is your direct on
20 your next witness?

21 MR. LARSON: I've been chastised before for
22 bad estimates. 20 to 30 minutes.

23 CHAIRMAN CATANACH: We have no witnesses
24 that need to testify and get out of here tonight or
25 anything like that? Travel restrictions?

1 MR. LARSON: Not for either of my
2 witnesses.

3 CHAIRMAN CATANACH: Okay. I think what
4 we're going to do is adjourn for this evening and try
5 and cast the three witnesses tomorrow. We don't have
6 to -- if we don't have time to deliberate tomorrow, we
7 can reschedule deliberations for another time. So
8 that's not critical. But it's critical that we finish
9 the case tomorrow. So if we should do that, I think
10 we'll be in good shape. I don't know how long
11 deliberations are going to take, so if we don't have
12 time, like I said, we can reschedule those for a later
13 time. So with that, I think we'll --

14 MR. FELDEWERT: Start at 8:00 tomorrow?

15 CHAIRMAN CATANACH: Yes, sir.

16 With that, I think we'll adjourn.

17 (Recess 5:00 p.m.)

18

19

20

21

22

23

24

25

1 STATE OF NEW MEXICO
2 COUNTY OF BERNALILLO

3

4 CERTIFICATE OF COURT REPORTER

5 I, MARY C. HANKINS, Certified Court
6 Reporter, New Mexico Certified Court Reporter No. 20,
7 and Registered Professional Reporter, do hereby certify
8 that I reported the foregoing proceedings in
9 stenographic shorthand and that the foregoing pages are
10 a true and correct transcript of those proceedings that
11 were reduced to printed form by me to the best of my
12 ability.

13 I FURTHER CERTIFY that the Reporter's
14 Record of the proceedings truly and accurately reflects
15 the exhibits, if any, offered by the respective parties.

16 I FURTHER CERTIFY that I am neither
17 employed by nor related to any of the parties or
18 attorneys in this case and that I have no interest in
19 the final disposition of this case.

20

21

22 MARY C. HANKINS, CCR, RPR
23 Certified Court Reporter
24 New Mexico CCR No. 20
25 Date of CCR Expiration: 12/31/2017
Paul Baca Professional Court Reporters

24

25