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STATE OF NEW MEXICO
OIL CONSERVATION COMMISSION
HEARING DAY 01

Agenda No. 11-23

Moderated by Dylan Fuge
Wednesday, November 8, 2023
9:09 a.m.

Pecos Hall Hearing Room
Wendell Chino Building, 1st Floor
1220 South Saint Francis Drive
Santa Fe, NM 87505

Reported by: James Cogswell
JOB NO.: 6304851

A P P E A R A N C E S

List of Attendees:

Dylan Fuge, Commissioner/Chair - Oil Conservation
Commission

Greg Bloom, Commissioner - Oil Conservation Commission

William Ampomah, Commissioner - Oil Conservation
Commission

Daniel Rubin, Attorney - Oil Conservation Commission

Darin Savage, Attorney, Abadie & Schill PC - Cimarex
Energy Company

Adam Rankin, Attorney - Colgate Production LLC,
Northwind Midstream

Jesse K. Tremaine, Attorney - Oil Conservation
Division

Dana Hardy, Attorney, Hinkle Shanor LLP - Targa
Northern Delaware LLC

Deana Bennett, Attorney, Modrall Sperling - Chevron

Earl DeBrine, Attorney, Modrall Sperling - Chevron

Cody Comiskey, Chevron

Bryce Taylor, Chevron

Jason Parizek, Chevron

Tom Merrifield, Chevron

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P R O C E E D I N G S

MR. FUGE: I'm going to call the meeting, the November 8th and 9th meeting of the New Mexico Oil Conservation Commission to order.

Welcome, everyone. This is the first meeting in a long time back in the Wendell Chino Building. We are in Pecos Hall. Still working on final tech filled out, but excited to be here.

Just wanted to cover a couple of administrative things because we're new and we're getting to the agenda. If you need to get onto the wi-fi, it's "NMEMNRD public." And the password is "security first," all one word. You will need a pop-up screen that says you agree to the terms and conditions and responsible use. But that should get you on the wi-fi.

For parties presenting cases, please log into the Webex meeting. That will enable you to share your material in the room on the large screen. With commissioners here and other -- I just ask that you mute your audio when you log in with those setups.

And then the last item -- and I'll bring this up a little closer to -- because of some family commitments, I have a very hard stop at five. So I will checking in with parties if we are

1 presenting testimony at four to just make sure we can
2 get through it within that hour. Otherwise, we'll
3 continue it to the next day. As everyone saw in the
4 notice, we made allowance for two days given that it
5 originally looked like this was going to be a
6 relatively large docket.

7 And with that, I'm going to send it
8 around to the first item on the agenda, which is
9 approval of the agenda for today.

10 And we'll see with my fellow
11 commissioners. Do you have any comments or changes to
12 the agenda?

13 DR. AMPOMAH: Did you read the roll
14 call already?

15 MR. FUGE: Oh, sorry. Forgot to do the
16 roll call.

17 Commissioner Ampomah.

18 DR. AMPOMAH: Present.

19 MR. FUGE: Commissioner Bloom.

20 MR. BLOOM: Present.

21 MR. FUGE: Let us reflect that the
22 entire Commission is present in person.

23 And then let's go to the agenda. Does
24 anyone have any comments on the agenda or changes?

25 DR. AMPOMAH: No.

1 MR. BLOOM: No. Mr. Chair, I move to
2 adopt the agenda.

3 DR. AMPOMAH: I second.

4 MR. FUGE: Let the record reflect the
5 agenda was adopted unanimously.

6 Have my fellow commissioners had a
7 chance to review the October 12, 2023, meeting
8 minutes?

9 MR. BLOOM: Yes. Mr. Chair, I move to
10 adopt the minutes.

11 DR. AMPOMAH: I second.

12 MR. FUGE: Let the record reflect that
13 the minutes from the October 12th meeting were adopted
14 unanimously.

15 And we will move on to our active
16 docket. We've got some prior cases set for status
17 conference and some new cases for status conference.

18 And I know from Commission Counsel and
19 Commission Clerk that there were some filings that
20 were made, you know, within the last 24 hours. So we
21 may, when your case is called up, just ask the party
22 to kind of walk through some of those in case we
23 didn't have a chance to get through all of the pieces.

24 But the first case that's up is Status
25 Conference in Case Number 23727, Application of Targa

1 Northern Delaware for Rehearing of Order R-13507-E,
2 and specifically a request that the Oil Conservation
3 Commission reconsider conditions included in Order
4 Number R-13507-E.

5 And from our last meeting, the parties
6 including the Division were potentially going to come
7 up with a sort of consensus or unopposed set of
8 condition revisions. So I'll turn it over to the
9 parties.

10 MS. HARDY: Thank you, Mr. Chair.

11 MR. FUGE: Please introduce yourself
12 for the court reporter.

13 MS. HARDY: Dana Hardy with Hinkle
14 Shanor on behalf of Targa Northern Delaware LLC.

15 MR. TREMAINE: Jesse Tremaine with Oil
16 Conservation Division.

17 MR. FUGE: Ms. Hardy.

18 MS. HARDY: Thank you.

19 MR. FUGE: What's the status of the
20 discussion regarding the order conditions?

21 MS. HARDY: We are still working with
22 the Division on the conditions. I suspect we'll be
23 able to reach an agreement. It's just a matter of
24 going back and forth a little bit more and making sure
25 that we have agreement on all the issues.

1 So I don't think we will need a status
2 conference. And I don't think we need a contested
3 hearing date. I think we can just reach agreement on
4 an exhibit that we would attach to propose order,
5 provided the Commission says that's acceptable.

6 MR. FUGE: That's acceptable to me.

7 Do my fellow Commissioners have any
8 other concerns?

9 DR. AMPOMAH: I'm not sure.

10 MR. BLOOM: Yeah. That works.

11 MR. FUGE: Thank you, Ms. Hardy.

12 MS. HARDY: Thank you.

13 MR. FUGE: The next case up, and it's
14 up for final status conference because it's been
15 kicking around the docket for a while, is De Novo
16 Case 21744. And you know, it's -- in the commission
17 records. It was going to be heard along with Case
18 Number 22018 and 22019. Can I have parties in those
19 cases appear?

20 MR. RANKIN: Morning, Chair. Morning,
21 Commissioners. Adam Rankin, appearing in this case on
22 behalf of Colgate and here to answer any questions.

23 MR. FUGE: Can you give us an update on
24 sort of the status of these cases and I believe a
25 filing that you made last night in the cases?

1 MR. RANKIN: Yes. And I don't know if
2 you want to let Mr. Savage also introduce appearance.

3 MR. FUGE: Oh, Mr. Savage, please go
4 ahead.

5 MR. SAVAGE: Yes. Good morning,
6 Mr. Chair, Commissioners, Counsel. Darren Savage with
7 Abadie and Schill appearing on behalf of Cimarex
8 Energy Company. And I assume you can see me as well
9 hear me?

10 MR. FUGE: Yes, I can.

11 MR. SAVAGE: All right. Thank you.

12 MR. RANKIN: Mr. Chair, good morning.
13 In this case, this case has been pending for some
14 time. It took me a little while to review fully the
15 convoluted procedural history here. There is a matter
16 before the Commission for de novo review. And that
17 case was brought by Cimarex seeking de novo review of
18 an order approving compulsory pooling for Colgate.

19 Parties have had a double hearing in
20 that matter addressing whether or not Colgate was
21 within its rights to proceed and pool Cimarex. That
22 order was entered before the Commission. I believe
23 it's 21629C.

24 Cimarex filed a Motion for Rehearing.
25 Upon the filing and briefing and arguments on that

1 Motion, the Commission issued a Revised Amended
2 Order 21629D. We, subsequently after some time that
3 that case was continued repeatedly Holland and Hart,
4 that entered appearance on behalf of Colgate I believe
5 in May of this year, substituted for counsel for
6 Colgate.

7 Parties have been in discussions since
8 we substituted, Mr. Chair. Mewbourne has filed a case
9 with the Division, Case 23688, in which it seeks to
10 revoke Colgate's order approving its compulsory
11 pooling and to pool itself some overlapping acreage
12 there.

13 So now we have a case pending before
14 the Division pursuant, I believe, to the Commission's
15 order that it should hear all these competing pooling
16 cases together. And that now is pending before the
17 Division. So Colgate has been in discussions with
18 Mewbourne trying to resolve that issue.

19 And that case is now before the
20 Division. It's set for a status conference on
21 November 16th's docket before the Division. So I'm
22 not sure exactly. I don't have an update on the
23 discussions there for you between Mewbourne and
24 Colgate. My hope is that we can get that resolved.

25 In the meantime, Mr. Chair, you are

1 correct. I did file a Motion to Reconsider the
2 Commission's decision to amend Order 21629C and
3 pointing out that in our view, there were some
4 fundamental errors in the Commission's decision
5 granting the rehearing and modifying Order 21629C.

6 So with that, we had filed that Motion.
7 And it is our hope that the Commission will reconsider
8 its track in this case. We believe that the
9 Commission has gotten a little bit off track in its
10 decision there. In light of that, I think you may see
11 more what's happening here, which is an application by
12 Mewbourne to revoke an order that's been in place for
13 more than two years. And we think that's a little bit
14 off course.

15 So with that, Mr. Examiner -- I
16 apologize -- Mr. Chair, I'll let Mr. Savage respond
17 with any questions or concerns he may have.

18 MR. FUGE: Mr. Savage.

19 MR. SAVAGE: Mr. Chair, thank you. I'm
20 glad that Colgate talked about perceived being off
21 course. We feel that the last-minute Motion -- this
22 status conference was designed and stated as the final
23 status conference. And we were expecting to have a
24 contested hearing date set. All the Motions, all the
25 competing applications have been approved and in

1 place, and they have moved from the Division to the
2 OCC for hearing.

3 Colgate had a substitution of Counsel.
4 That was on March 22, 2023. They have had eight
5 months. They have been in this proceeding for eight
6 months. They have never mentioned in any manner a
7 Motion to Reconsider. They have asked for a number of
8 continuances, which Cimarex has accommodated on every
9 occasion, although expressing our interest in having
10 an expedited, expedient hearing. We have accommodated
11 them, and then at the last minute here, the last 24
12 hours, they have filed a 23-page Motion to Reconsider.

13 Now, Mr. Chair, these issues that the
14 Motion addresses. I have not had a chance to fully
15 digest everything and analyze everything. But it
16 looks to me like these have been addressed thoroughly
17 by the Commissioners previously in the rehearing
18 setting. And they have made rulings.

19 And these rulings were pursuant to the
20 statute of limitations of Statute 7225, in which we
21 made an application for rehearing within the 20-day
22 limitation period. And we believe Colgate has not
23 abided by that statutory 20 days. They have waited
24 over eight months to file a final Motion.

25 We think that the minimum contested

1 hearing date should be set. We ask that we move
2 forward with these contested hearings based on
3 circumstances. Thank you.

4 MR. FUGE: Maybe a point of
5 clarification. Mr. Rankin, you referenced a case.
6 Mr. Savage suggested that all of the cases are done at
7 the Division with conditional orders up and, you know,
8 his position probably before the Commission.

9 You mentioned there was a Mewbourne
10 case that was set to go up before the Commission next
11 week for same acreage, overlapping acreage, related
12 acreage? Can you provide a little more color on what
13 that pending case is?

14 MR. RANKIN: Sure. The case is Case
15 Number 23638. It is set for a status conference
16 before the Division on November 16th. That case seems
17 to pool some of the acres at issue here. It overlaps
18 partially with the acreage subject to Colgate's order
19 that was on de novo review.

20 So I think potentially it has
21 complicated resolution of the competing pooling cases
22 that have been pending before the Commission.

23 MR. FUGE: So is it your position that,
24 setting aside your Motion that was filed -- but if it
25 was to go forward, that the Commission would need

1 23688 to go to order before we could hear the de novo
2 hearing if we decided to in this case?

3 MR. RANKIN: So Mr. Chair, when you
4 read the Motion for Reconsideration that we filed, we
5 do believe that there's a fundamental problem with
6 hearing Cimarex's competing pooling cases before the
7 Commission. The only matter before the Commission was
8 Colgate's Case Number 21744 and the order that was
9 issued by the Division, Order R21575.

10 But -- the Commission has authority.
11 Parties who are adversely affected have the right to
12 seek de novo review for matters that went before the
13 Division and were heard before the Division examiner
14 and are subject to a Division order. That's the case
15 with the Colgate matter.

16 The Commission fully heard that case as
17 a de novo matter and issued an order. So our view is
18 that, as to Mewbourne's case, which is now pending
19 before the Division, if the Commission were to take
20 that up for de novo, it would have to have an order at
21 the Division level first.

22 MR. FUGE: Mr. Savage, do you have a
23 response?

24 MR. SAVAGE: Yes. Since this is a
25 last-minute motion, we don't feel it's appropriate for

1 Mr. Rankin to be arguing this without us having the
2 opportunity to review and respond.

3 But Mr. Chair, it is correct that there
4 is a case pending by Mewbourne. I have talked to
5 counsel from Mewbourne. I don't believe he is here to
6 comment. But as I understand it, that's very close to
7 being settled by the parties.

8 In fact, they were trying to decide
9 whether or not even the case on November 16 was going
10 to go forward. And if it does go forward on November
11 16, I believe that if we do set a contested hearing
12 date that that case could be directly moved to be
13 included as a contested hearing on that particular
14 date, whatever the OCC decides to set.

15 And if it's resolved, which it looks
16 like it will be based on the conversations I've had,
17 then it would be a moot point. And so it wouldn't
18 impact the proceedings. Either way, I don't believe
19 it would impact the proceedings. I believe they could
20 be accommodated within the contested hearing date, or
21 it would be a moot point.

22 MR. FUGE: Looking to my fellow
23 commissioners if they have questions.

24 But maybe Commission Counsel, we got
25 the motion last night. I don't recall in our rules

1 what would be a normal opportunity to respond to a
2 party in it. Do they prescribe that?

3 MR. RUBIN: I don't know offhand if the
4 rules do. But it would be an abundance of caution to
5 allow a written response, I think the point with the
6 Counsel is well taken that we go and set -- the
7 Commission set a hearing, hear the motion. At that
8 onset of that hearing, there's nothing in the rules
9 that prevents that.

10 MR. FUGE: My fellow commissioners, any
11 questions on this one to the parties?

12 MR. BLOOM: No, Mr. Chair. But I did
13 not have an opportunity to review the materials that
14 were sent last night or yesterday. In addition, this
15 case has been frustrating. No.

16 As far as I knew, Mr. Rankin, you're
17 new to this. But I think in the past we've seen
18 moments where Counsel has struggled to even summarize
19 this case which has gone on for so long. So getting
20 up here and not being able to tell us where this is at
21 is frustrating as a commissioner. So I hope that this
22 is dealt with -- manner.

23 MR. FUGE: So Dr. Ampomah, do you have
24 any?

25 I mean, hearing the comments from the

1 Commission and advice from Counsel, Mr. Savage, and
2 arguments from both Mr. Savage and Mr. Rankin, we
3 would -- I guess I'd like to put forward a motion
4 directing Mr. Savage to file a response within two
5 weeks.

6 MR. RUBIN: Mr. Chair, the examiner for
7 today. Of course he came. It was 72-hours advanced
8 notice of the agenda. So this motion was not on the
9 agenda. All we have on the agenda for this matter is
10 the setting of a final hearing.

11 MR. FUGE: Fair.

12 I think to move this case along,
13 because it's been sitting for a while and we've got a
14 Motion, I say we put it for a final hearing. I'm
15 going to Motion to put it on the docket for a final
16 adjudicated hearing at the January 11th meeting.

17 I would just preserve for the record,
18 Mr. Savage, you have an opportunity to respond to
19 filings and other pieces. And the Commission,
20 consistent with its rules, will provide some guidance
21 how it's going to address those in subsequent agendas.

22 Is everyone comfortable with a
23 January 11th date between my fellow commissioners for
24 hearing this case?

25 MR. BLOOM: That will work.

1 MR. FUGE: And I think I can reiterate
2 what we've heard up here. We would like a resolution.
3 This case has been kicking around for a long, long
4 time.

5 Thank you.

6 MR. RUBIN: Mr. Chair, I think this
7 would be better to have a Motion. Is that fair?

8 MR. FUGE: Can I get a Motion to set --
9 let's read them out so we've got them. Can I get a
10 Motion to set De Novo Case 21744 and the associated
11 cases 22018 and 22019 for adjudicated final hearing on
12 January 11, 2024.

13 MR. BLOOM: Mr. Chair, I so move.

14 DR. AMPOMAH: Mr. Chair, I second.

15 MR. FUGE: Let the record reflect
16 Motion was approved unanimously.

17 MR. SAVAGE: Mr. Chair, if I may add an
18 additional comment, I would like to respond to the
19 Motion. Mr. Rankin has had months to review the
20 procedural history in the matters of this case. Could
21 I request three weeks as a time period to respond
22 instead of the two weeks that was mentioned?

23 MR. FUGE: I'm going to look at
24 Commission Counsel, but I think that the proceeding
25 was filed. On Motions, we typically consider filing

1 well in advance of the agenda at the next scheduled
2 hearing. So if you get your filing in prior to any
3 deadline there, that should be just fine.

4 MR. SAVAGE: Okay. Thank you.

5 MR. RUBIN: And we request that you
6 guys -- all arguments on the Motion if it's not on the
7 agenda.

8 MR. FUGE: Yes.

9 So that Motion just consistent with
10 practice is likely to be on the agenda for the
11 December 14th meeting. That would be clear when that
12 agenda comes out. Thank you.

13 I'm going to go to what I think it was
14 mooted by a subsequent filing, but I'm going to look
15 at Case Number 23942, Application of Avant Operating
16 LLC for Hearing De Novo of Case Numbers 23640 through
17 23645. And my understanding is that Avant made a
18 filing earlier that was a week withdrawing that
19 application.

20 MS. BENNETT: Yes. Good morning,
21 Mr. Chair and Commissioners. Deana Bennett on behalf
22 of Avant Operating LLC. And I did file a Motion
23 yesterday, I think it was, requesting dismissal of
24 this de novo application.

25 MR. FUGE: And I'm assuming that

1 request is uncontested?

2 MS. HARDY: Yes, Mr. Chair. Dana Hardy
3 for Colgate Production, and the request is
4 uncontested.

5 MR. FUGE: I think the request is
6 granted then.

7 MR. BLOOM: I'm sorry, Mr. Chair.
8 Which case number is this? The numbers get a little
9 jumbled.

10 MR. FUGE: Case Number 23942.

11 All right. Thank you.

12 MS. BENNETT: Thank you very much.

13 MS. HARDY: Thank you.

14 MR. FUGE: Next up is Case Number
15 23943, Application of Northwind Midstream Partners LLC
16 for Approval of Redundant Acid Gas Injection Well as
17 Required under Order Number R-20913 as Amended in Lea
18 County, New Mexico.

19 And can I have the parties appearing
20 for Northwind Midstream come up to counsel table?

21 Any other party entering an appearance
22 in this matter?

23 MR. TREMAINE: Jesse Tremaine for the
24 Oil Conservation Division.

25 MR. RANKIN: Mr. Chair, Commission,

1 Adam Rankin appearing on behalf of the applicant in
2 the case of Northwind Midstream.

3 MR. FUGE: Mr. Rankin, for purposes of
4 the status conference and scheduling, can you just
5 give us a brief overview of the filing and kind of a
6 high-level assessment of sort of anticipated hearing
7 time needed?

8 MR. RANKIN: Thank you very much,
9 Mr. Chair, Commissioners.

10 We have been in discussions with the
11 Division on that very matter. We have reviewed the
12 underlying orders that are subject to the proceedings
13 in this case. We filed an application to approve the
14 second AGI Number 2 in this case out of an abundance
15 of caution.

16 Having reviewed the orders, it's a
17 little bit ambiguous. It's a little unclear, but we
18 believe the Commission may have intended to authorize
19 the Division to approve the AGI Number 2
20 administratively. So we have prepared the Motion in
21 discussion with the Division to request clarification
22 and for the Commission to issue an order expressly
23 remanding the AGI Number 2 to the Division for
24 administrative approval.

25 And so essentially, that's where we

1 stand. We don't think it's necessary at this point,
2 unless the Commission disagrees, for this matter to
3 occupy time before the Commission. And we believe the
4 intent was potentially to remand to the Division for
5 administrative approval. This is in line with other
6 recent AGIs where the second AGIs were authorized by
7 an order in the Pinon and Meredith case where the
8 Commission expressly authorized the Division to
9 approve the second AGI administratively.

10 So with that, I'll pass it off to
11 Mr. Tremaine, who can discuss more directly the
12 Division's position on it.

13 MR. TREMAINE: Mr. Chair, I think I
14 agree with what Mr. Rankin said. There's in the order
15 section -- I don't have the order number up in front
16 of me right now. I apologize. But in the order
17 section, there is a reference to Division approval and
18 there's a reference to Commission approval. I have
19 consulted with the technical team, and the subsequent
20 ST108, for the reference, AGI well.

21 There's two technical changes to that.
22 One is that the surface swell location has moved 125
23 feet. And the second being that they've modified
24 their plan to drill through a zone that was
25 problematic for the previous as well.

1 So based on that review, it's the
2 Division's position that the Commission has already
3 essentially approved this well, and that there are
4 technical changes. So it is appropriate for
5 administrative review of this with one additional
6 clarification. The application was appropriately
7 styled because this well was originally conceived as
8 redundant to I believe it was AGI Number 1, which was
9 Devonian/Silurian well.

10 This is intended, the deeper injection
11 AGI. This one is intended to be the primary injection
12 well. And the DMG well is intended to be redundant or
13 a backup. It will be online first and utilized first,
14 but then at some point, it will be redundant to the
15 deeper injection AGI solely.

16 The application, like I said, was
17 appropriately styled because this has always been
18 called the redundant well. But the USC group wants to
19 clarify to the Commission that it is no longer the
20 redundant well. And so I think we can clarify that in
21 a proposed order submitted to the Division.

22 I have reviewed that proposed order,
23 and I think it's satisfactory. I'll make any final
24 recommendations to that, and I think the parties can
25 submit for admissions approval if the Commission's in

1 agreement that this is -- given the nature of the
2 modifications to the second AGI's C108 that it is
3 appropriate for administrative approval.

4 MR. FUGE: So it sounds to me, in
5 listening to the presentation of the parties, that
6 there may not be the need for a contested hearing in
7 this matter and that you are close to filing a sort of
8 joint order with the Commission, you know, resolving
9 this matter or at least positioning it appropriately
10 from the Division's and the applicant's perspective.

11 MR. RANKIN: Yes, Mr. Chair. We have
12 prepared a joint motion specifying or outlining the
13 specific language in the order that indicates the
14 intent potentially to authorize the applicant to
15 submit a C108 for the second well to the Division for
16 approval. And that's in Order 20913D, which has been
17 subsequently amended.

18 But those governing portions have
19 remained in full force and effect. And particularly,
20 you'll see Mr. Scherer [ph] -- and for the record I'll
21 cite to it. But there is a paragraph that
22 Mr. Tremaine referenced. It's ordering paragraph
23 number 1-E in that order. That states that "After
24 OCD's approval of the C108," then it goes on.

25 So the intent appeared to have been to

1 authorize the Division to administratively approve
2 that C108. So after further conferring with
3 Mr. Tremaine and the Division, we will likely be
4 filing a joint motion if that meets with the
5 Commission's approval, requesting that the matter be
6 referred to the Division for administrative approval.
7 And we will propose an order addressing that at the
8 same time.

9 MR. FUGE: Looking at my fellow
10 commissioners if they have any questions.

11 MR. BLOOM: No questions, Mr. Chair.

12 DR. AMPOMAH: No questions.

13 MR. FUGE: Based on the status report
14 from the parties, I don't see the need to set this for
15 hearing. And we will keep it on the docket waiting
16 for that joint motion, but I think that can be
17 resolved just on the papers. So we'll look forward to
18 that from the parties.

19 MR. TREMAINE: Thank you.

20 MR. FUGE: And that moves us through
21 our status conferences. And we now have two cases up
22 for adjudicatory hearing, 23686 and 23687.

23 I'm going to give a short ten-minute
24 recess for the parties to just reconfigure and set up,
25 because this will have witnesses and other components.

1 So I'm just going to put the line on mute but leave
2 the portal open and allow the parties to go.

3 And we will reconvene. Let's call it
4 12 minutes at 9:50.

5 (Off the record.)

6 MR. FUGE: Welcome back, everyone.
7 Next items up on the agenda, and these were both set
8 for adjudicatory hearing, Case Number 23686 and 23687.
9 My understanding is the same parties have entered
10 appearances in both cases. And I'm going to ask a
11 question, but I'm just confirming what it appears from
12 the primary statements and the like that the cases
13 will be presented together as opposed to jointly.

14 Then I'm going to look at Counsel for
15 Chevron first with that question.

16 MS. BENNETT: Thank you. Deana Bennett
17 on behalf of Chevron USA, and we do intend to present
18 the cases together in a consolidated fashion.

19 MR. FUGE: Can I have the parties in
20 the case who are entering an appearance just identify
21 themselves?

22 MR. TREMAINE: Jesse Tremaine for the
23 Oil Conservation Division.

24 MS. HARDY: Dana Hardy on behalf of
25 Mewbourne Oil Company.

1 MR. FUGE: Any other parties either in
2 the room or online entering an appearance?

3 Hearing or seeing none, Ms. Bennett,
4 you're on.

5 MS. BENNETT: Thank you very much.

6 Thank you all for being here. We
7 really appreciate the opportunity. Again, my name is
8 Deana Bennett. And I'm with Modrall Sperling law
9 firm. And I'm here with my colleague Earl DeBrine.
10 And we're here on behalf of Chevron USA, Inc. in these
11 two cases.

12 I did want to just say how great it is
13 to be back in person and in Pecos Hall. I might
14 stutter on the P a little, but it's great to be back.
15 Great to see people in person. Great to have the
16 opportunity to mingle with our colleagues again, so
17 very much appreciated.

18 Chevron and ourselves appreciate the
19 effort you made to present this two-well pilot project
20 to the Commission. And we look forward to a robust
21 discussion with the Commission and the other parties.

22 I do have a few logistical matters that
23 I wanted to talk to before we get started. And some
24 of that may involve the other parties as well in terms
25 of brief opening statements, and I'll get to that in

1 just a minute.

2 So first I did just want to kind of
3 introduce the Chevron team, if that's okay with the
4 Commissioners.

5 MR. FUGE: Yes.

6 MS. BENNETT: We have several people
7 from Chevron here, and I'll just run through that
8 quickly. And some of them are witnesses, and some of
9 them are not. So first, Cody Comiskey, Bryce Taylor,
10 Jason Parizek, Tom Merrifield, Fred Burner [ph], Ochi
11 Achinivu. And we might have some on the phone as well
12 on Zoom, but for now, this is the team that's present.

13 And this is just a handful of the team,
14 though, that worked on this. I just spoke with Cody
15 this morning, and he mentioned to me that over 24
16 subject matter experts have worked together in a
17 collaborative way to put together the presentation and
18 the people behind the project.

19 So the next thing I wanted to just
20 discuss is whether the Commission would like to swear
21 in our witnesses as they testify or as a group before
22 each one testifies.

23 MR. FUGE: Our practice has been to
24 swear them in as they testify. And we'll ask the
25 court reporter to administer an oath when they're

1 ready to go.

2 MS. BENNETT: Great. Thank you.

3 And then I mentioned this briefly to
4 several of the commissioners individually, but just
5 for the group's benefit, our pagination that we had
6 put on the exhibit packet that we prepared is likely
7 different than the pagination that appears to the OCD
8 filing system. And so we intend to use the references
9 to the OCD filing system, which is in the upper
10 righthand corner. And so as we're moving through the
11 exhibits, we'll be referring to that as the exhibit
12 number. And I did pass out hard copies of the exhibit
13 packets.

14 We did make some revisions to the order
15 of our witnesses yesterday, as well as some slight
16 revisions to the order of exhibits. And so what I
17 will do is refer to the exhibit number in the upper
18 righthand corner and wait for everyone to get to the
19 same page before we start talking about it. But there
20 will just be some little -- I'd say some ebbs and
21 flows in the PowerPoint as we move forward.

22 I did file the exhibits timely, and our
23 exhibit packet contains six tabs. And we'll walk
24 through each of those tabs with the Commission.

25 And with that, I think that is all of

1 the logistical items I had to discuss with
2 Commissioners, but I would like to have the
3 opportunity to present a brief opening statement. And
4 I understand that some of the other parties may like
5 the opportunity to do that as well. So I wondered if
6 the Commission is amenable to that.

7 MR. FUGE: I have no concern with that
8 approach, so go ahead, Ms. Bennett, and we'll let the
9 other parties go.

10 MS. BENNETT: Thank you very much.

11 So I have on the slide on the screen
12 the location, the map of this two-well pilot project
13 that Chevron is proposing and that we'll be discussing
14 today. And the Chevron witnesses will go into more
15 detail about the location of the map. But I did -- to
16 the location of the two wells before I started my
17 opening presentation.

18 So as I mentioned briefly, this is an
19 SWD pilot project. It's a two-well pilot project. So
20 Chevron is proposing two wells to target the DMG, so
21 shallow injection.

22 As I alluded to and you as you can see
23 from our team here today, Chevron has undertaken a
24 very extensive review of the surface and subsurface
25 seismic geological factors that are at issue here and

1 that OCD has raised in its materials as well. And
2 Chevron's been working on this project since 2021, so
3 this is a long time in the making to get to the
4 Commission.

5 Chevron has undertaken this
6 investigation of shallow disposable -- number of
7 reasons, primarily because of the need for additional
8 disposal options to address the high volumes of
9 produced water from the spring and volcanic
10 formations.

11 And the goal here is to come up with
12 disposal options that do not impair correlative rights
13 and that do prevent waste. So in the testimony you'll
14 hear today, the areas around these two pilot project
15 wells are not favorable for DMG production. The DMG
16 there is either depleted or the geology indicates a
17 low likelihood of unknown DMG reserves. So taking
18 into consideration correlative rates and waste, you'll
19 be hearing a lot of testimony about that today.

20 We'll also be talking about the low
21 potential for induced seismicity from these particular
22 shallow wells based on the geologic studies that the
23 Chevron witnesses have undertaken. And these wells
24 will also be protective underground sources of
25 drinking water.

1 So Chevron has presented this plan to a
2 number of stakeholders and a number of operators. And
3 the operators from whom Chevron has received feedback
4 are supportive of the project. In fact we submitted
5 several letters of support for the project in the
6 exhibits that we submitted.

7 So there are letters from Coterra, and
8 yesterday we submitted letters from OXY supporting the
9 project. We just received those letters yesterday.
10 And then Mewbourne, I understand from their
11 pre-hearing statement, is supportive of the project.
12 But I'll leave that to them to also discuss.

13 Chevron's also met with the New Mexico
14 State Land Office and the New Mexico OC.

15 So I'm going to skip some of these so
16 we can get to the meat of our presentation with the
17 subject matter experts. But I did just want to also
18 highlight that Chevron, you'll be hearing a lot about
19 data gathering and data analysis today, because that's
20 the key element of the pilot project.

21 Chevron intends and is proposing a
22 request data gathering system or protocol and then
23 intends to share that data with the Division and other
24 operators, not just in the spirit of transparency, but
25 in the spirit of collaboration to make sure that this

1 is a thoughtful approach to DMG disposal,
2 understanding that there are historic concerns about
3 DMG disposal. But Chevron's witnesses will address
4 that.

5 And just so we're all on the same
6 terminology, DMG is Delaware Mountain Group, just to
7 make sure. So that's that. And we'll have some
8 exhibits that show exactly where the Delaware Mountain
9 Group is within the geologic strata.

10 So Chevron is also proposing monitoring
11 programs to address any impacts to their rise to
12 correlative rights and waste. And so this is a
13 thoughtful, multidisciplinary approach to the request
14 to have this two-well pilot project approved by the
15 Commission.

16 And so with that, I look forward to the
17 discussion with the commissioners today and with the
18 Chevron witnesses. And we look forward to any
19 questions that the Division and Mewbourne may have for
20 our witnesses.

21 Thank you very much.

22 MR. FUGE: Mr. Tremaine?

23 MR. TREMAINE: Thank you.

24 This is Jesse Tremaine on behalf of the
25 Conservation Division. Good morning, Mr. Chair,

1 Commissioners.

2 The Oil Conservation Division
3 intervened in this case. And it does not oppose the
4 applications. But regarding the nature of the geology
5 and summarizing the Delaware Mountain Group, OCD
6 believes that certain safeguards for these wells are
7 required above and beyond what might be typical for
8 saltwater disposal wells that are injecting into other
9 zones.

10 We'll get to that in quite a bit of
11 detail once we get into the Exhibit 11 and 12. But
12 very briefly, as we've gotten in the pre-hearing
13 statement, OCD's concerns relate primarily to
14 projection of correlative rights, prevention of waste,
15 and identifying a very key need that Ms. Bennett has
16 already identified, the need for additional data
17 regarding injection into the DMG.

18 This is an area where I believe the
19 Commission will be informed today the geological
20 information and our understanding of the Delaware
21 Mountain Group is evolving over time. And there's
22 quite a bit of additional information that is
23 necessary and prudent prior to, you know, a rather
24 increased injection development within that zone.

25 The Oil Conservation Division will

1 present three witnesses today. First will be Brandon
2 Powell [ph], deputy director for -- Brushy Canyon.
3 Next, we will have Phillip Goetze [ph], the UIC Bureau
4 chief. Then we will have Mr. Million Gebremichael
5 [ph] testify.

6 We anticipate OCD's presentation taking
7 approximately an hour and a half. Try to stick to
8 that.

9 Basically, that's a brief outline of
10 OCD's concerns and where we're going with the
11 presentation. So I'll leave it there for now.

12 MR. FUGE: Ms. Hardy, do you have any
13 opening remarks you'd like to make on behalf of
14 Mewbourne?

15 MS. HARDY: Yes, thank you, very
16 briefly, Mr. Chair.

17 As set out in Mewbourne's pre-hearing
18 statement, Mewbourne's reports, Chevron's
19 applications, as long as appropriate conditions are
20 imposed on the injection and monitoring occurs to
21 ensure the protection of correlative rights.

22 And we did cite in our pre-hearing
23 statement the Commission and Division objection rule,
24 Rule 26, which requires that -- be maintained in such
25 a manner that allows the fluids to be confined to the

1 injection interval. So that's critically important
2 here to Mewbourne.

3 And in addition regarding OCD's
4 recommendations, Mewbourne fully supports OCD's
5 proposed procedures regarding the administrative
6 approval of DMGSTWD permits that are set out in OCD
7 Exhibit 11. Mewbourne believes these procedures will
8 minimize the risk of waste and protect correlative
9 rights.

10 Mewbourne also has some other
11 recommendations that I will ask OCD's witnesses about.
12 Really, they are that OCD seek the support of NMOGA,
13 its DMG disposal capacity reexamination workgroup, to
14 create a DMG type log and stratigraphic cross sections
15 to ensure consistent DMG layer picks across the basin
16 and also that OCD consider the requirement to perform
17 a new SRT test, a step-rate test, any time the tubing
18 diameter on the well is upgraded or additional DMG
19 preparations are added below the current disposal
20 interval.

21 So with the proposed conditions,
22 Mewbourne does support the applications. Thank you.

23 MR. FUGE: And I just want to check
24 before we go through just to make sure. I believe the
25 State Land Office entered an appearance, but I don't

1 see counsel for the State Land Office here or online.
2 But just want to open up that ask in case they have
3 opening remarks. Give a second.

4 UNIDENTIFIED SPEAKER: Mr. Jared Levy
5 [ph] will not be in attendance today.

6 MR. FUGE: Ms. Bennett, then. I'll
7 turn it over to you.

8 MS. BENNETT: Thank you very much.

9 At this time, I would like to call our
10 first witness, Mr. Cody Comiskey.

11 MR. FUGE: Can I have the court
12 reporter to administer an oath to Mr. Comiskey?

13 Think he's ready.

14 THE REPORTER: Will the witness please
15 raise your right hand.

16 WHEREUPON,

17 CODY COMISKEY,
18 called as a witness and having been first duly sworn
19 to tell the truth, the whole truth, and nothing but
20 the truth, was examined and testified as follows:

21 MR. FUGE: Thank you.

22 MS. BENNETT: Mr. Comiskey is lucky,
23 because he's going to be testifying for y'all twice.
24 So he is going to be giving an initial overview of the
25 pilot project and, like, the 30,000-foot view but as

1 well as some information on the detailed analysis that
2 has gone into this pilot project. And then he's going
3 to come back later in the day to discuss seismicity.
4 So you will be seeing him again later today.

5 EXAMINATION

6 BY MS. BENNETT:

7 Q So Mr. Comiskey, please state your name for
8 the record.

9 A Cody Comiskey.

10 Q And for whom do you work?

11 A Chevron.

12 Q And how long have you worked for Chevron?

13 A Four years.

14 Q What are your responsibilities at Chevron?

15 A So I'm a subservice advisor for Chevron's
16 primary business unit mainly focused on water disposal
17 operations planning, seismicity analysis, reservoir
18 modeling, engagement with various stakeholders,
19 regulators, academia. Things of that nature.

20 Q And what is your -- well, have you
21 previously testified before the Oil Conservation
22 Division or the Commission?

23 A No, I have not.

24 Q Have you previously testified before another
25 administrative body?

1 A Yes, I have.

2 Q And is that the Texas Railroad Commission?

3 A Yes, it was.

4 Q And were your credentials accepted as a
5 matter of record?

6 A Yes.

7 Q Can you provide a summary of your
8 educational background?

9 A I have a Bachelor's of Science degree from
10 Texas Tech University focused on geophysics and
11 tectonics. I graduated cum laude from Texas Tech. I
12 have a Master's of Science degree from Baylor
13 University in geophysics, earthquake seismology, and
14 crust tectonics and kinematics.

15 Q And do your responsibilities at Chevron
16 include a review of seismic review?

17 A Yes, they do.

18 Q And do your responsibilities include SWD
19 development and permitting?

20 A Yes, they do.

21 Q Before you worked at Chevron, where did you
22 work?

23 A Anadarko Petroleum Corporation.

24 Q And what did you do for Anadarko?

25 A Had a variety of roles. I worked in our

1 sales, shareholder development for a period of time.
2 I also worked in our global exploration group. I
3 worked in -- it was focused on West -- development
4 exploration, raw mechanics. I came back to work on
5 our global technology group. Started to focus on more
6 unconventional resource development technology,
7 production management, and then seismicity and water
8 management. That became more of a topic.

9 Q Thank you. Did you include a brief overview
10 of your qualifications as a resume in this matter?

11 A I did, yes.

12 Q And is that resume behind Tab E?

13 A Yes, it is.

14 Q Does your area of responsibility at Chevron
15 include the areas of Southeastern New Mexico?

16 A Yes, it does.

17 Q Does your area -- excuse me. Are you
18 familiar with the application that Chevron filed in
19 these two cases?

20 A Yes, I am.

21 Q Are you familiar with the saltwater disposal
22 wells that are the subject of the two applications?

23 A Yes, I am.

24 MS. BENNETT: At this time I'd like to
25 tender Mr. Comiskey as an expert in SWD development

1 and geophysics.

2 MR. FUGE: So recognized.

3 MS. BENNETT: Thank you.

4 BY MS. BENNETT:

5 Q Let's talk about your initial testimony that
6 we're about to go through this morning, setting aside
7 the seismicity testimony from later on today. What is
8 the purpose of your testimony this morning?

9 A So the purpose is to present an overview of
10 Chevron's view on water -- produce water management
11 optionality in the Permian Basin. We recognize that
12 there's a growing concern around produced water
13 management. See the rise in seismicity. Induced
14 seismicity has been attributed to -- to produced water
15 management as a growing concern amongst many.

16 So Chevron's view is looking at this pilot
17 program as a component of water optionality within the
18 state of New Mexico. To be able to continue to
19 develop the resources that are critical to the world,
20 doing it in an environmentally responsible manner, and
21 being forthcoming on information data about -- so that
22 everybody can understand, you know, the issues and
23 finally the opportunities that we have.

24 Q Great. And earlier today I mentioned that
25 Chevron's been working on this pilot project since

1 2021. Have you been working on the pilot project
2 since 2021?

3 A Yes, I have.

4 Q I have on the screen the location map of the
5 Chevron pilot project wells. Do you see that?

6 A Yes, I do.

7 Q And can you just briefly orient the
8 Commission to where the wells are supposed to be
9 located?

10 A So the Papa Squirrel well is in very
11 Southern Lea County, New Mexico close to the Texas-New
12 Mexico state border. And it's at Veritas 2 State
13 SWD 1 that's located Eddy County, again, proximal to
14 the Texas-New Mexico border.

15 Q And these wells, are they located within
16 development areas that Chevron has surface control
17 over?

18 A Yes, they are.

19 Q And actually, I meant to ask you before we
20 even got to this slide. But if you can briefly give
21 an overview of Chevron's operations and its presence
22 in the Delaware Basin?

23 A Absolutely. So the -- the map in the upper
24 left is just a broad Permian Basin map I think
25 everybody's probably familiar with. The bottom right

1 shows Chevron's acreage within the Permian Basin. So
2 we have a very large acreage position that Chevron
3 either operates or has -- has daily working interest
4 in. So we're very broad -- broad organization
5 operating in both Southeastern New Mexico, the Texas
6 portion of the Delaware Basin, and also the Midland
7 Basin as well.

8 Bottom right shows a forecast from our
9 report from 2020, second quarter of 2023, just showing
10 on a half sheet. And it's important to note that we
11 have a significant vested interest in the State of New
12 Mexico and are committed to the State of New Mexico
13 operating.

14 Q Thank you. So let's talk about why Chevron
15 chose these two specific locations for the pilot
16 wells. And again, this is on page 98 of the materials
17 and using the upper righthand corner pagination. So
18 page 98 of the materials.

19 If you can just briefly describe why Chevron
20 chose these two specific locations?

21 A So the two -- it shows two locations in
22 general. We want to accelerate our pace of learning.
23 So we know that geology does vary across the Basin.
24 And so one of the locations in the Papa Squirrel is
25 located in what you would call more of a core portion

1 of the Basin within the Delaware Mountain Group, the
2 DMG.

3 There's -- there's a tremendous amount of
4 shallow disposal just adjacent to it south along the
5 Texas-New Mexico border. The basin roughly produces
6 about 30 million barrels of water a day. And roughly
7 about 17 million of that are injected. And roughly
8 about 60 to 70 percent of that is injected just along
9 the state line. And so it's very practical then in
10 New Mexico.

11 As mentioned earlier, we have considerable
12 operations along -- along the -- within the Papa
13 Squirrel AOI. So it gives us a lot of leverage to
14 collect data. We also have existing service
15 facilities there that we can leverage. So it reduces
16 our service impact. We don't have to go out and build
17 new facilities to support this location.

18 The Severitas too is a little more on the
19 western edge of the Basin. So the -- the geology is
20 just different. And we'll -- we'll show those through
21 exhibits. It's a little shallower.

22 But again, some of the similar things.
23 There's a considerable amount of injection just to the
24 south of it in the Delaware Mountain Group. It's an
25 area where Chevron has also been drilling shallow

1 disposal wells in Texas and operating. And again, it
2 allows us to leverage our footprint from service
3 facilities we have already existing in the area as
4 well as operational synergies that we have.

5 Q Thank you. When you say existing service
6 facilities, are you talking about existing SWDs?

7 A Yes, I am.

8 Q And are those deep SWDs?

9 A Yes, they are.

10 Q So what I think you're getting at is that
11 you will be able to use some of those existing service
12 facilities for these SWDs rather than having to start
13 fresh?

14 A That's correct. Yes.

15 Q I think we talked about this a little bit,
16 about why there's a need for SWDs generally, which is
17 for disposal options. But why is there a need, in
18 your opinion, for Delaware Mountain Group SWDs?

19 A So through the last several years, there's
20 been a considerable rise in the number of earthquakes
21 associated with deep disposal. In -- in Southern New
22 Mexico, most of the disposal is deep.

23 And so looking at optionality, if we have
24 concerns on deep disposal longevity, continuing to
25 face a large amount of produced water, shallow

1 disposals, one of the options we're looking at to be
2 able to continue to develop the resources but also
3 mitigate the potential concerns around seismicity.

4 Q One thing I meant to ask you earlier about
5 is that these wells are not proposed for commercial
6 wells; right? These are just for Chevron's use?

7 A That is correct, yes.

8 Q I mentioned earlier that Chevron has been
9 assessing the viability of these pilot projects since
10 2021, and you've been involved in that assessment?

11 A That's correct, yes.

12 Q And can you briefly restate or in your own
13 words state for the Commission what that assessment
14 has taken into consideration?

15 A It's taken to further review both surface
16 and subsurface considerations. Looking at the geology
17 in the area. Broadly speaking, looking at the
18 geology, looking at some of the reservoir parameters,
19 looking at opposite operations, looking at own
20 operations in areas again where you can, you know,
21 actively collect more data that we have control over
22 instead of having to work in a field with maybe 20 or
23 30 operators within an area that limits our ability to
24 kind of have control.

25 Again, leveraging our service facilities as

1 much as we can to reduce any more service impact and
2 -- and areas where we have future operations, so we
3 can leverage the wells for use as well. So taking a
4 multitude of considerations into account was -- was
5 kind of a driving factor for these two locations. So
6 it's a -- it's a hybrid of multiple factors that went
7 into selection.

8 Q And as part of your proposals, have you met
9 with other operators in this area?

10 A Yes, we have.

11 Q And what has been the response of the other
12 operators?

13 A As noted, we received positive feedback from
14 a few operators who have issued support for this pilot
15 program. Late last year, there was a DMG working
16 group that I believe was mentioned earlier that was
17 stood up and had numerous companies to operate the
18 state of New Mexico.

19 And we presented our plan for the pilot
20 program back in I believe March of -- of this year on,
21 you know, leveraging, going through the work that
22 we've gone over to look at these locations.

23 And believe the feedback was positive in our
24 ability to not only accelerate our learning as an
25 industry, provide data publicly, collect a lot of

1 information to accelerate our learning for some of the
2 issues. But the -- but the feedback was positive from
3 the industry group that has been working on this.

4 Q Is part of the reason that you -- or I
5 understand from speaking with Chevron that there was
6 an earlier working group that had expressed that the
7 OCD and OCC should take greater care when considering
8 disposal in the Delaware Mountain Group. Are you
9 familiar with that working group?

10 A I am familiar with it, yes.

11 Q And what is your understanding of that
12 working group's goal or recommendations?

13 A My understanding is that group was -- was
14 looking at, you know, the -- the potential impacts
15 from Avalon and -- and Brushy Canyon production
16 potentially associated with -- with shallow disposal
17 impacts.

18 And -- and I believe the -- the view of the
19 group was to, again, look at more care for permitting
20 future disposal wells within -- within an area that
21 was established, noted as DMG restricted area or DMGRA
22 that -- that was established. I think most people are
23 aware of.

24 But I think the view of the group was not
25 necessarily to ban shallow disposal but to look at

1 additional data and more care provided on permitting
2 process and execution of such wells.

3 Q And has that been kind of your driving force
4 is to exercise that care and gather the additional
5 data to demonstrate that disposal within the DMGRA is
6 appropriate under certain circumstances?

7 A Yes. Chevron -- Chevron is committed to --
8 to safely operating and acquiring a multitude of data,
9 disseminating it to -- to everybody, to -- to the OCD,
10 to industry, for us to learn about the potential risk,
11 be able to monitor, educate ourselves on more dynamic
12 nature to support future operations.

13 Q Let's see. I think we've talked a lot
14 about the Permian produced water reduction, so I'm
15 going to skip some of those questions. But I did want
16 to ask you about Chevron's use of recycled water and
17 why recycling the produced water isn't the solution.

18 A So as I mentioned, the Basin roughly
19 produces about 30 million barrels a day roughly of
20 produced water. You know, Chevron, within its
21 operations, recycles as much produced water as it can
22 through further operations.

23 However, there's just more produced water
24 than we can recycle. And so the delta is -- is mainly
25 taken to disposal wells for -- for disposals. And in

1 New Mexico today, there's roughly about a 3 million
2 barrel a day imbalance from produced water.

3 So based on the oil production in the
4 injected water in Southeast New Mexico, there's
5 roughly about a 3-million-barrel delta, and most of
6 that water is moving across the state line into Texas
7 to be disposed.

8 Q One of the things you and I have talked
9 about in the past is the potential implications of the
10 water being transmitted or being transported into
11 Texas and how that can potentially impact New Mexico
12 oil and gas operations.

13 A Yes.

14 Q Could you provide a little more detail on
15 that? Or did you just do that?

16 A I believe I just did.

17 Q And then so earlier a moment ago, Counsel
18 for Mewbourne mentioned the OCD Exhibit 11. And have
19 you reviewed OCD's Exhibit 11, which is --

20 A Yes, I have.

21 Q And do you feel comfortable that Chevron's
22 applications are consistent with the conditions of
23 approval in OCD's Exhibit 11?

24 A Yes, I am.

25 Q And has Chevron, in your opinion, undertaken

1 the analysis that would support a careful review of
2 whether these two type wells are appropriate for
3 disposal in the DMG?

4 A Yes, I do.

5 Q In your opinion is the Papa Squirrel SWD
6 Well Number 1 appropriate for disposal in the DMG?

7 A Yes, I believe so.

8 Q And in your opinion, is the Severitas 2 SWD
9 Number 1 appropriate for disposal in the DMG?

10 A Yes, I believe so.

11 Q Based on the work that you and your team
12 have done and that we'll hear about more later today,
13 do you think that the pilot project will negatively
14 impact correlative rates?

15 A No, I do not.

16 Q And based on your analysis and Chevron's
17 analysis, do you think that the project will result in
18 waste?

19 A I believe not.

20 Q Do you think that the risk of waste is -- I
21 know that other witnesses will talk about this a
22 little bit more. But is the risk of waste and the
23 protection of correlative rights even more evident
24 here because of the lack of DMG offset producers in
25 these two areas?

1 A Can you state --

2 Q Sure. So if part of the concern is the
3 potential impact on DMG producers, has Chevron
4 undertaken a review of the impact on DMG producers in
5 the area?

6 A Yes, we have.

7 Q And is Chevron's conclusion that these two
8 pilot projects or these two wells would not negatively
9 impact those DMG producers within the area of the --

10 A Yes.

11 Q Have Chevron considered whether its shallow
12 disposal will impact drilling and completion at a
13 deeper strata?

14 A Yes, we have.

15 Q And will there be a witness who will testify
16 about that later?

17 A Yes, there will be.

18 Q So before we move onto our next witness,
19 I'll open you up for questions from the other lawyers
20 and the Commission. Do you have any final takeaways
21 that you want to say about the pilot project since
22 you've been working on it for so long, and it's sort
23 of your baby?

24 A Yes, I do. This is -- this is part of a
25 broader position from Chevron looking more optionality

1 in produced water. The amount of water again that's
2 produced on a daily basis in the Permian is unlike any
3 other unconventional plate ever in the history of oil
4 and gas. And it poses unique challenges that faces
5 everybody in this room.

6 So one of the components of Chevron's
7 approach on -- on environmentally safe produced water
8 management is the expansion of optionality within not
9 on the state of New Mexico but across the Permian.
10 And one component of that is re-looking at shelves
11 within Southeast New Mexico.

12 We feel that these locations provided an
13 opportunity for not only Chevron, the industry, the
14 OCD and everybody involved to learn about potential
15 consequences and concerns, understand those,
16 understand the opportunities that could be there that
17 will allow for development of the resource within the
18 state of New Mexico and across the Permian to support,
19 you know, the -- the -- of that.

20 MS. BENNETT: Thank you. Those are all
21 the questions I have for you at this time. And I open
22 the floor for other questions from the Commission or
23 other counsel.

24 MR. FUGE: Mr. Tremaine, do you have
25 any cross?

1 MR. TREMAINE: I do have a couple
2 questions. Thank you.

3 EXAMINATION

4 BY MR. TREMAINE:

5 Q So I believe during your testimony, you
6 stated that this pilot project was considered kind of
7 a broader view of development of injection activity in
8 the DMG. Is that a fair assessment?

9 A Yes.

10 Q If this pilot project is successful, what's
11 the scope of Chevron's anticipated injection
12 development within the DMG in this area?

13 A I think with that, our scope is -- is going
14 to be tactical. It's going to be "What does the data
15 tell us?" From -- from future projects, when we look
16 at these, really, it's a case-by-case basis. We look
17 at these in review of all the technical information
18 and also too our -- our pace of development,
19 locations, many different factors.

20 But we look at this as a key component to
21 understanding what our -- the future of produced water
22 management may look like. But we are utterly
23 dependent on "What does the data tell us operationally
24 from the subsurface, from the facilities, which we'll
25 speak to later, how they can maybe potentially be

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1 expanded upon down the road given the information is
2 disseminated and reviewed in a proper manner.

3 Q Thank you. I believe that you mentioned
4 that Chevron performed a review of potential impacts
5 on current production within this area; right?

6 A Yes.

7 Q Did you look at potential future production,
8 or did Chevron focus on current, existing production
9 within the area?

10 A We looked at both. We looked at existing
11 legacy production what's in the area and also a
12 geological review that could lead to future production
13 areas as well.

14 Q So is it my understanding then that that
15 Chevron review of production in the area -- well, how
16 would you describe a future potential production in
17 the area potentially impacted by this development?

18 A So we looked at the different benches that
19 could -- that potentially are productive. We looked
20 at a geological review that'll be -- that'll be talked
21 on more in future testimony on, you know, geological,
22 you know, ingredients, which could lead to future
23 development, obviously historical development, things
24 like that. But that will be discussed in the -- in
25 future testimony.

1 Q And just one other topic really quickly. It
2 sounds like you've had an opportunity to review OCD
3 Exhibits 11 and 12; correct? Administrative approval,
4 processing conditions, and the separator tests. You
5 may get to this later, but does Chevron have any
6 specific concerns for items to address in those
7 exhibits?

8 A Yes, we do. And I -- I believe we will
9 address those questions later in some other testimony,
10 but we do have a few questions we would like to ask.

11 MR. TREMAINE: I'll reserve the
12 questions then. Thank you.

13 MR. FUGE: Ms. Hardy, do you have any
14 questions for the witness?

15 MS. HARDY: I don't at this time. I
16 expect to have some questions for Mr. Comiskey on the
17 seismicity testimony, but I have no questions right
18 now.

19 MR. FUGE: Looking at my Commissioners,
20 Dr. Ampomah, do you have any questions for the
21 witness.

22 DR. AMPOMAH: Yeah, a quick one.
23 So can you clarify the use of the word
24 "pilot"?

25 MR. COMISKEY: Yes.

1 DR. AMPOMAH: And the application.

2 MR. COMISKEY: So I think when we --
3 that's a great question. Thank you, Commissioner, on
4 that. Think the -- our view on a pilot project is
5 that, you know, we're acquiring a lot of data that's
6 not normally acquired in -- in DMG wells. I would
7 argue this is probably one of the most science DMG
8 disposal permit in the Basin.

9 So from that perspective, we look at
10 these as -- as an opportunity to learn. We look at
11 these as -- as just like any other disposal well, as
12 an opportunity to dispose as well. But from the pilot
13 perspective and the way we voice this to not only to
14 the OCD or the State Land Office but to industry is we
15 want feedback. We want to be able to -- to
16 incorporate that from a broad perspective and include
17 that in our operations.

18 And so that's kind of a -- a typical --
19 that's atypical from a traditional development plan,
20 which is very, you know, thought out and executed.
21 This is something that -- that I think we're going to
22 have a little more flexibility on. So that that's
23 kind of where the pilot is coming from.

24 DR. AMPOMAH: So your testimony talked
25 about how Chevron talked to multiple counties in the

1 area and they received approval. So with their
2 concerns, some of the written social reason how you
3 were able to address those?

4 MR. COMISKEY: Yes, there -- there were
5 concerns. We did have a few protests on those wells,
6 which we've -- they've been dropped and removed
7 through the ongoing discussions. And I think the
8 biggest thing from our perspective is we want to be
9 open. We -- we're collecting a lot of data.

10 We recognize there's concerns.
11 Obviously, there's been historical testimony. It's
12 been presented as exhibits and something that Chevron
13 was -- was involved in. We're not shying away from
14 those, so we recognize there's concerns.

15 But we also recognize this is an
16 industry issue. Produced water management is not just
17 a Chevron issue. This is an industry issue. So we
18 need to work together. And so we look at this as an
19 opportunity for us to, you know -- we're going to put
20 capital in these projects.

21 We're going to take data, collect data,
22 provide it, and we hope through this and through the
23 ongoing through the New Mexico work group that was
24 mentioned earlier, that we can collectively work
25 together to understand any issues, understand

1 opportunities, things like that. So that's -- that's
2 something we'll find out.

3 DR. AMPOMAH: My last question will be
4 I just want to know if these two proposed wells are
5 the area where the -- more or less after the data as a
6 protected area.

7 MR. COMISKEY: These wells are within
8 the area, yes.

9 DR. AMPOMAH: Thank you, Mr. Chair.

10 MR. FUGE: Mr. Bloom?

11 MR. BLOOM: No questions at this time,
12 Mr. Chair.

13 MR. FUGE: I had a couple questions I
14 wrote down, but I think you already covered them when
15 you talked about seismicity, so I'll reserve to there.

16 I did have two, though, other
17 questions. You indicated that one of the reasons why
18 you chose this location is for Chevron's interest in
19 the area. What proportion of the area around, meaning
20 surface and subsurface, does Chevron currently
21 control?

22 MR. COMISKEY: Which area?

23 MR. FUGE: Around the Severitas and
24 Papa Squirrel wells.

25 MR. COMISKEY: I don't know off the top

1 of my head what percentage. I know that we operate
2 production wells in the Avalon and the Wolfcamp below
3 the Papa Squirrel location. And we operate production
4 wells and -- and the Bone Spring Wolfcamp below the
5 Severitas location. So both those sections, Chevron
6 operates and has -- has license to operate. And those
7 are lease agreements to operating those.

8 So within the sections, a hundred
9 percent. But I don't know within the -- within the
10 area the exact percentage. I -- I think we have a few
11 slides open a little further that will show a little
12 bit more detail.

13 MR. FUGE: Did I hear correctly that
14 Chevron is the owner of some DMG offset wells in the
15 area around Papa Squirrel and Severitas or?

16 MR. COMISKEY: We are and -- and we are
17 in the case of the Severitas.

18 MR. FUGE: And then I think building
19 off Commissioner Ampomah's questions about the pilot
20 nature, maybe I'll provide a little context for my
21 question. When thinking about pilots and other
22 pieces, are there any dates proposed in Chevron's
23 application to either come back into the Commission or
24 others to revisit what you're learning about? Or is
25 this a standard kind of 30-year term SWD permit with

1 the feedback?

2 MR. COMISKEY: No, it is not a standard
3 30-year term permit. We have -- and I will speak to
4 in -- in my later testimony on -- on response
5 framework that was developed with support of the
6 working group on -- on signpost on data dissemination.
7 We -- we hope to have ongoing engagement with the OCD
8 and industry on this as we collect and learn
9 information. So we hope this will be very open-ended
10 and -- and very collaborative.

11 MR. FUGE: I don't think there are any
12 other further questions from the Commission, so you
13 may be excused. Thank you.

14 MS. BENNETT: Thank you.

15 MR. FUGE: All right. Call your next
16 witness.

17 MS. BENNETT: Thank you. I'd like to
18 call Mr. Tom Merrifield.

19 MR. FUGE: Can I ask the court reporter
20 to swear in Mr. Merrifield?

21 THE REPORTER: Will the witness please
22 raise their right hand?

23 //

24 //

25 //

1 WHEREUPON,

2 TOM MERRIFIELD,

3 called as a witness and having been first duly sworn
4 to tell the truth, the whole truth, and nothing but
5 the truth, was examined and testified as follows:

6 MR. FUGE: Thank you.

7 Proceed.

8 MS. BENNETT: Thank you.

9 EXAMINATION

10 BY MS. BENNETT:

11 Q Mr. Merrifield, would you please state your
12 full name for the record?

13 A Yes. My name is Tom Merrifield.

14 Q And where do you work?

15 A I work for Chevron.

16 Q And how long have you worked for Chevron?

17 A Eleven years.

18 Q What are your responsibilities at Chevron?

19 A My primary -- primary responsibilities for
20 Chevron are to assist in permitting saltwater disposal
21 wells, to plan saltwater disposal wells, and to
22 execute saltwater disposal wells, and primarily in the
23 Delaware Basin, which includes Southeast New Mexico.

24 Q And so your responsibilities include
25 designing SWD, saltwater disposal wells?

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1 A That is correct.

2 Q And operation of saltwater disposal wells?

3 A That is correct.

4 Q And have you previously testified before the
5 Oil Conservation Commission or the Oil Conservation
6 Division?

7 A No, I have not.

8 Q Did you provide a resume with your
9 materials?

10 A Yes, I did.

11 Q And is that behind Tab E?

12 A Yes.

13 Q If you could, could you briefly summarize
14 your educational background for the commissioners?

15 A Yeah. I have a Bachelor of Science degree
16 from Texas A&M in geology, and I have a Master of
17 Science degree from Southern Illinois University at
18 Carbondale.

19 Q And you mentioned that you worked at Chevron
20 for 11 years. Where did you work before Chevron?

21 A Various places. I worked in the water
22 resource, you know, sector for approximately 16 years.
23 I've also worked in the Permian Basin previously for
24 ARCO as well as Exxon. And I've worked -- I also did
25 work somewhat with the Hershey building program for

1 about six years.

2 Q One of the things you and I talked about a
3 bit when we were talking about your professional
4 experience was the number of UIC wells that you've
5 been involved with in terms of design, permitting,
6 operation. If you had to guess, what is the number of
7 UIC wells that you've been involved with?

8 A Just for clarification, I worked for oil and
9 gas at UIC wells. I've worked both water flood as
10 well -- as well disposal wells. And somewhere in the
11 order of a hundred.

12 Q And again, that's both water flood DOR wells
13 and SWDs?

14 A That's correct.

15 Q If you were to limit that to just saltwater
16 disposal wells, about how many saltwater disposal well
17 projects would you say you worked on?

18 A About 20.

19 Q So your background, you've done a lot of
20 work with saltwater disposal wells and other injection
21 wells? Is that a fair statement?

22 A Yes.

23 Q Does your area of responsibility at Chevron
24 include the areas of Southeastern New Mexico?

25 A Yes.

1 Q Are you familiar with the application that
2 Chevron filed in these matters?

3 A Yes.

4 Q Have you been working with Chevron on this
5 particular project since 2022?

6 A Yes.

7 Q And are you familiar with the wells, then,
8 that are the subject of the applications?

9 A Absolutely.

10 MS. BENNETT: At this time I would like
11 to tender Mr. Merrifield as an expert in UIC
12 terminating and operation matters and petroleum
13 geology.

14 MR. FUGE: The witness is so
15 recognized.

16 MS. BENNETT: Thank you.

17 BY MS. BENNETT:

18 Q So I'm going to start sharing my screen
19 again, and we'll start with the applications that
20 Chevron submitted to matters. So Mr. Merrifield,
21 before I turn to the applications, though, what is the
22 purpose of your testimony today?

23 A Really to just kind of walk through the C108
24 application first. Also to touch on the geology of
25 the injection intervals and how favorable they are --

1 and also to address some of the -- their indicators of
2 the likelihood of DMG reserves in -- in both of these
3 areas.

4 Q Great. So let's start with the discussion
5 of the C108s. Are the C108s included with the
6 applications that I filed on Chevron's behalf?

7 A Yes.

8 Q And turning to Tab A, which is at page 3 of
9 267, does that look to you like the application that I
10 filed along with the C108 that you provided to me to
11 include with the application?

12 A Yes, it does.

13 Q And Tab A is the application in Case 23686
14 for Papa Squirrel; is that right?

15 A Yes.

16 Q And Tab B is the application in Case 23687,
17 which is for the Severitas well?

18 A Yes, it is.

19 Q Did you compile the materials? Well, let's
20 focus on Papa Squirrel for a moment.

21 A Sure.

22 Q Did you compile the materials that were
23 submitted as the Papa Squirrel C108?

24 A Yes.

25 Q And did you submit that material to me?

1 A Yes, I did.

2 Q And in your opinion, does the C108 for the
3 Papa Squirrel well include all of the information and
4 documentation required by the C108 and by the
5 Commission?

6 A That was my understanding, yes.

7 Q Did you review OCD's, the Oil Conservation
8 Division's pre-hearing statement in this matter?

9 A Yes.

10 Q And did you see in the OCD's pre-hearing
11 statement where the Division noted that the C108s
12 comply with the current construction? Or the well
13 bore side, I should say, comply with current standards
14 for UIC Class 2 well?

15 A Yes, I did see that.

16 Q And did you see where both the wells were
17 designed for the area of review to be adequate?

18 A Yes, I did see that.

19 Q So with that initial stamp of approval --
20 although I'm not trying to go too far with what OCD
21 said in its pre-hearing statement. But I think that
22 does narrow our inquiry a bit and discussion on C108.
23 So with your permission, I'd like to go through the
24 C108s rather quickly.

25 A Okay.

1 Q So did Chevron submit a map that identifies
2 all wells within 2 miles of the Papa Squirrel well?

3 A Yes.

4 Q And is that Attachment 1 to the C108?

5 A Yes.

6 Q Did Chevron attach data within the AOR, so
7 the area of review for the wells, if there are any,
8 which penetrate the proposed injection zone?

9 A Yes.

10 Q And was that Attachment 2?

11 A Yes.

12 Q And in your materials, is there a plugged
13 well within the AOR for Papa Squirrel?

14 A Yes.

15 Q And did you submit the plugging information
16 from the well files?

17 A Yes.

18 Q Did you include information regarding the
19 requirements for showing how much volume or the daily
20 rate of injection and the proposed pressure?

21 A Yes. The operational part, yes.

22 Q And I just want to take a quick look at
23 that. That's Attachment 3; right?

24 A Yes.

25 Q And so on Attachment 3 for Papa Squirrel,

1 what maximum rate of injection or barrels of water per
2 day is Chevron requesting in the application?

3 A For Papa Squirrel, 20,000 barrels a day.

4 Q And what is the average daily rate?

5 A 15,000 barrels per day.

6 Q And what is the max permit pressure that
7 Chevron is seeking for Papa Squirrel?

8 A 125 psi.

9 Q And how about the average pressure?

10 A 750 psi.

11 Q Thank you. Did you submit geologic data
12 with your C108s?

13 A Yes, I did.

14 Q And is that Attachment 4?

15 A Yes, it was.

16 Q Did you provide information on the proposed
17 stipulation program?

18 A Yes, I did.

19 Q And is that Attachment 5?

20 A Yes, it was.

21 Q Did you provide logging and test data on the
22 well?

23 A Yes, I did. But this well has not been
24 through -- what I -- what I showed in that -- just in
25 that attachment was what we were planning to -- what

1 kind of data we were going to gather after an oil
2 spill.

3 Q So because it is not an existing well, no
4 wells have been run. But this Attachment 6 does show
5 some of the logging that Chevron is proposing to do?

6 A Yes, it does.

7 Q So I'm just going to skip Attachment 7.
8 There were no wells within the area of review for Papa
9 Squirrel; is that right?

10 A Yes.

11 Q Attachment 8 is what I call in shorthand the
12 affirmative statement. And it's an affirmative
13 statement signed by you; is that right? Is that your
14 signature?

15 A Yes.

16 Q And did you submit the statement saying that
17 you, on behalf of Chevron, had examined the available
18 geologic and engineering data, and you found no
19 evidence of open faults or other hydrologic
20 connections to underground sources of drinking water?

21 A Yes, I did.

22 Q And that's based on your review of the
23 materials?

24 A That's correct.

25 Q And is that still your conclusion today that

1 there is no connectivity? Or you have not found any
2 connectivity?

3 A Yes.

4 Q Let's turn to the Severitas C108. And I'm
5 not going to walk through that in any level of detail
6 except to ask you about the rates and pressure. But
7 did you provide all of the same information for the
8 Severitas C108?

9 A Yes, I did.

10 Q And if we turn to page 66 of 267, which I'm
11 showing on the screen, is that the operational data
12 information that's required by the C108?

13 A Yes, it is.

14 Q And what is the maximum rate that Chevron is
15 requesting for the Severitas 2 state well?

16 A 15,000 barrels per day.

17 Q And what is the average daily rate?

18 A 12,500 barrels per day.

19 Q And Chevron is requesting lower psi, is that
20 right, for this well?

21 A Yes, it is.

22 Q And what is the max pressure that Chevron's
23 requesting?

24 A 468 psi.

25 Q And the average pressure?

1 A 400 psi.

2 Q Did you prepare an affirmative statement for
3 the Severitas well as well regarding the evidence of
4 open faults or other hydrologic connections to your
5 SDWs?

6 A Yes, I did.

7 Q And is that Attachment 8?

8 A Yes, it is.

9 Q If you could just read this last paragraph
10 here, starting with "Both the Papa Squirrel"?

11 A Okay. "Both the Papa Squirrel 781 and the
12 Severitas 2 State SWD 1 are -- are locations which we
13 find" -- excuse me.

14 Q Yeah, I know. It's so small.

15 A "Find no indication of open faults at the
16 surface or in the subsurface. No indication of
17 hydrologic connection between the proposed injection
18 zone, Bell Canyon and Cherry Canyon, and the
19 underground source of drinking water. Both locations
20 have low potential for offset and reduce substance."

21 Q Thank you. And is that still your
22 conclusion today for both wells?

23 A Yes, it is.

24 Q Are you familiar with the stimulation
25 program that Chevron is proposing for these two wells?

1 Or is that a question better for someone later in the
2 day?

3 A I'm familiar with it enough to answer a
4 brief statement on it. But yes, there is someone else
5 later today that can address that more -- more.

6 Q Well, let's start with you. And if we need
7 to defer, we can. So have you looked at the OCD's
8 Exhibit 11?

9 A Yes.

10 Q And just do you recall that in Exhibit 11,
11 OCD was proposing a limitation on how shallow DMG SWDs
12 are stimulated?

13 A Yes.

14 Q And in your opinion is your proposed
15 stimulation program consistent with what OCD is
16 looking for in terms of a stimulation program?

17 A Yes. And it's just a -- it's just an acid
18 job. That's -- that's the stimulation.

19 Q Do you recall what OCD was suggesting would
20 not be an appropriate stimulation method?

21 A It's my recollection I think what they were
22 concerned about mostly is -- is this one would
23 hydraulic fraction with -- and with profit without
24 hydraulic stimulated fracture. This -- this proposal
25 is not going to utilize either one of those methods of

1 stimulation.

2 Q So having reviewed OCD's conditions of
3 approval, it's your opinion that your stimulation
4 program is consistent with OCD's request?

5 A It's my understanding, yes.

6 Q Thank you. One thing that you and I have
7 spoken about is a potential need in the future to
8 microsite. To make some micro siting changes, I'll
9 call them, to the location of the Severitas well?

10 A Yes.

11 Q And why would Chevron perhaps need to move
12 the service location of the Severitas well a few feet
13 here or there?

14 A Currently, the location that's in the
15 application is in our lay down yard in the area. It
16 would -- there's still a chance that that may work.
17 We have to make sure that the -- the footprint can fit
18 in there without going across roads and things of that
19 nature.

20 There's another location that's about 200
21 feet away that we -- we think we can move to. And we
22 will make that decision after hearing.

23 Q But before coming here today, you and I
24 talked about whether that change in location would
25 change any of the parties who were entitled to notice

1 of the hearing. Did we talk about that?

2 A Yes, we did.

3 Q And what was your conclusion?

4 A We -- we evaluated that a few weeks back.
5 And there is not going to be any change in the
6 entities that need to be notified if we move it to
7 that location.

8 Q Now, the applications and the C108s discuss
9 injecting into the Brushy Canyon. But just to be
10 perfectly clear, Chevron does not intent to inject
11 into the Brushy Canyon; is that right?

12 A We are not planning to operationally inject
13 produced water into the Brushy Canyon formation. In
14 fact, after we've logged the route in the Brushy
15 around defects, we plan to plug off that Brushy --
16 Brushy Canyon and only inject into the Cherry Canyon
17 and Bell Canyon. And we are not drilling into the
18 hollow part of the Brushy either.

19 Q So let's kind of take that statement and
20 unlock it just a little bit.

21 A Sure.

22 Q So what is a DFIT?

23 A DFIT is a diagnostic fracture injection
24 test. So we actually do inject fluid into that
25 formation. It's usually fresh water or some very

1 compatible formation fluid. But it's usually fresh
2 water. And so they're very short-term injection
3 tests, very minor, but they are injection tested going
4 to the formation.

5 Q And is this DFIT test part of Chevron's data
6 collection protocol?

7 A For these wells, it is part of the -- our
8 protocol.

9 Q And my understanding though is that the sole
10 reason that you had included the Brushy Canyon in your
11 applications at all is to authorize this DFIT test?

12 A It -- it's to authorize the DFIT test, but
13 also to conduct open hole logging within this portion
14 of Brushy Canyon. And the open hole logs -- are going
15 to be resistivity, gamma-ray, sonic, and neutron
16 density. We'll also be running image logs as well.

17 Q So maybe I was too narrow saying it was just
18 for DFIT. But really it is just for testing purposes,
19 and then you'll be cementing it off?

20 A That's correct.

21 Q And so it's a very limited purpose?

22 A That's correct.

23 Q And the targeted -- just to clarify, it is
24 not a targeted injection interval?

25 A We are not targeting for reduced water

1 injection.

2 Q Thank you. And so with that, I did want to
3 turn into the well bore designs. Now, these were in
4 your C108s, but you also inserted them side by side in
5 a slide for our convenience. And that is on Slide
6 Number 101. So if we could move to Slide 101, I
7 wanted to talk through the casing designs a little
8 bit, the well bore designs.

9 A Okay.

10 Q And as we talked about earlier, the Division
11 has already said that the well bore designs are
12 consistent with the construction standards these days
13 for UIC Class 2 wells?

14 A That is my understanding.

15 Q But what I liked about your well bore
16 designs is that they give us a little bit more
17 information about where the closest aquifers are and
18 some of the formations that provide -- above and below
19 the targets.

20 So I was wondering if you could walk us
21 through the Severitas State SWD Number 1 casing design
22 or well bore design first, and then we can move to
23 Papa Squirrel. And I might have some questions for
24 you as you're walking through it.

25 A Okay. Both wells are a three-strand casing

1 design. And the Severitas well, we have a very -- we
2 don't have much of an aquifer present in that
3 location. But we do have a very thin, less than 100
4 foot -- aquifer in that location. And that extends
5 down to about 400 feet.

6 The second string as you enter is the
7 intermediate. It will be set in Lamar formation. And
8 then we have a third string, which will be set in
9 the -- about 500 feet above the basin Brushy Canyon
10 formation.

11 Q And so in your opinion, is the three-string
12 casing design protective of underground sources of
13 drinking water?

14 A Yes, because if -- essentially, that design
15 will have a two-string -- two layers of containment
16 protecting the -- aquifer.

17 Q And I see on these two slides that Chevron's
18 proposing to use 5 1/2-inch tubing; is that right?

19 A That is correct.

20 Q And did you notice in the OCD's Exhibit 11
21 that OCD was also recommending 5 1/2-inch tubing?

22 A I think they're saying that they would not
23 approve anything larger than 5 1/2 inches around.
24 Yes, it is consistent.

25 Q Great. And then the other thing I wanted to

1 talk about on her is the upper containment zone and
2 the lower containment. So let's start with upper
3 containment, which is noted right here. What can you
4 tell us about the upper containment?

5 A The Lamar limestone is considered the upper
6 containment zone for the projection for the Severitas
7 well. The lower containment zone of the well is the
8 limestone, which is shown at the base.

9 Q And Chevron has other witnesses today that
10 will talk about some pressure tests and things that
11 were done on those two containment zones later today;
12 is that right?

13 A That is correct.

14 Q But one thing I did want to talk about with
15 you because I find it to be quite interesting was you
16 and I had talked about the presence of anhydrites and
17 how those can act as a seal or sort of reinforce the
18 seal for containment zones. Are there anhydrites
19 present here?

20 A Yes, there are. Anhydrites are -- are a
21 part of basically the whole component of what's shown
22 here on the diagram as the Castile formation.

23 Q And the Castile formation is this upper area
24 above the line?

25 A And correct. Well, it's right above the

1 line.

2 Q And when you and I spoke, what I found to be
3 interesting was that Castile and Lamar together
4 interact in a way because of the anhydrites to create
5 an even greater seal?

6 A That is correct. The essential -- what's
7 interesting about the anhydrites in Castile is when we
8 assess the mechanics of those units that the high
9 density Castile lies on top adds to the fracture
10 screens of the Lamar. And Bryce Taylor will talk a
11 little bit more about that later today.

12 Q Thank you. I just find that to be quite
13 interesting that in aggregate, that together they're
14 stronger than they would be individually?

15 A That's correct.

16 Q Let's see. What is the vertical distance
17 between injection and the rustler in the Papa
18 Squirrel? Is that noted on here or have you done
19 the --

20 A It -- it's not shown on here. I think the
21 question is what's the vertical difference between the
22 top of injection and the shallow aquifer. And that
23 distance is about 2200 feet in the Severitas well.

24 Q And have you calculated the same thing for
25 Papa Squirrel?

1 A Yes. That distance is about 3700 feet.
2 And -- and in that case, it -- we do have rustler
3 present. And so it's really from the top of injection
4 at the top of the bell right below the Lamar to the
5 base of the rustler in the Papa Squirrel well.

6 Q But there are multiple thousands of feet of
7 vertical separation?

8 A Correct.

9 Q And earlier we were talking about the DFIT
10 test and cementing back. And do these show the
11 cementing back to prevent injection of produced water
12 into the Brushy?

13 A Yes, they do. It -- to touch on the Papa
14 Squirrel, there's an additional language that's left
15 over from a diagram that went back and forth between
16 myself and -- and wells, but really, the cement is --
17 the cement plug in the -- within the Brushy Canyon is
18 what we're planning for both wells.

19 Q Now I wanted to turn to a study that you
20 prepared to show the porosity of each of the two wells
21 and their favorability or the geology as an injection
22 interval. And here I'm going slightly out of order.
23 So at this time, I'd like to turn to Slide 103 of the
24 material. And again, that is the number of the top
25 righthand side.

1 A Okay.

2 Q The substance starts on page 104. So the
3 slide I'm looking at now says, "Bell Canyon High
4 Porosity: Papa Squirrel." Are you there with me?

5 A Yes. Yes.

6 Q What is the purpose of the analysis that you
7 undertook in this slide?

8 A The purpose of this analysis was really a
9 prelude to identifying what -- where the optimal
10 locations are in both of these development areas. The
11 Salado Draw. And that's what he was talking about,
12 the Salado Draw here in the Papa Squirrel well as --
13 as proposed.

14 Q And let's maybe take a moment and walk
15 through these. Before we do that, what is your
16 conclusion from the study that you undertook in terms
17 of whether the injection interval is favorable in the
18 Bell Canyon for the Papa Squirrel?

19 A Our -- our determination is the Bell Canyon
20 is -- is very favorable for injection in this area,
21 and it's primarily due to the stacked thickness of
22 high porosity sands within the Bell Canyon in this
23 area.

24 Q And did you reach this same conclusion in
25 the next slide, which we'll turn to in a moment, for

1 the upper area?

2 A Yes.

3 Q And did you prepare the same analysis or a
4 similar analysis for the Severitas well?

5 A Yes. I think -- and you'll find that the --
6 the slides are slightly -- the diagrams are slightly
7 different, but they're -- they're made by other
8 geologists that were involved in this process, and
9 they just took slightly different approaches, but they
10 came to the same conclusion regarding the net
11 thickness of porosity within the two areas.

12 Q And is that conclusion that that thickness
13 is favorable for injection?

14 A Yes, it is.

15 Q Let's start then on this slide, which is
16 number 104 of 267. And let's start with an
17 orientation of the slide for the commissioners and the
18 other parties. What is this right here that I'm
19 highlighting?

20 A This is an inset that shows where that
21 portion of the map is located relative to the Delaware
22 Basin that's shown where the tan lines are kind of
23 projected into the map -- the second map.

24 Q And if you had to guess about -- I mean, if
25 you had to identify on this map where the Papa

1 Squirrel well is, is my hand more or less?

2 A That is approximately where it's located,
3 yes.

4 Q And so what does A to A prime mean on this
5 slide?

6 A This is a line of the projection, the
7 cross-section that's shown on the left.

8 Q And does A correlate to the first
9 cross-section that you have there?

10 A Yes, on the left side.

11 Q And then A prime is the second cross-
12 section?

13 A Yeah, it's -- A prime is just the other side
14 of the cross-section.

15 Q And what about the red box? What is the
16 significance of the red box?

17 A The red box just identifies the location of
18 the Bell Canyon formation.

19 Q So this is an outline of where the Bell
20 Canyon formation falls within these cross-sections?

21 A Within those -- within those two wells.

22 Q And what is your conclusion that you draw
23 from this slide?

24 A The conclusion. The -- the porosity in --
25 in this cross-section that's shown in the kind of red

1 pinkish curve, and when you see a movement of that
2 curve to the left, that means that there's high --
3 there's going to be higher porosity in that area. And
4 what's -- what's done on the right in each -- each
5 well, where you see the column with the blue, thick
6 units identified, those are -- are thicknesses of --
7 of sediments that are greater than 14 percent
8 porosity.

9 Q So you filtered out anything below 14
10 percent or Chevron filtered out anything below 14
11 percent?

12 A Greater than 14 percent. Greater than 14.

13 Q Oh, greater than 14. This is why I don't do
14 math. Less than, greater than. Challenging.

15 But these dark blue areas indicate units
16 that are favorable for injection based on their
17 porosity levels?

18 A Yeah. The lighter color blocks are really
19 greater than 14 percent. The darker blue is for
20 actually greater than 18 percent porosity, which is a
21 higher threshold. But it still shows that in both --
22 you know, both of those wells, we see, you know, a lot
23 of neck thickness of porosity. Which -- and Bryce
24 will talk about this later. But when we look at model
25 of -- of injection in the -- in the DMG, that porosity

1 is really a key fact. And that's why we come in and
2 we looked to identify areas where we want to target
3 placing the SWD wells.

4 Q And just for the record, the Papa Squirrel
5 well is about halfway down or a third of the way down
6 the line from A to A prime?

7 A Right over here.

8 Q So let's turn to the next slide then, unless
9 there was anything else on that slide you wanted to
10 touch on.

11 A No, that's all.

12 Q So this next slide is page 105. And this
13 slide, again, are these the same two logs that we
14 reviewed on the last time?

15 A They are the same two logs. Same two wells.

16 Q And so in this leg you're just focusing
17 further down in the geologic formation?

18 A Right. In the upper Cherry -- Cherry
19 Canyon.

20 Q And did you undertake this study again to
21 understand the net porosity in this area?

22 A Yes, I did.

23 Q And what was your conclusion?

24 A This is still favorable. It's -- it's less
25 favorable, but it's still favorable.

1 Q This area would still take water in theory?

2 A Exactly.

3 Q Is there anything else you wanted to mention
4 about this slide before I move onto the next slide?

5 A No, I think that covers everything I wanted
6 to cover on the slide.

7 Q So turning to the next slide, this is the
8 geologic analysis that you undertook for the Severitas
9 well to understand the porosity in that area; is that
10 right?

11 A That is correct, yes.

12 Q And this is page 106 of 267. And so can you
13 orient the Commission again? What is the inset map
14 here on the righthand side of the slide?

15 A The inset -- inset map shows -- is a net
16 porosity map that's color coded for an area that
17 covers this development area that's known as Harris,
18 New Mexico.

19 Q And I see on here you have some legends.
20 Worst net porosity, better net porosity. And the
21 shading, the dark purple, does that correlate to worse
22 net porosity?

23 A Yes, it does.

24 Q And then this sort of turquoise or greenish
25 blue is better net porosity?

1 A That is correct.

2 Q And the Severitas well is approximately
3 halfway between the A and A prime on this?

4 A Yeah. And the -- and the arrow point is
5 shown pretty correctly. So the point of the arrow is
6 really where the Severitas well is.

7 Q And do these logs have the same data as the
8 prior logs that we looked at in terms of gamma?

9 A Yes, they do. And the difference is that
10 these were plotted in Petra. The other -- others were
11 -- we used a different software package.

12 Q But they contained the same material.

13 A Same basic material. Just different
14 programming.

15 Q And what conclusions did you draw from this
16 analysis?

17 A Well, as -- as Cody Comiskey noted earlier,
18 you know, we -- we've looked at two areas where we had
19 slightly different variations in stratigraphy. One,
20 you know, the -- the stratigraphic thickness of the --
21 of the Delaware Mountain Group is thicker in the Papa
22 Squirrel area to the east.

23 It's thinner to the west where the Severitas
24 is. So we would naturally expect that the -- the
25 reservoir character in this well would be less

1 favorable than that in the Papa Squirrel just because
2 of stratigraphic thickness -- thickness variations.
3 It's thinner over here. And we're actually seeing
4 less net porosity thickness in -- in this area.

5 But from a standpoint of what we're trying
6 to do within, you know, the scope of this -- these two
7 pilot wells, it's important for us to kind of evaluate
8 these areas where we may not have as great a
9 thickness, but at least, you know, crossing some sort
10 of threshold coming from the well before us, and this
11 one does.

12 Q So if I'm understanding you, your choice of
13 wells is intentional, because you want to test the
14 reaction of these different thicknesses?

15 A That is correct, yes.

16 Q And Dr. Ampomah asked Mr. Comiskey a
17 question about the pilot nature of these wells, and it
18 seems to me that at least one answer to that question
19 is that you are trying to go get data from different
20 reservoir thicknesses to enable Chevron to interpret
21 that data?

22 A That is correct, yes.

23 Q And then move forward with other projects or
24 not.

25 A Exactly. And it should give us some insight

1 about what the opportunities are, you know, moving
2 forward in the future. It's also going to give us
3 this data in a collaborative way where we can kind of
4 share in -- with both the OCD as well as other
5 operators and -- and kind of help out with the
6 decision-making process moving forward.

7 Q Great. Well, we're going to switch gears a
8 little bit and turn to a study that he did regarding
9 DMG productivity in the area of the two wells. So I
10 am going to switch now to page 99 of the materials.

11 MS. BENNETT: Give everybody a chance
12 to catch up with me. You there?

13 BY MS. BENNETT:

14 Q So on page 99, can you describe to the
15 commissioners what this exhibit is and your intentions
16 behind this exhibit?

17 A Yeah, in -- in this exhibit, this is the --
18 the diagram on the right and the -- the table that's
19 shown are really part of the C108 application. And --
20 and what I did was just to kind of combine both
21 components that are included in the C108 application
22 into one slide. It just makes it --

23 Q And what --

24 MR. FUGE: Give it a second.

25 BY MS. BENNETT:

1 Q One of the primary takeaways I had from this
2 slide was or questions I had was whether there are any
3 DMG, Delaware Mountain Group wells within a half mile
4 of the Papa Squirrel?

5 A The answer is no.

6 Q Where are the closest Delaware Mountain
7 Group producers from Papa Squirrel?

8 A They're -- they're about one and a half to
9 two miles away to the southeast.

10 Q And will Mr. Taylor be discussing those
11 wells?

12 A Yes, he will. Yes, he will.

13 Q Great. And then the next slide, which is
14 slide 100 of 267, is this the same information but for
15 the Severitas well?

16 A Yes. Again, these are -- these two tables
17 as well as the -- the map are both components that are
18 submitted with the C108 application.

19 Q And one thing I wanted to ask you about,
20 actually. I'm going to turn back to page 99. Chevron
21 operates wells within the Papa Squirrel AOR; accurate?

22 A That is correct.

23 Q And so you have your own wells that are
24 currently in production within the area of the Papa
25 Squirrel well?

1 A That is correct.

2 Q And is that true for the Severitas well
3 also, which is on page 100?

4 A Yes, it is.

5 Q So Chevron, as part of the pilot nature of
6 this project, you are able to test whether these wells
7 impact your -- "these wells," I mean SWDs -- impact
8 your existing wells?

9 A Correct. We -- we essentially don't have to
10 worry about going out and asking another operator to
11 -- to monitor horizontal wells in these areas because
12 we have some. And we can evaluate those impacts if
13 they exist directly.

14 Q So you would have both the -- you manage the
15 existing production wells, but you'll also be able to
16 manage the proposed SWDs?

17 A That is correct.

18 Q And again, I think we might have talked
19 about this, but there's no DMG wells within the
20 half-mile radius of the Severitas well; is that right?

21 A That -- that is correct.

22 Q Now I want to turn to a slide you prepared
23 about the drill stem tests, and that's page 107 of
24 267. Give everybody a second to catch up there.

25 So first of all, what is a drill stem test?

1 A A drill stem test is a test that's run open
2 hole within a vertical well normally, and which there
3 is a packer that is engaged, and a pressure suction on
4 the well that allows oil or any kind of fluids that
5 are in the units where the packer isolates in -- in
6 the well. And it's able to -- to evaluate both
7 pressures as well as the fluid types that come into
8 the -- into the test -- testing device, the drill stem
9 test.

10 Q And so what does the drill stem test, what
11 kind of data does it provide you or provide Chevron
12 through you?

13 A It essentially can indicate to us or any
14 operator whether or what kind of potential there is
15 for hydrocarbons within the zones that you're testing.

16 Q And these drill stem tests aren't tests that
17 you undertook though; right? They're existing tests?

18 A These were publicly available drill stem
19 tests. And the way we approach this data gathering
20 was to assess, you know, the -- the large resource of
21 public data available in both areas and determine
22 which -- which drill stem test was conducted within a
23 radius of these wells within the -- the Delaware
24 Mountain Group.

25 Q And so let's just knock out Papa Squirrel

1 really quickly. You noted that there were no drill
2 stem tests taken in the DMG within two or three miles
3 of the Papa Squirrel?

4 A That's correct, yes.

5 Q And so there was no data for you to analyze
6 there?

7 A There was no data to analyze. Correct.

8 Q So how about for the Severitas? What did
9 you find for the Severitas?

10 A In the Severitas well there were -- there
11 were no DSTs within two miles of the Severitas well.
12 We did have two DSTs within two to three miles of the
13 Severitas well.

14 Q And were those two DSTs the two that you
15 identified here?

16 A That is correct, yes.

17 Q And in your review of the data, what did you
18 glean from the data in terms of DMG productivity in
19 and around Severitas 2 State SWD Number 1?

20 A Well, the fact that they were two to three
21 miles away told me that -- that basically there's a
22 low risk of impact production in and around the
23 Severitas well.

24 Q Let's turn now to the structure map that you
25 prepared. And the way I was looking at your -- was

1 sort of a -- yeah, looking to see if there were
2 existing wells, which there weren't any. And then
3 looking to see if you could find any drill stem tests
4 on the existing wells, which there weren't any within
5 two or three miles.

6 A Right. Correct.

7 Q And then you focused then even on the
8 geology of the area to see what the geology says about
9 the presence of DMG and reservoirs in the area?

10 A That's correct. So -- so really
11 fundamentally both these slides, what we were trying
12 to do to establish was to take a stab at this question
13 of -- of, you know, the future reserves. What -- what
14 is -- you know, how can you come up with some sort of
15 assessment on how or whether or not there are future
16 reserves within the DMG in these areas. And -- and
17 these were two approaches that we came up with.

18 We felt that the drill stem test was the
19 preferred way of assessing whether or not existing
20 hydrocarbons are in the area. Because when a -- when
21 the operator drills a well or looking for oil, you
22 know, a drill stem test is -- is a very cheap way to
23 determine whether or not it's worthwhile running
24 casing and producing from that zone.

25 And then this second map was really designed

1 to say, "Okay. If I'm an exploration geologist, what
2 would I do?" Well, in the previous slide where we had
3 stratigraphic units shown within the Bell Canyon and
4 the Cherry Canyon formation, we showed that the
5 stratigraphic units seemed to have some sort of
6 continuity across all those areas.

7 So then the question is, okay. Given the
8 fact that you don't have any obvious stratigraphic
9 pinch outs in these areas, then what else would you
10 look at? And the solution was, okay. I wanted to
11 take a look at the structure map in both of these
12 areas, and that's what I did.

13 Because the structure map would define -- if
14 there were no pinch outs of stratigraphy, then you
15 would have to have some sort of tracking mechanism in
16 addition to that, and that would be structural
17 closure. And the bottom line in both of these series,
18 I didn't see them.

19 Q Thanks for that. You know you and I talked
20 a lot about this because -- structural closure and
21 trapping is, you know, over my head. But what I
22 appreciated about it was that you went -- you were
23 using actual information to test your theory about the
24 lack of DMG reserves in this area.

25 A Yes, I got to be an exploration geologist,

1 and yeah, so.

2 Q Yeah. And I really appreciate what you just
3 said about the drill stem test, because I don't think
4 before today I actually understood that, that that is
5 a mechanism by which operators consider whether it's
6 worth it to continue to explore for -- it's a
7 preliminary step in an exploration for reserves; is
8 that right?

9 A It's a very cheap preliminary step to make
10 that evaluation, yes.

11 Q And so if that -- that's incredible. Thank
12 you.

13 On these, we've talked a lot about traffic
14 in the area. And you know, you ad I talked about an
15 inverted bowl. And is that sort of where the
16 hydrocarbons would be trapped such that there could be
17 future reserves in this area? Would that be an
18 indicator of that?

19 A Yes, that's correct.

20 Q And did you see anything that would indicate
21 the potential of unknown reserves in these two
22 structure maps?

23 A No, I did not.

24 Q Did you see any fault in the lower
25 containment zone?

1 A No. No faults at the -- at the level of
2 Bone Spring limestone. We evaluated seismic data in
3 -- in both areas and determined that there were no
4 nearby faults within a two-mile radius of -- of the
5 Severitas and the Papa Squirrel well.

6 Q How about any faults in an upper containment
7 zone, which is the little Lamar limestone? Were you
8 looking for faults there too?

9 A We did. And the challenge in Lamar kind of
10 touched on the challenge with that, because if you
11 remember in the Castile formation where you have
12 anhydrite, you also have salt in -- in these areas.
13 And there are some problems with depth conversion of
14 the seismic data when you have these velocity changes
15 that occur laterally within the section above the zone
16 that you're trying to map.

17 The zone we're trying to map is determined
18 -- it's really the Lamar limestone. Do we see faults
19 and seismic data with the Lamar? Because of these
20 velocity problems what we have as a -- as a result of
21 the -- the salts and anhydrites in the Castile.

22 We get some anomalies that are really
23 difficult to sort through, and you have to have really
24 good velocity data to -- to make accurate
25 interpretations of that -- that surface. But from

1 what we could tell, given all that, we don't have any
2 faults in -- both areas.

3 Q And will one of Chevron's other witnesses
4 today talk about the Lamar limestone and the amount of
5 pressure it would take to break that or the
6 sufficiency of the Lamar as a containment zone?

7 A Yes, Bryce Taylor will discuss that further.

8 Q Great. So to summarize, in your opinion is
9 the Papa Squirrel well, does it have the potential to
10 -- in your opinion and just focusing on the slide and
11 your work with Chevron, does it have the potential in
12 your opinion to negatively impact correlative rates?

13 A Not in my opinion.

14 Q And in your opinion, do you think that there
15 is a low likelihood of hydrocarbons in the DMG within
16 the AOR of each of these two wells?

17 A Not in my opinion.

18 Q But it's your opinion that --

19 A It's my opinion that that is correct, yes.
20 Sorry.

21 Q That there is a low likelihood?

22 A That there is a low likelihood.

23 Q And that's based on the drill stem tests?

24 A The drill stem test coupled with the -- with
25 all the structural closure and the fact that there's

1 continuity in the stratigraphic units across both
2 areas.

3 Q And the continuity in the stratigraphic
4 units, if there was a pinch out, that would be a place
5 where hydrocarbons could collect?

6 A That's correct. And the other factor is
7 that we have a number of wells that then drill
8 through, you know, in these areas, and we haven't
9 today seen any evidence that there's -- from those
10 wells that there's potential for -- for hydrocarbons.

11 Q Not to dwell on the stratigraphic uniformity
12 any longer, but I did just think of a really great
13 analogy for me, which is a stream, and the fish tend
14 to gather, you know, in eddies or along the bank or
15 rocks within a stream. And so if the hydrocarbons are
16 fish, we're looking for some anomalies in the stream
17 where they might gather and enjoy their day when we go
18 fishing?

19 A That might be an analogy, yes.

20 Q Well, it works for me. And I'm going to go
21 fishing this weekend now that I've thought about it.

22 Any last things you'd like to say or tell me
23 not to draw analogies ever again?

24 A No, I really don't have any other comments
25 to add.

1 MS. BENNETT: Thank you very much.

2 And with that, I would move the
3 admission of Exhibits A and B, which are the
4 applications and the included C108s. And I would also
5 move admission of the slides numbered 98 through 108.

6 MR. FUGE: Any objections?

7 They're admitted.

8 (Exhibit A, Exhibit B, and Exhibit 98
9 through Exhibit 108 were marked for
10 identification and admitted into
11 evidence.)

12 MS. BENNETT: Thank you.

13 MR. FUGE: Mr. Tremaine, do you have
14 any questions for the witness.

15 MR. TREMAINE: I do have some
16 questions. Thank you, Mr. Chair.

17 EXAMINATION

18 BY MR. TREMAINE:

19 Q Mr. Merrifield, I'm hoping to clarify a
20 response that you provided to Ms. Bennett. You used
21 very specific language when you were talking about the
22 produced water injection. I believe what you said was
23 Chevron was not targeting the Brushy Canyon for
24 produced water injection. Is that correct?

25 A That is correct, yes.

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1 Q Is it Chevron's expectation that produced
2 water that is targeted to be injected into the Bell or
3 the Cherry Canyon, will a communicator migrate down to
4 the Brushy Canyon?

5 A At this point in time, we do not think so.
6 Okay. Now, the -- the part of the surveillance
7 process program we've been putting together --

8 Q Believe it or not, it's better than it was.

9 A -- is to further evaluate their -- their
10 questions about reversal and frac gradient as we get
11 deeper in the DMG. And that program hinges on the
12 sonic data that we're going to be collecting in these
13 wells.

14 And we're also going to just -- just to get
15 into detail a little bit, we're going to be collecting
16 monopole, dipole, and sonar data. We'll also be
17 collecting triple-combo data as well throughout the
18 Bell Canyon, Cherry Canyon, and that -- that one upper
19 portion of the Brushy Canyon and we drill through.
20 And then we'll also be collecting the DFIT data.

21 Now, all of those will be coming together
22 with several different analyses on frac gradients.
23 And -- and that is from -- in my opinion, it's the
24 most exhaustive approach. It's really important to
25 take that -- gather that kind of data to make the most

1 accurate assessments of frac gradients in these two
2 wells.

3 Q Thank you. And bear with me. Likewise, I'm
4 not a geologist. So when you are done with the DFIT,
5 when the lower zone is cemented off, how are you going
6 to be able to tell whether injected produced water in
7 the higher zone migrated down to the Brushy -- to the
8 Brushy Canyon?

9 A We should have some indication with the
10 analysis of the data. So the data should tell us
11 something about frac gradients and whether they
12 linearly increase with depth or if there is a
13 reversal. So there should be a theoretical indication
14 before, you know, any migration fluid occurs, it --
15 but it will tell us about the possibility.

16 Q So you're going to see it before or as it
17 happens rather than after the fact?

18 A It's -- we're going to -- yes, correct.
19 It's -- it's really part of the data analysis. Now,
20 mind you, the -- you know, after we collect the data,
21 we're going to start injecting. Okay. There's going
22 to -- before any -- any potential migration were to
23 move into the Brushy, it would have to collect some
24 sort of threshold pressure and volume that we've
25 injected into the Bell and Cherry before we see any

1 injection of migration downward into the Brushy. So I
2 think there's going to be time where we would
3 determine -- could determine from a theoretical
4 standpoint that's a possibility or know it's probably
5 unlikely.

6 Q Thank you for that clarification. One more
7 quick question here, Mr. Merrifield. In terms of the
8 assessment of reserves from the DMG, was that focus on
9 the Bell, Cherry, and Brushy Canyon zones? Or is that
10 --

11 A So yes, we looked at -- in fact, I -- the
12 search criteria was very exhaustive. I looked for
13 Delaware Mountain Group. I looked for Delaware
14 Canyon, Cherry Canyon, Ranchy Sand. I went through
15 all of the possible names to kind of extract from the
16 AHS database to assess that.

17 Q And did that include the Lower Brushy within
18 Avalon or just focus on the three zones we discussed?

19 A It -- it included all of Brushy. And you
20 know, I did not get into that one. No, I did not.
21 'Cause the -- the whole assumption there is that I was
22 going to carry it down to the -- which is really the
23 base of the Delaware Mountain Group. And then I
24 stopped at that point.

25 Q Are you aware of any reserve assessment that

1 was a problem at any other operators?

2 A No.

3 MR. TREMAINE: No further questions.

4 MR. FUGE: Ms. Hardy?

5 MS. HARDY: I do have a couple of
6 questions.

7 MR. FUGE: If you could just come up,
8 it will make it easier to hear.

9 MS. BENNETT: I can switch too if you
10 want.

11 MS. HARDY: That would be great. Thank
12 you.

13 This will be quick. Sorry.

14 EXAMINATION

15 BY MS. HARDY:

16 Q Mr. Merrifield, I just have a couple
17 questions for you. With respect to your well bore
18 diagram that we were looking at, which was page 101
19 using the file page number, you had discussed with
20 Ms. Bennett the DFIT test and how they will impact or
21 how they will be performed at Brushy Canyon.

22 A Yes.

23 Q Will the Brushy Canyon DFIT be performed
24 only in the open-hole section?

25 A It will not be performed in the open-hole

1 section. And -- and maybe that was not clear. It --
2 it will -- DFITs, the diagnostic fracture injection
3 test will be done through case toll. And that's --
4 one of the advantages of doing that is that the
5 chances of success are greatly enhanced when you have
6 packers that are actually in contact with --

7 Q Then looking at your slide 108, which is the
8 structure map, what is the contour interval on those
9 maps?

10 A I think it's 100. It could be 50 feet.
11 It's 100 or 50 for sure.

12 Q 100 or 50?

13 A Yes.

14 Q Is it correct the down dip is to the right?

15 A It is correct.

16 MS. HARDY: Those are my questions.

17 MR. FUGE: Dr. Ampomah, do you have any
18 questions for the witness?

19 DR. AMPOMAH: Yes, I do. So let's go
20 over the C108.

21 MR. MERRIFIELD: Okay.

22 DR. AMPOMAH: So on page 23.

23 MR. MERRIFIELD: Okay.

24 DR. AMPOMAH: You show the schematic of
25 the -- well.

1 MR. MERRIFIELD: Okay. This is a --
2 this is one of the abandoned ones.

3 DR. AMPOMAH: Yeah, one of them.

4 MR. MERRIFIELD: I remember this.
5 Yeah.

6 DR. AMPOMAH: So looking at this, how
7 they procced it, do you believe that it was plugged in
8 a good way to prevent any potential complication with
9 the oil breaching?

10 MR. MERRIFIELD: So I don't recall the
11 exact date. I'm looking at the way that they plugged
12 this well. It's an -- it's an older plugging
13 approach. And -- and the reason I know that is
14 because they use kind of these intermittent cement
15 plug and then match --

16 And then it -- that is a standard
17 approach back in the -- kind of the 70s or the 80s and
18 sometimes even into the 90s depending on what state
19 you're in. They -- they will still allow. Today,
20 that's not, you know, the best way to do it, but it
21 was acceptable at that day and time.

22 Now, having said that, we were talking
23 about mud slurry. That's usually a thick -- slurry
24 usually. So it's -- it is still -- So yes, I -- it
25 is an approved approach, but historically, I think,

1 you know, that there's historical context.

2 DR. AMPOMAH: So it's still workable?

3 MR. MERRIFIELD: It's still what?

4 DR. AMPOMAH: Is it workable? Like you
5 believe there should be some sort of highlight on this
6 particular well?

7 MR. MERRIFIELD: All I'm saying is that
8 it's -- it's not the standard practice. But bentonite
9 is a very impermeable material. When it's mixed with
10 mud, basically the mud portion of that well as well as
11 the cement portion are considered impermeable barriers
12 within that well.

13 DR. AMPOMAH: So let's talk a little
14 bit about --

15 MR. MERRIFIELD: Did that answer your
16 question?

17 DR. AMPOMAH: Yeah. I'm sure OCD knows
18 more to make sure that there will be no problem with
19 that. And I just wanted to know that. On page 10 of
20 the C108 1B application.

21 MR. MERRIFIELD: Okay.

22 DR. AMPOMAH: So you have on -- saying
23 Brushy Canyon is included as a potentially -- the
24 Brushy is not intentionally targeted for injection.
25 Now, but you're also going to do a DFIT in this

1 project; right?

2 MR. MERRIFIELD: Correct. That's --
3 that's the key point.

4 DR. AMPOMAH: So I just want to know is
5 there no any other alternative? Other than more like
6 bridging the Brushy Canyon, knowing very well that you
7 are not going to do any injection. So is there any
8 other alternative to collect the data that you're
9 looking for without actually performing the DFIT in
10 this position?

11 MR. MERRIFIELD: The purpose of the
12 DFIT and -- is to really calibrate the interpretation
13 of the frac gradients that are determined from loss.
14 And the only way that you can do that is by having
15 some type of injection test. A DFIT in my opinion is
16 the best approach to get the most accurate and -- and
17 best chance at getting data than any other data that
18 you can do.

19 But all the data that you can -- in
20 order to -- to calculate the frac gradients, you have
21 to -- you have to have some sort of injection test.
22 And -- and Bryce will touch on this a little bit
23 later, but he -- what he'll show is, you know, what
24 the pressure buildup looks like and what it comes back
25 down to and -- and what part of the curve you actually

1 have to measure in order to assess, you know, what the
2 frac closure stress or fracture is when you -- when
3 you run that test.

4 DR. AMPOMAH: So are you saying that
5 let's say the DFIT that you're going to do in this
6 hurricane land in the creek formation. There was two.

7 MR. MERRIFIELD: Mm-hmm.

8 DR. AMPOMAH: You don't have right now
9 datapoints to be able to calibrate your entire project
10 gradient, but you still have -- can you do a DFIT in
11 the Brushy?

12 MR. MERRIFIELD: What we'll have after
13 we collect this data is we'll have DFIT data in the
14 Brushy Canyon, the Cherry Canyon, and the Bell Canyon
15 formations. We'll have a continuous curve of what the
16 frac gradient looks like.

17 DR. AMPOMAH: Yeah. But my --

18 MR. MERRIFIELD: And to calibrate that,
19 we have to have certain datapoints that require some
20 sort of injection test. And the injection test that
21 we're proposing is a DFIT.

22 DR. AMPOMAH: So you said you have to
23 do how much percent of -- if we are not going to use
24 this formation for injection, why do we have to
25 perforate it, you know, in the first place, and then

1 coming back to fill it out? You know, so that is my
2 concern.

3 MR. MERRIFIELD: Yeah. So the reason
4 why we have to -- I think I understand where you're
5 coming from -- is we actually have or are forced into
6 injecting into the formation.

7 So we actually have to cut a hole
8 through casing and inject into the formation and
9 monitor the pressure buildup and decline in order to
10 gather this datapoint that's going to be used as a
11 calibration point. There's no other way to do it from
12 my standpoint. I don't -- I don't know of any other
13 way to do it. You could do it open hole.

14 DR. AMPOMAH: Mini-frac, yeah.

15 MR. MERRIFIELD: But it -- but what I'm
16 saying is the chance of success with the mini-frac of
17 getting the data is about 40 percent. Okay. And --
18 and with this, it's about 95 percent.

19 DR. AMPOMAH: So, like, 104 actually?

20 MR. MERRIFIELD: Yeah. Yeah.

21 DR. AMPOMAH: So page 104 on the
22 application. I want to know how many wells you used
23 in analyzing the petrophysics to obtain results.

24 MR. MERRIFIELD: Okay. Yeah. And so
25 the -- the amount of wells, I don't have that number

1 in hand. But the -- we had probably on the order of
2 at least a hundred datapoints to create that map
3 that's on -- that's color-coded on the righthand side
4 right there. At least a hundred. Maybe 200. Maybe
5 500 to create -- do you want me to point at it?

6 DR. AMPOMAH: No, I can see.

7 MR. MERRIFIELD: Okay. Yeah. But
8 the -- all those datapoints are not shown here.

9 DR. AMPOMAH: So you show a porosity 20
10 percent going in there, but probability 0.4 to 3 so my
11 question is what does it show? Or how did you compute
12 permeability?

13 MR. MERRIFIELD: How -- how did we
14 compute permeability? We did not actually calculate
15 permeability. So in -- if you -- in the Delaware
16 Mountain Group, because these are sandstones, there
17 is -- there are a number of authors that have
18 evaluated the permeability-porosity relationship and,
19 you know, plot how linear that relationship is. But
20 we have not -- we did not go in and calculate
21 permeability in -- in these for our study.

22 DR. AMPOMAH: So on page 98, you talk
23 about how the two wells, there is an extent of geology
24 between these two wells, two locations. Right. We
25 talked about that from the other testimony. Now, you

1 are using upper relation to --

2 MR. MERRIFIELD: Yes, exactly.

3 DR. AMPOMAH: Let me ask. So do you
4 have any plans to offer a quarry program to be able to
5 get the actual call because you want to build a
6 database right now really dependent on more or less a
7 correlation?

8 MR. MERRIFIELD: We -- we did have that
9 in some of our initial evaluations of all the
10 surveillance that we were going to gather. But
11 because of -- the coring I think ended up being a
12 minor component just because we did not feel that that
13 would add as much value as the cost, and it was really
14 just to -- when we evaluated all the different
15 surveillances that we were going to do, we just felt
16 that was a lower priority. Yeah, we did -- we did
17 entertain that. That -- I'm letting you know that.

18 DR. AMPOMAH: But why would that be a
19 low priority?

20 MR. MERRIFIELD: It was a lower
21 priority. That's all.

22 DR. AMPOMAH: Yeah, but we want to know
23 how Pinon water formation was, had it done just
24 relying on no map relation, no --

25 MR. MERRIFIELD: Well, see part of the

1 assessment was we actually pulled the existing core
2 data that was available from the DMG and incorporated
3 that into the analysis.

4 DR. AMPOMAH: Thank you. I appreciate
5 that.

6 MR. MERRIFIELD: Yeah.

7 DR. AMPOMAH: Help me understand. On
8 your well design for the Papa Squirrel well.

9 MR. MERRIFIELD: Mm-hmm.

10 DR. AMPOMAH: So I'm trying to
11 correlate that to the well correlation that you're
12 showing on page 104. Is the Papa Squirrel well the
13 one that -- that one is in the total vertical depth;
14 right?

15 MR. MERRIFIELD: Is it -- I'm sorry.
16 What was your --

17 DR. AMPOMAH: Total vertical depth.

18 MULTIPLE SPEAKERS: Total vertical
19 depth.

20 MR. MERRIFIELD: Yes. Right.

21 DR. AMPOMAH: Yeah. So I see the Bell
22 Canyon is about 4,655 feet.

23 MR. MERRIFIELD: Uh-huh.

24 DR. AMPOMAH: Now, when I cross-check
25 that to you, the well correlation that you have on

1 page 104. So from A to A prime, you have your well.
2 It's going to be in the middle. And maybe the well
3 correlation is in a different depth to me?

4 MR. MERRIFIELD: It -- it is. It's
5 subsurface 2DD.

6 DR. AMPOMAH: Okay. I just wanted to
7 clarify that.

8 MR. MERRIFIELD: Yeah.

9 DR. AMPOMAH: And maybe if we can --
10 because it's not --

11 MR. MERRIFIELD: It's not. And
12 that's -- you know, that's something that should have
13 been caught, but it wasn't.

14 DR. AMPOMAH: Because I was totally
15 lost.

16 MR. MERRIFIELD: No, valid question.

17 DR. AMPOMAH: I do have further
18 questions. So how in your application you showed on a
19 structure map that you did place all the well
20 correlations. But I don't see that on the side, so I
21 don't -- base, you know, but I just want to know why
22 did you not include any interpretation from the
23 seismic?

24 MR. MERRIFIELD: The -- the question
25 about seismicity and showing that is -- really has to

1 go through IP review process. And -- and we, you
2 know, in the process of going through this, I felt
3 that interpretation, it was based upon interpretation
4 of our SME.

5 And to go through that, we would
6 probably -- there would have been a lot more that
7 needed to be addressed other than just this group. We
8 would have had to been -- gotten into a lot of detail
9 on that evaluation. And we just didn't see that that
10 added as much value.

11 DR. AMPOMAH: So you took the -- You
12 were not able to identify any -- in the Castile. Now,
13 when you talked about how there was some sort of
14 anomaly because of salt and then the presence of
15 anhydrites in there, so you were not able to build a
16 very good velocity forward to really interpret those.

17 MR. MERRIFIELD: Right.

18 DR. AMPOMAH: Now, I just want to know,
19 did you try any different options to see if there are
20 no geological features that could impede any potential
21 pathway?

22 MR. MERRIFIELD: Other than the seismic
23 data? Is that what you're saying?

24 DR. AMPOMAH: So for the seismic data,
25 there are multiple options that you can run. You see

1 where under any given seismic faults, anything. So
2 I'm just asking just a normal interpretation. Did you
3 go further to use attributes?

4 MR. MERRIFIELD: We -- yeah. And the
5 person that did this actually looked at a couple of
6 different ways of looking at the data, but it -- it
7 boiled down to one fundamental criteria, how you
8 define fault using seismic data.

9 And that there -- it's a very
10 traditional way of looking at it, and that is if you
11 really need to be able to define separation of
12 stratigraphic units across a discontinuity that can be
13 seen at the scale of the observation that you're
14 making.

15 'Cause it's that discontinuity between
16 two horizons across some plan of discontinuity, which
17 is defined as a fault, where you actually see
18 separation of layers. So he was really looking for
19 that characteristic to define a fault.

20 MS. BENNETT: And I don't mean to
21 interrupt here, but Mr. Comiskey will also be able to
22 address some of the questions on seismicity if that's
23 useful for you later today as well.

24 DR. AMPOMAH: Yeah, I was mostly
25 talking about the seismic interpretation, not

1 seismicity. I know that one. Yeah.

2 Can you talk a little bit about the
3 stimulation? Do you plan to do stimulation in this
4 well?

5 MR. MERRIFIELD: After we complete the
6 well, after we drill the well and then we run casing
7 and then we perforate the casing and then we set the
8 tubing in the packer in the well and we put a well
9 head on it, we will conduct an acid job.

10 And that really is to clean out, you
11 know, the perforations, clean out anything near well
12 bore so that when we actually go in and -- and inject
13 into the formation that we know that the -- the
14 formation is as clean as possible and the near well
15 bore is as clean as possible to enhance injectivity.
16 So that's going to be, you know, the primary reason
17 for doing an acid job. And by -- when we say
18 stimulation, an acid job is a form of stimulation.

19 DR. AMPOMAH: Thank you.

20 MR. FUGE: Mr. Bloom?

21 MR. BLOOM: Yeah, just a couple quick
22 questions about the location and some of the wells.
23 You mentioned I think with respect to the Severitas
24 well that there were three nearby Bone Springs wells?

25 MR. COMISKEY: Yes.

1 MR. BLOOM: And do you do any extra
2 sort of particular monitoring of those wells in your
3 proposal?

4 MR. COMISKEY: I'll have to defer that
5 to someone later, I think. Surveillance plan.

6 MS. BENNETT: Mr. Comiskey will be
7 discussing the data and monitoring plan in detail.

8 MR. BLOOM: Yeah, I was interested in
9 the monitoring too.

10 And then I don't know if this would be
11 a question for you or perhaps someone else well. But
12 regarding the location of the Severitas well, looks
13 like that's in the SCADA. That's the state federal
14 unit.

15 MR. COMISKEY: Yes, it is.

16 MR. BLOOM: Yeah. I don't know if that
17 unit's formations include the salt water disposal
18 target formations. Do you know?

19 MR. COMISKEY: So this is within the
20 SCADA unit. This well is actually going to be located
21 on State Land Office land. And it's -- it's from --
22 from our assessment -- land assessment of this, we --
23 we have the right to inject into the DMG, if that's
24 your question.

25 MR. BLOOM: That's where I was going.

1 Yes. And similarly if you move that, I think there
2 was a mention of a micro-move of a couple hundred
3 feet?

4 MR. COMISKEY: Mm-hmm.

5 MR. BLOOM: You'd still be on State
6 Trust Land?

7 MR. COMISKEY: Yes. Yes.

8 MR. BLOOM: You may want to check with
9 the Land Office and see if that unit actually includes
10 the DMG formation. And I believe -- have you filed
11 that application for the easement yet, salt water
12 easement with the Land Office?

13 MR. COMISKEY: I don't know if we have
14 or not to be honest. Well, but I -- but I will tell
15 you this. The person that is evaluating that is
16 actually over at the State Land Office right now
17 having a discussion with them about some -- some
18 things.

19 And I know that -- that the question
20 that you're asking is -- is something that -- and he
21 -- he's aware of both locations. I've been having
22 these -- these ongoing discussions with him about this
23 and -- and he understands fully the need to have the
24 -- own the right to inject disposal water within the
25 DMG on either location.

1 MR. BLOOM: Yeah. Thank you. And you
2 know, that might be a little bit beyond the scope of
3 this today. But I just wanted to ask about those
4 practicalities there so.

5 MR. COMISKEY: Exactly.

6 MS. BENNETT: Thank you.

7 MR. BLOOM: Yeah. Thank you for the
8 presentation. No further questions.

9 MR. FUGE: And I've got no questions
10 for the witness.

11 So you may be excused.

12 MR. MERRIFIELD: Thank you.

13 MS. BENNETT: Thank you.

14 Mr. Chair, I did want to -- and I
15 should have been -- well, I don't need to with
16 Mr. Comiskey. But with Mr. Merrifield, I would like
17 to reserve the right to call him for a rebuttal
18 witness if necessary.

19 MR. FUGE: Okay.

20 MS. BENNETT: Thank you.

21 MR. FUGE: I think in the interest of
22 time, and I think that the next witness will be
23 relatively long. I say we adjourn for a relatively
24 brief-ish lunch break and resume at 12:45.

25 (Off the record.)

1 MR. FUGE: Make sure I've re-initiated
2 the recording. Good.

3 I think we're ready to have you call
4 your next witness.

5 MS. BENNETT: Thank you very much. And
6 Mr. DeBrine is going to handle the next two witnesses.

7 MR. FUGE: Okay.

8 MR. DEBRINE: Good afternoon,
9 Mr. Chair.

10 Chevron would like to call its next
11 witness, Jason Parizek.

12 MR. FUGE: Can I ask the court reporter
13 to swear in Mr. Parizek please?

14 THE REPORTER: Please raise your right
15 hand.

16 WHEREUPON,

17 JASON PARIZEK,
18 called as a witness and having been first duly sworn
19 to tell the truth, the whole truth, and nothing but
20 the truth, was examined and testified as follows:

21 MR. FUGE: Thank you. You may take a
22 seat.

23 EXAMINATION

24 BY MR. DEBRINE:

25 Q Please state your name.

1 A Jason Parizek.

2 Q Who do you work for, Mr. Parizek?

3 A Chevron.

4 Q How long have you worked for Chevron?

5 A Just over ten years.

6 Q And if you could for the Commission just
7 give a shorthand background with regard to the
8 evolution of your duties and responsibilities for any
9 jobs with Chevron during that period?

10 A Yes. I started off working in San Joaquin
11 Valley, California, as an acid development geologist.
12 My duties there were planning and overseeing execution
13 of both horizontal and vertical well bores.

14 Following that, I went out to a field office
15 working with the production operations group on
16 technical team. Duties in that role were setting up
17 and establishing reservoir management and surveillance
18 programs for both a sour gas disposal project and
19 water injection projects. I was also responsible for
20 overseeing and planning side tracks of both vertical
21 and horizontal wells.

22 2018 I moved out up to Midland, Texas
23 working the Permian Basin. I started off working in
24 the production office group as a technical team
25 geologist. Duties on that team involved evaluating

1 some of our deep disposal wells, looking at different
2 performance between the wells. I was responsible for
3 a re-frac project that we conducted in the basin and
4 oversaw some technology projects such as gas
5 reinjection.

6 I'm currently working as a development
7 geologist in New Mexico. Have responsibilities in
8 that role involved planning and overseeing execution
9 of horizontal wells.

10 Q Could you give a brief summary of your
11 educational background?

12 A I have a master or a bachelor's degree, a
13 Bachelor's in Science from San Diego State University.
14 Graduated summa cum laude. And a master's degree from
15 San Diego State University. Both of them are in
16 geological sciences.

17 Q Have you previously specified before the New
18 Mexico Oil Conservation Commission or Division?

19 A I have testified before the Division in
20 February of 2020.

21 Q Were your credentials accepted as a matter
22 of record --

23 A Yes, they were.

24 MR. DEBRINE: We would tender
25 Mr. Parizek as an expert in petroleum geology.

1 MR. FUGE: So tendered.

2 BY MR. DEBRINE:

3 Q Are you familiar with the applications that
4 Chevron filed in these two cases?

5 A Yes.

6 Q Are you familiar with the two saltwater
7 disposal wells that are the subject of the present
8 project?

9 A Yes.

10 Q Before we start reviewing the exhibits you
11 prepared as part of your study, if you could give the
12 Commission just a brief summary of what inquiry you
13 undertook and the subject of your testimony today?

14 A Yes, my testimony will be exploring in
15 further detail some of the case studies that were
16 identified in the map that was referenced I believe in
17 the opening statements regarding one of the products
18 of the 2016 work group that was taking place.

19 What I'm going to show is that several
20 observations of looking at watercut changes can be
21 explained in different ways by establishing some of
22 the understanding that we have developed with DMG and
23 fracture driven interactions between various ventures
24 within the Permian Basin.

25 With those learned, we can now apply those

1 -- that same level of assessment back to those case
2 studies and potentially come up with different or more
3 -- more robust interpretations for the root cause.

4 MR. DEBRINE: And to the benefit of the
5 commissioners, the exhibits we're going to discuss
6 with Mr. Parizek start at page 109. If we can turn to
7 the first slide.

8 BY MR. DEBRINE:

9 Q Could you just briefly explain what this
10 slide represents and the work that went into it?

11 A Yes. This slide really the -- the core of
12 the slide is I want to demonstrate that watercut alone
13 is not a definitive test for salt water disposal's
14 interference of producing wells.

15 So just some of the background in going into
16 this. I mentioned the 2016 work group. That work
17 group shared observations of both Delaware Mountain
18 Group production wells and Avalon production wells
19 that were seeing increased watercut over time.

20 And on the map on the right side, I've got
21 a -- an example of what -- what those maps had looked
22 like that was within that slide deck. And that slide
23 deck is I believe Exhibit 8 in the -- the OCD's
24 exhibits.

25 But on that -- on that map, you'll see kind

1 of a locator map. And within that, there are sections
2 that are highlighted in purple or red. And those
3 sections represent areas that were suggested to have
4 had DMG interactions with underlying Avalon producers.

5 And the way that they're identified, if you
6 look at the circles, you'll see a larger light-colored
7 circle and kind of a smaller dark circle. Well, the
8 smaller dark circle represents a cumulative watercut
9 over the life of the producing well and the larger
10 light-colored circle would represent the last six
11 months' watercut.

12 And when you would see an increase in the
13 last six months' watercut over the lifetime watercut
14 of the well, that would indicate that that well is now
15 producing a higher watercut than it was historically,
16 suggesting that something has changed reading that --
17 that production change.

18 Q So is it fair to say that your study was to
19 look into whether there were other potential causes to
20 explain the increased watercuts that were reported in
21 those case cuttings?

22 A It was -- it was part of the work that I've
23 done. And I'll show in future exhibits that we've
24 learned a lot about our development areas that are
25 located proximal to the example I've shown. And we

1 would apply those learnings and revisit in some of
2 these cases and -- and come up with different, and I
3 would argue in my opinion, stronger hypotheses as to
4 what's going on with the watercut changes.

5 Q If you could turn to your next slide -- what
6 does this represent?

7 A The map shown on this exhibit represents a
8 locator map for the case studies that I had evaluated
9 as part of this assessment. And it's a subset of
10 them. Also shown on the -- they're represented by the
11 colored circles, and I'll describe those shortly.

12 Also shown on this map in stars, yellow star
13 represents a location of the Papa Squirrel saltwater
14 disposal well that's part of this case. And the blue
15 star on the left side of the map represents the
16 location of the Severitas 2 State SWD 1, also part of
17 this -- this case.

18 And the pink or purple polygons that are
19 scattered across this map represent locations or areas
20 that Chevron operates.

21 The colored circles shown on this map --
22 I've got a legend off to the upper right. But the --
23 the green circles represent an area where we've
24 identified Wolfcamp completions affecting the Avalon
25 and resulting in similar observations that we had seen

1 in the previous exhibit that I've shared regarding
2 Exhibit 8 that the OCD has entered.

3 The blue circles represent areas where
4 Chevron is operating Avalon wells either directly
5 under or adjacent to Delaware Mountain Group saltwater
6 disposal. And we are not seeing any impact from those
7 operations.

8 The red circle represents an area where
9 there is identifiable geologic features that trend
10 between Delaware Mountain Group injectors and Delaware
11 Mountain Group producers that may have a driver on why
12 some of the -- the potential communication was seen in
13 those areas.

14 And then lastly, the orange circles
15 represent areas where there are geologic features that
16 trend between Avalon producers and Delaware Mountain
17 Group saltwater disposal wells that again could -- it
18 may indicate why some of those observations were made.

19 Q Let's turn to the potential exhibits
20 prepared for inspection and study. The first one is
21 just identified in the next slide, "Wolfcamp
22 Completions Affect Avalon Production." Just the title
23 and the actual first exhibit representative of these
24 studies on page 112, "Wolfcamp Completions Result in
25 Avalon Production Interaction."

1 If you could explain for the Commission what
2 you did in your study and what's represented by this
3 exhibit?

4 A Yes. Chevron operates in the vicinity of
5 the Papa Squirrel saltwater disposal well we're
6 proposing. We operate several sections that are fully
7 developed with Avalon producers. And those Avalon
8 producers in the northern part of Salado Draw have
9 produced for three to four years from the time we
10 drill till the time I'm showing on this slide with
11 very stable production traits, very stable declines.

12 We've seen predictable gas -- through the
13 time, the life of those wells. And the only
14 particular upsets that we've seen with those well
15 during the production periods were when were
16 developing an offset add directly adjacent to those
17 wells. We would typically see fracture-driven
18 interactions that would result in a short-term
19 gas-oil-ratio trend change or increase in water
20 production.

21 So in roughly 2019 into 2020, we started to
22 see pretty significant changes in our -- our Avalon
23 wells. And -- and by changes I am referring to the
24 diagram that's on the right side of the -- the exhibit
25 here. If we look at -- at that diagram, what we're

1 showing here is both oil production rate and the gas
2 oil -- producing gas-oil-ratios for a sample of the
3 Avalon producers on the northeast side of our Salado
4 Draw development area.

5 Q And what colors are represented in that
6 chart for each?

7 A The green circles represent the oil rate,
8 and the yellow circles represent the solution
9 gas-oil-ratio. What you'll observe on here as I
10 discuss is there's been relatively consistent or let
11 me say stable declines through the oil rate and
12 increases in gas-oil-ratio. What we observed at -- at
13 that time was increases in production.

14 If you'll look at where the vertical dash
15 black line is on that plot, and this is prior to us
16 really understanding what was going on. We started to
17 see significant increases in oil production and
18 significant decreases in gas-oil-ratio.

19 These Avalon wells are approximately 3,000
20 feet TBD shallower than our Wolfcamp pads. And at the
21 time of the study, we didn't have a precedent for --
22 for Wolfcamp completions interacting with Avalon
23 wells.

24 So some of these, we took an investigation
25 to understand what was going on. We looked at

1 facilities bottlenecking. We looked at a wide
2 spectrum of drivers, but the only one that really
3 correlated to what we've observed here were our
4 underlying Wolfcamp A fracs. And the -- and the frac
5 date is shown by that vertical dashed black line. So
6 that was our first -- our first indication that we had
7 an interaction.

8 Following that, I've got another diagram
9 here shown on the left -- the lower left corner of the
10 slide. Practically 3 miles west of -- of the first
11 example, we had another pad. This is our second pad
12 of Wolfcamp A wells that was being completed in the
13 area. And we observe again another interaction in
14 those Avalon wells that's highlighted here in the
15 lower left corner.

16 So let me describe what this chart
17 represents. I've got the time on the -- on the X axis
18 and on the Y axis of showing water rate shown in blue
19 and the gas-oil-ratio shown in black. We see a stable
20 decline in producing water rate, but up until the
21 first black line that's shown with a callout that says
22 "Avalon Frac Interaction Event." This was an offset
23 -- directly offset pad where we saw the completions
24 from that pad interacting with this particular well,
25 and the result was a drop in the producing GOR and an

1 increase in the water production.

2 You'll see another stable decline from that
3 first event down until the point where there's a
4 vertical red solid line and then a second vertical
5 dash line. What this window represents is the start
6 to the end of the Wolfcamp A completion that was being
7 conducted below the -- this Avalon well.

8 So this is two examples. Following this, we
9 had strong hypothesis that these Wolfcamp completions
10 were interacting with Avalon. So we took a
11 surveillance -- we conducted a surveillance study on a
12 third pad where we showed it in two Avalon wells. We
13 ran down whole memory pressure gauges.

14 We conducted water samples from both the --
15 predicted the Avalon well as a baseline. Collected
16 water samples from an offset Wolfcamp pad as a
17 baseline, and we took our water samples from our
18 completions. And what we observed when that
19 underlying Wolfcamp A well or the pad was completed,
20 2,000-psi increase in one of our Avalon wells.

21 We saw the water chemistry change from the
22 time that -- from the time prior to the completion to
23 during the completion and then reverted back to this
24 baseline after the completion. So we -- we then had,
25 again, more data now that supports this hypothesis

1 that our Wolfcamp wells were interacting with Avalon.

2 Q Could you turn to your next exhibit on page
3 113? It's talking about "Wolfcamp Completions Have
4 Extended Periods of Water Influx in Nearby Avalon
5 Wells." And what did you do for this study in order
6 to reach these analysis and conclusions?

7 A Yes. So I've got on the bottom righthand
8 corner just a locator map showing the -- the
9 development, the Salado Draw development area just in
10 the vicinity of where we were observing these
11 Wolfcamp A interactions with our Avalon wells.

12 And highlighted in the blue rectangles, each
13 of those blue rectangles represents an individual pad
14 of Wolfcamp A wells where we have seen an interaction
15 with the overlying Avalon wells. And the only reasons
16 that -- that 13 and 24 aren't highlighted is that they
17 were completed after I conducted his study. So I have
18 not evaluated any -- whether those -- those pads have
19 interacted with Avalon.

20 At the top -- at the top half of this
21 exhibit, I'm showing three different production plots.
22 And this is again a sample of -- of Avalon wells from
23 across our -- our field as -- as highlighted in the
24 bottom right locator map.

25 But on the spot, again, the X axis is timed,

1 and the Y axis represents in blue, water rate; in red,
2 gas rate; and in green, the oil rate. And you --
3 looking at these I'll kind of walk through one of
4 them.

5 Looking at the one on the left, you'll see a
6 very subtle increase around the -- the first callout
7 that says "Avalon Frac," the left of the two. There's
8 a small increase in the water change. And this
9 represents the pad of Avalon wells that were completed
10 two well spaces over from the -- the well that's shown
11 here or two pad spaces over.

12 The second Avalon frac callout represents an
13 offset Avalon pad that was fracked. You'll see a more
14 significant increase in water production, a drop in
15 the producing -- in the gas production, and then an
16 increase in oil production after the -- the well
17 recovers from that frac-driven interaction.

18 But we'll also refer to those as fracture
19 stimulation interference, FSI or FDI. We're using
20 those. I'm using those terms analogously.

21 Q And you may have covered it, but which ones
22 are you referring to when you're talking about water?
23 I mean which color on the graphs?

24 A The blue. So the water -- the water rate
25 itself, the water production rate is blue. But when I

1 refer to the water cut, what I'm observing is that the
2 oil rate drops down to roughly the zero line as the
3 water rate increases from the base line. So that
4 would have indicated that the water cut's increasing
5 at that point.

6 So I've stepped through the two examples
7 from Avalon fracs. Now I want to show that the
8 Wolfcamp fracs are the next two vertical lines on this
9 plot. And both of those -- the first Wolfcamp frac
10 figurative interaction that we observe, we'll see an
11 increase again in -- in the -- the water production
12 rate in blue and the oil production rate in green.
13 And again, that well recovers back to a baseline
14 within about six months, just estimating based on
15 the -- the graph.

16 And then lastly, if you move over to roughly
17 where it says Year 6, you'll see that -- that next
18 Wolfcamp A completion that took place resulted in an
19 increase in water production in this well. But this
20 increase in water production rate is extended at least
21 nine months based on the data that's shown on this
22 plot.

23 And that's really the key that I want to
24 demonstrate with these plots here is if you look over
25 to the middle plot where that Wolfcamp A frac is shown

1 around Year 5, you see that production upset or that
2 change in water production rate extends almost a year
3 on this plot to the end of the data.

4 And lastly, in the -- in the last example,
5 again, that -- that that water rate increases for
6 the -- the limit of the data that's shown on this
7 plot.

8 So the key to -- the key to what I'm showing
9 here is that the fracture-driven interactions or frac
10 interactions between completions and offset wells are
11 generally short term in duration, that these Wolfcamp
12 interactions that we've observed and kind of
13 established are hurting in our area can lead to
14 long-term changes in the -- the water production rate
15 for the -- the Avalon wells.

16 Q If you could turn to your next slide on
17 page 114. And what does this slide represent?

18 A This slide represents a reevaluation of one
19 of the case studies that -- that we had taken a look
20 at. And I want to draw attention to the locator map
21 on the left side. What's shown here in yellow
22 highlight on that locator map is the western extent of
23 our Salado Draw development area. And in the middle
24 of Section 21, and I've -- I've got a blue well stick
25 located. And that is the Avalon producer that we're

1 going to be looking at here in this example.

2 Q So this was multiple other case studies and
3 now Exhibit 8?

4 A This is -- that's correct.

5 Also shown on the map in Section 16 north of
6 Section 21 is a blue triangle in the southeast corner.
7 This represents the location of a Delaware Mountain
8 Group saltwater disposal well. And -- and that same
9 -- on the eastern side of Section 16, I've got two
10 well sticks that are difficult to discern.

11 But the callouts on the top represent those
12 being the locations of one-third Bone Spring well with
13 the completion date shown to be between May and June
14 of 2015. And a stack of three Wolfcamp wells with the
15 completions to be between July and August of 2015.

16 Looking at the -- the production on the
17 right side of -- of the X axis, we're looking at time.
18 And on the Y axis, we're looking at monthly volumes on
19 the logarithmic scale. Shown in blue on this plot is
20 the water production rate. Green is oil rate. Red is
21 the gas rate for the producer that I have called out
22 on Section 21.

23 Also shown on this plot is the injection
24 rate in monthly volumes again up for the saltwater
25 disposal well that's shown in the southeast corner of

1 Section 16. In this example in the documents that
2 were shared in Exhibit 8, the -- the thought or the
3 hypothesis is that breakthrough occurred due to
4 increasing injection rate on that saltwater disposal
5 well, causing the increase in water production in that
6 well located in Section 21.

7 Given the learnings that we had in our
8 development area, I had taken the completion dates for
9 those third Bone Spring well and those Wolfcamp wells
10 and -- and overlay those onto that production file.
11 And what I've noticed is where that purple vertical
12 line is representing the date of the Wolfcamp A
13 completions, that's when we see the significance
14 change in water production on this particular well.

15 So while I'm not ruling out that the
16 saltwater disposal well may have been the driver in
17 it, my -- in my opinion, the Wolfcamp A completions is
18 likely a more robust or superior explanation of the --
19 kind of the -- the two hypotheses that we're looking
20 at here.

21 Q If you could turn to your next exhibit on
22 page 115, "Wolfcamp completions impact Avalon
23 production." And what does this slide show?

24 A This is looking at -- looking at the locator
25 map on the left. We're looking at the same general

1 area, but I've moved the subject well one well spacing
2 to the -- to the east of the -- the previous example.
3 Located in Section -- it's located roughly in the
4 center of Section 21.

5 Also in Section 21, there are two light blue
6 well sticks on the left side representing two Wolfcamp
7 A wells. There are four well sticks kind of in the
8 center of this section representing another set of
9 Wolfcamp A wells and set of purple or I guess purple
10 well sticks on the east side, again representing
11 Wolfcamp A wells.

12 So I've taken the completion dates for those
13 wells and overlaid those onto a production plot from
14 that particular well. And those are shown with the
15 vertical dash lines on the production plot on the
16 right side of this exhibit.

17 I want to note that this one is looking at
18 daily rate versus -- rather than monthly -- monthly
19 rate that we have seen on the last slide. So the
20 first pad of -- the first two Wolfcamp A completions
21 that took place don't show a -- a significant step
22 change. You could argue that the -- if you look at
23 the vertical blue dash line that there's a small
24 increase in water production.

25 But what I really want to call out on this

1 example is that the two pad, the Wolfcamp A wells that
2 are directly underlying that Avalon producer are
3 plotted with a red dash line and a purple dash line.
4 And this well sees a significant change in oil, gas,
5 and water rate coincident with that -- with those
6 completion dates.

7 And this is similar to the example that I
8 had shown in my previous exhibit. One -- on page 112,
9 where we saw increased oil production following an
10 underlying Wolfcamp A completion.

11 Q So your bottom line including with respect
12 to the analysis of the Wolfcamp and Bone Spring
13 completions on oil and gas?

14 A So the -- the key takeaway for my -- for
15 this section is that the observations that we've seen
16 in Exhibit 8 can have alternative -- alternative
17 explanations. Chevron has consistently seen
18 Wolfcamp A completions interacting with our Avalon
19 wells in this particular section of Lea County.

20 And again, the -- just looking at water cut
21 alone in proximity to saltwater disposal wells, it
22 is -- it is not conclusive in determining root cause.
23 With the additional data we have, we really need to do
24 more thorough examinations of -- to rule out which the
25 leading hypothesis is.

1 Q Let's turn to the next aspect of your study,
2 which begins on page 116, looking at whether Avalon
3 wells were affected by DMG disposal. And the first
4 substantive slide is on page 117. If you could
5 explain to the Commission what we're looking at here
6 and what conclusions were reached.

7 A Yes. This example is in a location that's
8 similar to I believe Exhibit 7 that the -- the OCD has
9 submitted. And this is an a -- an area where in 2014
10 and into 2015, the Bran SWD 1 and the Heavy Metal 12 1
11 were two open-hole saltwater disposal wells.

12 And the operator of the -- the green well
13 sticks that were shown on this map where it says "DMG
14 producers," I noted an increase in water production
15 and reached out to the operator of those -- those two
16 saltwater disposal wells, showed them the -- the
17 observations that they had, and they came to an
18 agreement that -- that they were going to shut those
19 wells in due to suspected communication.

20 Q If you could just identify the location of
21 those two wells that you managed to modify on the map?

22 A Those two wells are indicated by a blue
23 circle with a cross in the middle of it.

24 Also shown on this map are two other just
25 open circles, smaller circles. And those represent

1 two others, the Delaware Mountain Group saltwater
2 disposal wells. One of them was -- one of the SDS 11
3 Fed 1 was injecting into only the -- the Bell Canyon.
4 Lotos 11 Fed 2 was injecting into the Bell Canyon and
5 Cherry Canyon.

6 But the -- really the key that I want to
7 demonstrate here is despite the potential
8 communication between the -- the two saltwater
9 disposal wells over to those Delaware Mountain Group
10 producers, Chevron operates Avalon wells that are
11 underlying or between those two locations shown by the
12 -- the DMG wells and the saltwater disposal wells.
13 And we had not seen any indication of water and influx
14 or abnormal production from those underlying Avalon
15 wells.

16 Q Where are the Avalon wells shown on the map?

17 A They're shown by the tan or pink color
18 that's in the tan polygon representing the development
19 area.

20 Q If you could turn to the next slide on
21 page 118 and explain what your study looked at here
22 and the conclusions that you reached.

23 A This -- this study demonstrates again what
24 I'm going to highlight on the locator map shown on the
25 bottom right of the -- of the slide with a blue --

1 what we're looking at here is our -- again, our
2 Chevron Salado Draw development area, the wells that
3 are showing up on the map in Sections 15, 14, 13, 18,
4 19, 24, 23.

5 These are Avalon producers within that area.
6 The northeast corner of our development area is a
7 saltwater disposal well that was completed in the Bell
8 Canyon and the Cherry Canyon.

9 Q And just to clarify, Chevron's Avalon
10 producers here are in a different area than what we
11 looked at in the prior exhibit?

12 A Correct. This is -- this is south of that
13 prior exhibit.

14 Also on this map is a -- is a SHMax
15 orientation. This -- this is the maximum horizontal
16 stress direction. And it was derived from image --
17 image logs looking at four-hole breakouts as well as
18 micro-seismic that was conducted in Sections 18 and 19
19 on this -- on this map.

20 But what I'm going to demonstrate here is
21 that that saltwater disposal well was active from the
22 time that we drilled those wells all the way to
23 February of 2019. And we were on strike to that SHMax
24 orientation of that well, and we did not see any
25 indication of production change over the course of

1 that time aside from the known completions that we had
2 in the Avalon wells that are called out on the
3 production plot that's shown on the left side here.

4 Q You said it runs; correct?

5 A Yes. What I mean by that is if you take the
6 SHMAX orientation from the -- and lay -- overlay it on
7 the saltwater disposal well, that orientation
8 direction points directly into our Avalon wells.

9 Q So the conclusion you've reached is
10 demonstrated by the slide as well?

11 A In part. The other -- the other point that
12 I want to make regarding this -- this area is that
13 these wells produced roughly a 50 percent water cut
14 over their -- over their well life up until we started
15 to see interactions with the Wolfcamp completions. We
16 were able to draw down.

17 We conducted a -- a pressure study in
18 Sections 18 and 19. We were able to draw down
19 bottomhole pressures to where we cut -- conducted
20 those pressure surveys. We were seeing 500 psi to 800
21 psi on those surveys. And over the course of that --
22 that time when that well was actively injecting, we
23 didn't see any indication of a water pressure change.

24 Q Let's take a look at the next aspect of your
25 study when you looked at possible causes of faulting

1 or the lineaments that begins on page 119 and then for
2 subsequent slides on page 120. If you could explain
3 to the Commission the work you did here and what the
4 slide demonstrates.

5 A So now -- now we -- I've stepped back up to
6 the previous example that I've shown where our Avalon
7 wells do not interact with overlying and offset
8 saltwater disposal in the Delaware Mountain Group.
9 But we're -- we're focused now on the Delaware
10 Mountain Group producers in relation to the Delaware
11 Mountain Group injectors that are -- that are shown on
12 this map on the right with the DMG producers being in
13 green, DMG injectors being in blue.

14 Q This is again looking at those wells
15 depicted on Exhibit 11 -- or 7, I mean?

16 A That is correct.

17 On the -- the well that has a callout
18 labeled PLU 401H, I've got a pink dot that indicates
19 where on a pressure -- I'm sorry -- production logging
20 tool. Basically a production log that was run on that
21 well. They observed 1,520 barrels of water coming in
22 at one perforation cluster. That point on this well
23 represents that inflow point.

24 We had a, as Tom mentioned, our geophysicist
25 map out and look for potential faults, potential

1 lineaments in our different development areas. And
2 not being aware of this particular case study, I took
3 the work that that geophysicist had done, and I
4 integrated it into this example.

5 And on that map shown in green represent a
6 potential lineament that was -- that was mapped out
7 from seismic. And the location of that lineament
8 trends between the -- the heavy metal well, the Bran
9 well. And the projection of that extends through
10 where you see that PLT inflow point on that 401H
11 producer.

12 Q So you're talking about the green diagonal
13 line that runs from the southwest to the northeast?

14 A That -- that's correct. And the
15 significance of that with regard to the SHMax
16 orientation that's shown with the double red arrow on
17 the -- the bottom of the slide here is that a -- you
18 know, any kind of fracture, lineament, fault, anything
19 that's oriented parallel to the SHMax direction is
20 going to be under an -- an opening mode or it's going
21 to be in an orientation.

22 I would enhance or enable potential fluid
23 migration through it versus an -- an orientation such
24 as shown on the bottom of this slide. I guess there's
25 two -- there's two little cartoons on the bottom of

1 the slide.

2 The one on the left would represent an
3 orientation of the lineament relative to the -- the
4 SHMax and SHMin. That would give the opening mode.
5 The one on the right shows that that lineament is now
6 perpendicular to SHMax, so it would be under an
7 orientation that would be preferentially closed or
8 restricted fluid movement.

9 But having lineaments, faults, any kind of
10 feature like that in the vicinity of the injection
11 would be unfavorable. And this is a potential
12 explanation as to why that -- that area has reserved
13 the effects that were -- that were noted in here.

14 Q So is it fair to say that your conclusion as
15 to the lineament is a possible pathway for the
16 migration of fluids were observed?

17 A That's correct.

18 Q If you could turn to your next slide on
19 page 121, this looks like a little bit deeper analysis
20 of the same issue.

21 A That's correct.

22 So what I want to first call out is the
23 locator map that's shown on the left side of this
24 slide here. The blue box on that locator map
25 represents generally the general area that we're

1 looking at with this particular example. Looking at
2 the -- the larger map in the center of the exhibit,
3 there are several different colored lines here. And I
4 want to describe what those are.

5 First are the green -- there's a green well
6 location, a green well stick on the southern part or
7 the -- the lower half of this map. That represents a
8 well that was included in the case study. I believe
9 that was Exhibit 8 as a well that had watered out or
10 seen an increase in water production.

11 As part of the review of that case study, I
12 did not observe any offset Wolfcamp A or Avalon or
13 Bone Spring completions that occurred around the time
14 of that well. Seeing increased water production, so
15 we were able to exclude that as a potential driver.

16 But the -- on the right side of the map
17 there are two triangles that represent the locations
18 of two Delaware Mountain Group producer injectors that
19 were completed in the Cherry Canyon and in the Brushy
20 Canyon. Those were thought to be the potential driver
21 to the -- the events that were observed and the vents
22 being the increased water production in the -- in the
23 Avalon well that's shown on the -- the map here.

24 I again integrated the work of our
25 geophysics team. The blue lines on the map

1 represent -- these are deep Woodford or deeper faults.
2 And you'll notice that there's one that trends
3 southwest/northeast across this map. And the -- the
4 red lines indicate -- the red lines indicate a
5 potential Delaware Mountain Group lineaments that the
6 geophysicist had identified in that seismic volume.

7 And what I want to note here is two things.
8 The first is that the DMG lineaments are roughly
9 parallel to the deep faults that we -- that are
10 interpreted in the area. And both of those are
11 parallel or sub-parallel to the SHMax orientation
12 here.

13 So again, this is a potential geologic
14 control on why two saltwater disposal wells could
15 potentially interact with the producing well that's
16 over four miles away. So you know, looking at it from
17 an interpretation standpoint, this would be an
18 unfavorable location group to -- to put it in
19 saltwater disposal wells.

20 Q Did you also take a step in regard to the
21 lower containment for detecting influx?

22 A Yes.

23 Q And that begins on page 122, with a
24 supplement slide on page 123 where you analyze the
25 Bone Spring Lime thickness across the basin?

1 A Yes. This -- this study went to evaluate
2 the -- the strength or the ability of the Bone Spring
3 Lime to prevent fracture growth from Avalon producers
4 up through it. So one of the hypotheses that we
5 identified early on is that these Avalon wells are
6 potentially seeing water production -- production
7 higher than -- than expected because they were
8 breaching through the Bone Spring Lime.

9 So I've got a -- a map on the lower left
10 side here, a map showing the Bone Spring Lime gross
11 interval thickness. And this area covers the New
12 Mexico portion of the Delaware Basin. Also on the
13 slide is the Delaware Mountain Group risk area
14 outline, but it's truncated at the Texas-New Mexico
15 border, and that's shown in black.

16 There's a yellow star near the -- near the
17 Texas-New Mexico border that represents the Madera
18 Malcolm R ET 1 well. And the significance of this
19 well is that in evaluating the Bone Spring Lime
20 throughout this area, the -- although the gross
21 thickness was roughly 30 feet thick, the net carbonate
22 thickness within this well was -- was only
23 representative of two beds that were approximately
24 8 feet thick. So this was a pessimistic case showing
25 the thin or low side case for what the Bone Spring

1 Lime thickness would be at the area.

2 Lastly, on the -- on the map shown on the
3 left side, I've got the -- the starred locations in
4 orange of the Papa Squirrel, the Severitas wells. And
5 in white are callouts showing the -- the thickness of
6 the Bone Spring Lime at 42 feet at the Papa Squirrel
7 and 87 feet thick at -- at the Severitas location.

8 Q And what does it show on the right?

9 A On the right is the -- showing the log on
10 the Madera Malcolm, the well that I had mentioned
11 previously. And we're looking at -- in a -- in terms
12 of the tracks, the first track is the gamma ray. Then
13 you'll see the depth track with depth indicated in
14 both TBD and TBD sub C.

15 The -- the next log frac is the resistivity,
16 and there is ferocity along with the PE,
17 photoelectric. And then lastly is just a lithology, -
18 - lithology on the -- the right track.

19 Q If you could turn to your next slide on
20 page 124 where you dug deeper with regard to the Bone
21 Spring Lime being breached?

22 A Yes.

23 Q And what are you showing here?

24 A What's showing here was a -- a modeling
25 exercise that had taken place to understand whether

1 our baseline Avalon completions could potentially
2 breach through the Bone Spring Lime at this location.
3 So what was done is we took the base case completion
4 with slurry volume per cluster basis and started out
5 with 69,000 gallons per cluster.

6 We also studied sensitivities of 79,000
7 gallons per cluster and 91,000 gallons per cluster.
8 And in doing that, we were looking at the potential
9 that you weren't seeing the great cluster efficiency,
10 meaning that not all the clusters were receiving
11 fluid.

12 And in all three of those scenarios, we did
13 not observe the Bone Spring Lime. Or let me, well,
14 rephrase. We did not observe the -- the Avalon
15 completions propagating up through the Bone Spring
16 Lime. But we also undertook a study to understand
17 what it would take.

18 So we -- we increased the -- the volumes
19 for -- of it -- volume per cluster basis. And it took
20 over 109,000 gallons per cluster in order to start to
21 breach the 8-foot-thick Bone Spring Lime. But I want
22 to emphasize that over our development area and over
23 the -- the locations of our saltwater disposal wells
24 that the Bone Spring Lime is significantly thicker
25 than this.

1 And then one final note. You know, this is
2 a model, so we want to calibrate it to field data.
3 And as I mentioned previously, we were able to draw
4 down our Avalon wells to less than a thousand psi
5 bottomhole pressure, which suggests to us that we are
6 not seeing influx of water from the overlying Delaware
7 Mountain Group, meaning that those completions did not
8 breach through the -- the Bone Spring Lime.

9 Q Can you turn to the next slide, which is
10 just a summary of your conclusions? If you can go
11 through them and express your opinions based on your
12 study?

13 A Yes. To summarize, you know, looking at --
14 looking back at the case studies that were shared, I
15 -- it's shown that water cut can have multiple drivers
16 in unconventional wells. And really, we need data and
17 we need to do more exhaustive analyses on these case
18 studies to identify what the root cause is just
19 because water cut alone in proximity to saltwater
20 disposal is not a conclusion of interference.

21 We've seen consistently within our
22 development area in South Lea County that we've had
23 Wolfcamp completions interacting with Avalon wells.
24 And often the response that we see those Avalon wells
25 is -- the observation is similar to what was noted in

1 Exhibit 8 from the OCD map in the previous study.

2 We have two cases of complete development
3 areas where we're able to produce our Avalon wells in
4 proximity to Delaware Mountain Group injection without
5 seeing indications of communication.

6 When the SHMax orientation of features such
7 as lineaments or faults is parallel to the -- when the
8 strikes of the lineaments or fault are parallel to
9 SHMax, those locations are -- that orientation's
10 potentially enabling to fluid migration through them
11 as opposed to when they're orthogonal to SHMax or
12 perpendicular to it where the -- the lineament will be
13 under enclosing mode.

14 Q And Chevron analyzed the areas around the
15 two wells that are the subject of the pilot project to
16 determine if they're lineaments?

17 A They have investigated it, and they have not
18 any evidence within 2 miles of the locations.

19 Q And finally, what does the --

20 A In conclusion, the -- the Bone Spring Lime
21 is -- is not being breached during Avalon completions.
22 And the saltwater disposal wells are operating in a
23 manner not to frac the reservoir. Whereas our Avalon
24 completion is the intent of those was to break down
25 the reservoir. So we were trying to stimulate frac of

1 the -- the reservoir below them, and we were not
2 breaching through the Bone Spring Lime.

3 Q In your opinion, will the Chevron wells that
4 were subject to the pilot project negatively impact
5 DMG existing or future projects in the area?

6 A No.

7 Q In your opinion will the Chevron wells
8 negatively impact Avalon's wellspring production into
9 the area?

10 A No.

11 Q In your opinion will the wells actively
12 impact relevant rights of producers of Avalon or Bone
13 Spring or DMG?

14 A No.

15 Q Were the exhibits we discussed today
16 prepared by your or under your direction?

17 A Yes.

18 MR. DEBRINE: We would move the
19 admission of Exhibits I believe it's 109 through 123.

20 MR. FUGE: Any objections?

21 MR. TREMAINE: Yes, Mr. Chair. Thank
22 you.

23 MR. FUGE: Any objections?

24 Exhibits have been admitted.

25 //

1 (Exhibits 109 through Exhibit 123 were
2 marked for identification and admitted
3 into evidence.)

4 MR. FUGE: Mr. Tremaine?

5 MR. TREMAINE: Making sure I understand
6 the formulation of the questions.

7 EXAMINATION

8 BY MR. TREMAINE:

9 Q We're going back to slide 120. This is a
10 clarifying question. What is the distance between the
11 injection wells that you're referring to and the
12 producing wells that were affected on the slide?

13 A Approximately two and a half miles.

14 Q And I want to make sure I'm understanding
15 the summary of your presentation here. Is it
16 Chevron's conclusion that the Wolfcamp wells are
17 communicating with Avalon producing wells?

18 A They are. That is our conclusion, yes.

19 Q And can you speak to whether that
20 communication is negatively affecting or damaging
21 production in those Avalon wells?

22 A We have seen cases where it has -- where it
23 has taken longer to recover in those wells. I can't
24 speak to the -- the economic value of that.

25 Q And is my understanding also true that you

1 cannot eliminate the Mesquite well SWD wells as the
2 source of the interference for the wells?

3 A No, I'm not. I'm not suggesting that
4 they're not.

5 Q In the area where the observed influence for
6 the Wolfcamp completion was observed in the Avalon,
7 were there any similar observations in the Bone Spring
8 horizontal wells and the Avalon and Wolfcamp?

9 A I have not investigated that in that area.

10 MR. TREMAINE: No further questions.

11 MR. FUGE: Ms. Hardy, any questions?

12 MS. HARDY: I do have some questions.

13 Thank you.

14 EXAMINATION

15 BY MS. HARDY:

16 Q Good afternoon. I've got a few questions
17 for you, and I'm going to be jumping around a little
18 bit here. If you can look at page 110 of the
19 application file.

20 A Yes.

21 Q So it looks like this exhibit addresses or
22 references six case studies; is that right?

23 A Yes.

24 Q And then the writeup within the subsequent
25 exhibits I only see five.

Page 159

1 A Yeah.

2 Q Is there still -- what is happening with the
3 sixth case study?

4 A Yeah. The sixth case is the orange circle
5 that's shown on the -- near the state line on this
6 map. And it's -- it represents the area where Chevron
7 drilled eight Avalon wells, and since the beginning of
8 those wells, they've seen high watercut and high
9 pressure.

10 Across the state line -- difficult to
11 explain. I guess across the state line and one
12 section to the west, so approximately 1 mile to the
13 southwest of that location, there is a saltwater
14 disposal well that's completed in the -- in the
15 Delaware Mountain Group.

16 We identified between that saltwater
17 disposal well and our Avalon wells some potential
18 localized faulting. And it's our -- it's our leading
19 hypothesis that those wells are being influenced by
20 saltwater disposal in that -- in that area. But
21 that's the last case. I did not have an exhibit on it
22 and did not discuss it.

23 Q And what's the current production status for
24 the Avalon wells included in this case study?

25 A I don't know the current status of the

1 wells.

2 Q You can -- what is the approximate vertical
3 separation between the Wolfcamp and the Avalon shale?

4 A 3,000 feet.

5 Q And what do you think is the mechanism or
6 the pathway that is allowing Wolfcamp fracs to
7 communicate with Avalon?

8 A I don't know. But -- but the hypothesis is
9 either existing potential -- existing open networks or
10 the stimulation networks. But we -- we do not think
11 that we are propagating the Wolfcamp fractures up all
12 the way to the Avalon.

13 Q Is the frac being comprised or vertically
14 through the pole rod section or is the communication
15 occurring through natural fractures or faults?

16 A I think that's what I answered in the last
17 question.

18 Q Those are that it's growing vertically
19 through the?

20 A Oh, we don't -- we don't believe that it's
21 growing vertically 3,000 feet.

22 Q You don't know. Have you checked the oil
23 gravity to determine whether it's changed?

24 A We have not.

25 Q And let's see the next slide. Can you look

1 at Slide 113? And there are three production rate
2 versus time lapse on this page; correct?

3 A Yes.

4 Q And are these composite graphs for all of
5 the Avalon well drilled in a path?

6 A These are not. These -- these represent a
7 sample of wells primarily taken from the -- the east
8 side of the -- of the Salado Draw development area, so
9 Sections 18 and 19.

10 Q And what are the dates for the data that's
11 shown on these graphs?

12 A The dates indicate -- I don't have the --
13 the dates listed on here but these represent from the
14 start of the well shown on the left side of the data
15 all the way through just the years I've shown on here.

16 Q So you don't have an idea or you don't know
17 what the timeframes were?

18 A Roughly 216 would -- would be the start of
19 the plots, the times on here.

20 Q And were any of these sections at least
21 including the original production areas caused by DMG
22 injections?

23 A Can you rephrase the question?

24 Q Yeah. Were any of these sections included
25 in the original production areas that were influenced

1 by DMG injection?

2 A Not sure I understand the question.

3 Q Let me ask this. Did the other Avalon pad
4 show similar production performance or are there some
5 that are showing water influx?

6 A Yes. The -- the paths that are shown on the
7 -- the map on Exhibit 113 showed stable production.
8 The -- the two sections that I've noted in that case
9 study in sections 29 and 32 that are cropped off on
10 this map are the wells that have showed increased
11 influx from these early production wells.

12 Q So back on page 112, the exhibit indicates
13 that Chevron observed significant production changes
14 in Avalon wells overlying Wolfcamp A fracs; right?

15 A Overlying and your -- directly overlying and
16 in proximity to the pad. So it did not have to be
17 directly underlying the -- the Avalon wells impactor
18 did not need to be directly overlying the Wolfcamp
19 fracs. So even if there were a couple well spacings
20 offset, we still would see the -- the influence of
21 them.

22 Q And then on page 114, are you attributing
23 the watering out of the Section 21 Avalon well to
24 fracs that were completed approximately a half-mile
25 away?

1 A That -- that's the best bit of data we have,
2 so we're looking at the fracs that are roughly a
3 half-mile away, but we're also looking at the
4 saltwater disposal well to that same distance and
5 spacing where the Wolfcamp wells were, again,
6 intentionally trying to break -- break down the rock,
7 whereas the saltwater disposal well was -- was not.
8 It was supposed to be injected under a frac gradient.
9 So that's the conclusion that we lead to is that the
10 Wolfcamp completions that are a -- a superior
11 hypothesis.

12 Q And the Wolfcamp completions are several
13 thousand feet deeper; correct?

14 A That's correct.

15 Q What typical half fracked length does
16 Chevron target?

17 A I don't know.

18 Q Do you have any examples in this
19 presentation where Chevron has performed targeted
20 surveillance and Wolfcamp frac water traveled over a
21 half-mile?

22 A Not in this presentation, no.

23 Q And has Chevron done that analysis other
24 than in this presentation?

25 A Can you rephrase the question?

1 Q Sure.

2 A Or restate that.

3 Q Sure. Has Chevron performed targeted
4 surveillance of the Wolfcamp frac that has shown the
5 Wolfcamp frac water has traveled over a half-mile?

6 A We have vertically. So we have seen
7 indications -- it's not conclusive, but we have seen
8 indications where a Wolfcamp to Avalon water mixing
9 relationship is a valid solution to the observations
10 that we have.

11 Q That's vertical?

12 A That's vertical.

13 Q But not horizontal?

14 A Not that I'm aware of. No.

15 Q Do you have the 3D seismic in this area?

16 A We do.

17 Q And have you been able to determine the
18 location or trend of these fractures or faults that
19 are allowing this fracture stimulation's appearance?

20 A Not in -- not in the vicinity of this area,
21 no.

22 Q If you'll look at page 118 please. And this
23 is a production rate versus time graph; correct?

24 A Yes.

25 Q And is this plot a single Avalon well?

1 A This is, yes.

2 Q And where is the well located?

3 A Roughly in the center of Section 18.

4 Q And the data on the graph ends in late 2021;
5 is that correct?

6 A That's correct.

7 Q Has there been any change in the production
8 performance of this well since then?

9 A There has, yes.

10 Q And what has that shown?

11 A That's shown a Wolfcamp completion that
12 was -- there was two paths of Wolfcamp wells that were
13 completed on the west half of Sections 18 and 19. And
14 this well has seen a response to that frac gradient
15 interaction in both wells. And I believe that this
16 well is actually one of the examples shown on another
17 exhibit that has all this data.

18 Q And on the lower right side, the Mesa B SWD
19 is highlighted; correct?

20 A Yes.

21 Q And is that a DMG SWD?

22 A It is.

23 Q And do you have any information about the
24 history of that well?

25 A Other than what's located on the or

1 indicated on the slides, that's the -- the history
2 that I have on it.

3 Q If you can please look at page 124.
4 Actually, sorry, 121. What is the name of the well
5 that is labeled 24/8/2011? Sort of the lower part of
6 the --

7 A I -- I do not recall. And that -- that date
8 represents the completion date for that well.

9 Q And do you know what zone that well is
10 completed in?

11 A I believe it's Avalon.

12 Q What's the significance of these DMG
13 lineaments that are shown on this exhibit?

14 A That it could -- that the orientation of
15 those lineaments is parallel to the SHMax orientation
16 and that they trend between the disposal wells and
17 the -- the producer that's shown on the map.

18 Q Do they provide a vertical connection
19 between different layers?

20 A We don't know.

21 Q On which path does Chevron believe the water
22 moved between the SWDs and the producer?

23 A One hypothesis is since these lineaments are
24 parallel to the deep basement faults that are shown
25 here is that potential movement or even minor movement

1 of those -- those features could reach through the
2 Bone Spring Lime providing a conduit. We don't have
3 data that -- to support those hypotheses.

4 Q Were the two DMG SWDs shown on this exhibit
5 good disposal wells?

6 A I don't know the -- the rates that went into
7 those wells.

8 Q Does Chevron believe there could be a
9 correlation between the presence of faults and
10 injectivity?

11 A I wouldn't be able to answer that. I don't
12 have the background in that. It's not my area of
13 expertise.

14 Q Let's look at page 124. And you indicated
15 earlier in your testimony that your frac predictions
16 were based on the models; is that correct?

17 A In part, yes. They were -- the modeling was
18 a test. Yes.

19 Q And can you confirm that you won't be able
20 to predict the shape of the actual fracs until the
21 models are calibrated?

22 A The -- the frac model, the, like, details of
23 the frac models, Cody Comiskey will be able to answer
24 some of those.

25 Q Did Chevron run micro-seismic in this area?

1 A Yes.

2 Q Did that analysis agree with your simulation
3 results?

4 A It did.

5 MS. HARDY: Those are all of my
6 questions. Thank you.

7 MR. FUGE: Dr. Ampomah?

8 DR. AMPOMAH: Thank you, Chair. I do
9 have some few questions.

10 So beyond the tunnel fracture model
11 that you did, has there been any actual -- done to
12 test some of these hypotheses?

13 MR. PARIZEK: We -- not to my
14 knowledge.

15 DR. AMPOMAH: And is there any plans?

16 MR. PARIZEK: To -- there may be. And
17 perhaps one of the other witnesses can discuss that.
18 I'm not aware of what the entirety is of what 25 folks
19 did, but I don't know the answer to that.

20 DR. AMPOMAH: Someone needs how do I
21 put this? Based on the testimony it's more like some
22 of them are still inconclusive.

23 MR. PARIZEK: In -- I think that's a
24 great question and part of the basis of our pilot is
25 to collect the data in order to really rule out and

1 understand what the root causes are so we're not in a
2 situation where we have multiple working hypotheses
3 but no way to test them.

4 DR. AMPOMAH: So what about the trace
5 test?

6 MR. PARIZEK: That's -- that's a key
7 part of surveillance. However, it's difficult to
8 convince an operator of a saltwater disposal well to
9 run a tracer in their well when it may prove that that
10 well connects to one of your producers. So having an
11 operator operate the saltwater disposal and the
12 producer, it helps to test those types of scenarios.

13 DR. AMPOMAH: And I know that's
14 something that you want to do as part of the pilot
15 program.

16 MR. PARIZEK: Yes. And we discussed by
17 another witness, but that is part of our results, yes,
18 is that.

19 DR. AMPOMAH: So the Avalon and the
20 Wolfcamp, these are open and producing results; right?

21 MR. PARIZEK: That's correct.

22 DR. AMPOMAH: So where is the water
23 coming from?

24 MR. PARIZEK: We -- we don't have a
25 conclusive answer to that, where that water is coming

1 from. We've seen -- well, what we have seen with the
2 -- the surveillance that we have done is that we -- in
3 the east half of the field, we have seen a valid
4 mixing relationship between Wolfcamp water and Avalon
5 water, meaning that multiple constituents show an
6 increase in -- in enrichment. And in the west half of
7 the field, we've seen a valid mixing relationship
8 between frac water and Avalon water, suggesting that
9 we were seeing migrated frac fluid up.

10 But again, we don't have water samples
11 for all of the different benches, so we don't know
12 whether that's potentially coming from another bench
13 that we don't have to sample for. But we -- again,
14 valid mixing relationships in those cases.

15 DR. AMPOMAH: So let me ask you this on
16 your experience in this area. Why does it take
17 induction rates for -- in this area?

18 MR. PARIZEK: The only example that I
19 have knowledge of is the one that I shared on --

20 DR. AMPOMAH: [Unintelligible response]

21 MR. PARIZEK: Yes. I believe it --
22 that is --

23 DR. AMPOMAH: 118?

24 MR. PARIZEK: 118. That -- the typical
25 rate for that well is between 2,000 and 4,000 barrels

1 per day.

2 DR. AMPOMAH: So is it a general
3 representation of the typical rates in this area?

4 MR. PARIZEK: In New Mexico, that's the
5 example. Across the state line, approximately half a
6 mile south of the state line, there is a well that has
7 injected -- I want to say to the best of my knowledge
8 over 10,000 barrels a day, potentially higher.

9 DR. AMPOMAH: So you talk about a
10 geological feature like the lineament or send out
11 potential communication, so have those been marked,
12 you know, in this area, especially where you are,
13 because of the pilot?

14 MR. PARIZEK: It has. The geophysicist
15 has gone in investigation for DMG lineaments kind of
16 mapping the way that they had done in the other
17 examples that I have shown. And they have not
18 identified any within 2 miles.

19 DR. AMPOMAH: And I just want to
20 confirm. So you showed the thin thickness of the Bone
21 Spring Lime. So I just want to confirm that in your
22 area it's much thicker than in that 8?

23 MR. PARIZEK: That's correct. So that
24 -- that map shown -- shown on Exhibit 123 or page 123,
25 that well is located both outside of development area,

1 the Salado Draw, and across the Texas state line. So
2 it's outside of where we're going to be operating or
3 potentially operating these two wells. At the
4 locations of the wells noted it's 42 feet thick at
5 Papa Squirrel and 87 feet thick at Severitas.

6 DR. AMPOMAH: Are there any extra
7 fractures in this area that you're aware of?

8 MR. PARIZEK: That --

9 DR. AMPOMAH: Multiple fractures?

10 MR. PARIZEK: In the -- in the Bone
11 Spring Lime?

12 DR. AMPOMAH: In the Bone Spring. Also
13 the Brushy Canyon, and also the actual injection zones
14 that you target?

15 MR. PARIZEK: Not that I'm aware of.

16 DR. AMPOMAH: So you don't believe --
17 could there be a possibility that there could be an
18 existent fracture is causing some of the
19 communications?

20 MR. PARIZEK: The -- the image logs
21 that have been acquired over the area generally show
22 -- and I'm speaking just in general in the Permian
23 that the vast majority of fractures are -- are healed
24 or sealed.

25 DR. AMPOMAH: So there's no need to get

1 a --

2 MR. PARIZEK: The -- I think it would
3 be -- I don't -- I don't know the answer to that.

4 DR. AMPOMAH: -- Thank you.

5 MR. PARIZEK: Thank you.

6 MR. FUGE: Mr. Bloom?

7 MR. BLOOM: No questions. Ms. Hardy
8 and Dr. Ampomah asked my questions there. Thank you.

9 MR. FUGE: I just had one, and it goes
10 back to your testimony. 2016, if I was understanding
11 it correctly, you referred to re-looking at some of
12 the case studies there that the operator group came up
13 with. And at the time they'd attributed to SWD. But
14 in looking at it more closely, you know, it at least
15 equally attributed in your testimony of kind of the
16 Wolfcamp A completion.

17 Why wasn't some of that analysis
18 done in 2016? Was the data not available? I'm just
19 curious of the change in sort of the conclusions and
20 the source.

21 MR. PARIZEK: I -- I wasn't part of the
22 work group in 2016. But I will -- I would suspect
23 that seeing Wolfcamp fractured interactions with
24 Avalon was probably something that they weren't
25 considering at that time. And having experienced that

1 in our area, that's what prompted us to -- to revisit
2 that.

3 And in fact, when I started out here in
4 the Permian Basin, that was -- you know, that study
5 was kind of a foundation that -- that I use in
6 evaluating Solada Draw area in general. And when we
7 started to see the -- the production changes in our
8 Avalon wells around the time that we were completing
9 the Wolfcamp fracs, we did test water and we were
10 seeing different water chemistry that we had observed
11 in the wells that we suspected to be watered out by
12 the DMG.

13 So that suggested to us that that SWD
14 to Avalon model wasn't an explanation for what we were
15 observing and caused us to -- to investigate other --
16 other causes being built at Wolfcamp A.

17 MR. FUGE: No further questions.

18 MS. HARDY: Mr. Chair?

19 MR. FUGE: Yes, I'm sorry.

20 MS. HARDY: I apologize. Would it be
21 possible for me to ask a couple more questions
22 following Dr. Ampomah's questions?

23 MR. FUGE: Yeah, that's fine.

24 MS. HARDY: Thank you. I'll be quick.

25 //

1 EXAMINATION

2 BY MS. HARDY:

3 Q Can you confirm that for a Wolfcamp frac
4 that you'd give with an Avalon producer, there would
5 have to be a breach in the Bone Spring Lime?

6 A There would not.

7 Q There would not have to be a breach?

8 A So Avalon lies below the Bone Spring Lime as
9 does the Wolfcamp, so it would not require a breach.

10 Q And I think you said this earlier, but can
11 you confirm that you're not able to identify the
12 fracture pathways that allowed the communication
13 that's a result of the 3D seismic analysis?

14 A That's correct.

15 Q Based on Chevron's experience with
16 stimulation appearance between Wolfcamp fracs and
17 Avalon producers, have you seen an immediate response
18 in the producer while stimulation operations are
19 occurring?

20 A We have with pressure. We did see pressure
21 response increase during the Wolfcamp completion.

22 Q Does Chevron shut in its Avalon producers
23 while fracturing the live Wolfcamp horizontal wells?

24 A We do not.

25 Q Does Chevron surface commingle its Avalon

1 Wolfcamp wells?

2 A I don't know.

3 Q What if your graphs shows water production
4 versus gas-oil-ratio? That should be on slide 112.
5 And is that a plot of the production from a pad or
6 from an individual well?

7 A The -- which plot?

8 Q The water production versus gas-oil-ratio?

9 A That's an individual well.

10 Q Would Chevron consider this a tight curve
11 for Wolfcamp frac to Avalon producer interference?

12 A Can you rephrase?

13 Q Sure. I'll ask it again. Would Chevron
14 consider this plot a tight curve for Wolfcamp frac to
15 Avalon producer interference?

16 A We -- we have not seen this type of response
17 everywhere. Some of them were positive
18 fracture-driven interactions. This represents a
19 negative fracture-driven interaction. So there is not
20 a -- a single response to those interactions. So no.

21 Q And is the entire production history of that
22 well, that shelf on the --

23 A I don't recall.

24 MS. HARDY: That's all my questions.

25 Thank you.

1 MR. FUGE: I think the witness is
2 excused.

3 MR. DEBRINE: Yeah, no further
4 questions. We'll reserve the opportunity to call on
5 him for rebuttal.

6 MR. FUGE: Okay.

7 MR. DEBRINE: Chevron calls its next
8 witness Bryce Taylor.

9 MR. FUGE: May I ask the court reporter
10 to swear in the witness?

11 THE REPORTER: Please raise your right
12 hand.

13 WHEREUPON,

14 BRYCE TAYLOR,
15 called as a witness and having been first duly sworn
16 to tell the truth, the whole truth, and nothing but
17 the truth, was examined and testified as follows:

18 MR. FUGE: Thank you.

19 You may begin.

20 EXAMINATION

21 BY MR. DEBRINE:

22 Q Could you please state your name for the
23 record?

24 A Yes, my name is Bryce Taylor.

25 Q Who do you work for, Mr. Taylor?

1 A I work for Chevron.

2 Q How long have you worked for Chevron?

3 A I've worked for Chevron for approximately 11
4 years.

5 Q If you could give the commissioners a brief
6 summary of your background and experience with Chevron
7 as well as your educational experience?

8 A Yes, I'd be happy to. So I graduated in
9 2012 with a Bachelor's of Science degree in Mechanical
10 Engineering, magna cum laude, from Brigham Young
11 University. Subsequently hired on with Chevron. And
12 while working full-time for Chevron, I also had the
13 opportunity to work on a master's degree with the
14 University of Southern California in petroleum
15 engineering with emphasis in smart oilfield
16 technologies.

17 I started off my career in Chevron working
18 in -- in California in San Joaquin Valley assets as a
19 reservoir engineer primarily focused on developing
20 steam flood projects for steam floods. That's
21 enhanced recovery. We'll inject steam instead of
22 water to heat up the heavy oil.

23 I also did that for about two and a half
24 years. And I stayed within California in those heavy
25 oil assets but moved to a new team working as a

1 production engineer for about two and a half years.
2 Following that, I transferred out here to the Permian
3 Basin as a reservoir engineer.

4 I get into our asset development groups who
5 do drilling or do horizontal wells. My primary area
6 of focus was in the Midland Basin where I was at --
7 had the opportunity to bring online approximately 200
8 unconventional wells across my tenure there. That
9 lasted about four and a half years.

10 And then at the beginning of 2022, I moved
11 into my current role, which is our water strategies
12 senior petroleum engineering advisor for the entire
13 Permian. And this role is primarily focused on
14 long-term water -- produced water handling strategy.
15 It's focused on their -- program and really the
16 subsurface reservoir engineering related tasks and
17 analyses as they relate to our produced -- produced
18 water.

19 Q You said your responsibility includes the
20 entire Permian, which obviously is part of New Mexico?

21 A That is correct.

22 Q Have you ever testified before the Oil
23 Conservation Commission or Division?

24 A I have not.

25 Q Are you familiar with the applications that

1 Chevron has filed in these two cases?

2 A I am.

3 Q Are you familiar with the two wells that are
4 the subject of Chevron's pilot project underlying
5 these applications?

6 A Yes.

7 MR. DEBRINE: We would tender the
8 witness as an expert in operations and engineering.

9 MR. FUGE: Accepted for those purposes.

10 BY MR. DEBRINE:

11 Q If you could briefly summarize, Mr. Taylor,
12 the work that you did as a part of Chevron's pilot
13 project that we're considering here today?

14 A Yeah, so be happy to. So my -- my testimony
15 will cover several aspects of -- my first focus was on
16 our -- looking at the -- the assessment of the
17 remaining reserve potential in the Delaware Mountain
18 Group talked about here today. In Tom Merrifield's
19 analysis, there are some offset wells, and so I
20 analyze those for their remaining potential.

21 I'm also going to speak today about -- a
22 little bit more about containment. Jason just shared
23 with us the -- the lower containment strength of that
24 Bone Spring Lime. I'll be sharing an analysis of the
25 upper containment, that upper seal of the -- of the

1 Lamar limestone.

2 I also have an assessment of some modeling
3 work, how we identify analogs for the SWD wells, and
4 applying those analogs to these -- these two wells in
5 question, the Papa Squirrel and Severitas to modeled
6 their -- the potential performance over their life,
7 which will include what their radius of impact will
8 be, what their total storage would be, and how the
9 reservoir pressures could react over time as we inject
10 water into these SWDs.

11 And finally, I'll give a brief overview of
12 our -- our surface operations of our SWDs and the
13 associated facilities.

14 MR. DEBRINE: For the benefit of the
15 commissioners and the parties, the exhibits we're
16 going to discuss begin on page 142.

17 BY MR. DEBRINE:

18 Q And the first substantive slide is on
19 page 143. If you could just lay the background for
20 that slide for the commissioners.

21 A Be happy to. So this slide is intended to
22 orient everyone. You can see our Papa Squirrel SWD up
23 there is Section 13 at the top of the -- the top of
24 the map. As I mentioned already there early a -- two
25 or three active DMG producers within a 2-mile radius

1 of that well.

2 Those wells are located within the El Mar
3 Field. The El Mar Field extends south across the
4 state line actually into Texas. And as previously
5 mentioned, there's no active DMG producers within the
6 2-mile radius of the Severitas well. So that this
7 analysis, which I share with you here, is this exhibit
8 and subsequent exhibits as focused on the DMG in the
9 vicinity of the Papa Squirrel.

10 Q If you could turn to the next on page 144.
11 And is this the beginning of the analysis of the three
12 wells that were in this produce line?

13 A Yes, it is. Just to walk everyone through
14 this analysis. So we have here in a plot on the right
15 the production history of the Sahara Fed-Littlefield
16 DR 1 well as you can see that the production history
17 dates back to, you know, 1960s, 1970s. This is the
18 entire production history of the well, so this
19 includes its primary production and secondary recovery
20 portions of its life.

21 The analysis -- the decline analysis that I
22 conducted took into account approximately -- and each
23 dot here -- sorry, on the chart. Green dot represents
24 the oil production for a given month. And that's --
25 that oil production has been calculated in terms of

1 barrels per day over that month.

2 The decline portion of the analysis covers
3 an area or a timeframe of approximately five to ten
4 years, as you can see indicated there by the straight
5 line through the production points on the right to --
6 which is a sufficient amount of data to establish a
7 long-term trend for this producer well. I did choose
8 a cutoff rate.

9 As you can see there in the table on the
10 left of one barrel per month. This is an extremely
11 low -- low amount of production for any well just to
12 really give this well the most benefit of the doubt to
13 calculate its remaining potential.

14 As you can see the decline is -- is in my
15 opinion extremely steep for a conventional producer at
16 33.67 percent per year. Extrapolating that decline
17 out to that cutoff rate, it shows this well's
18 potential item life would happen in June of 2026 with
19 only 96 barrels of oil remaining to be recovered.
20 Like to emphasize that most of the current production
21 for this well is much less than one barrel a day. And
22 in my opinion, this well is depleted.

23 Q Did you sit and want to analyze the other
24 two wells?

25 A Yes, I did.

1 Q And is that analysis on page 145 and 146?

2 A That is correct. A similar process was
3 followed. Both of these wells, again, are producing
4 much less than a barrel a day. One of the wells had
5 that ringing assessment of only 11 barrels and there
6 were only a few barrels remaining. And so again these
7 wells appear to be depleted.

8 Q What conclusions did you draw with respect
9 to the potential impact of the pilot project wells on
10 the future production from these declining producers?

11 A My conclusion is that there will be no
12 impacts to the trend -- the production trend that
13 we're seeing since these wells --

14 Q Did you also conduct a decline analysis for
15 the remaining reserves in the entire field?

16 A Yes, that's correct.

17 Q And I believe that begins on page 147?

18 A Yes, it does.

19 Q If you could just explain to the
20 commissioners what you did and what you found out
21 about this exhibit.

22 A Yes. So this is a very similar methodology.
23 The only difference being this is rolling up and
24 sending all of the wells together. You could see the
25 decline there represented in the straight line at the

1 right part of the plot. Over that defined period
2 there have been a -- the well count of about 20 wells,
3 which continued through 2022. Declining out those 20
4 wells also resulted in a 33.82 percent annual decline
5 rate against a very high ceiling. Had the three
6 individual wells examined.

7 The cutoff rate I chose for this analysis
8 was 30 barrels a month for the entire field. That's a
9 very small amount of -- a very small rate for a field.
10 This is projecting with that cutoff rate of the field
11 to potentially in the next year with only 1300 barrels
12 of oil remaining.

13 I'd also like to apologize on the exhibit.
14 We have a box there. We have kind of a blank there
15 for "Most recent well drilled." The -- the year of
16 the -- of those 20 wells, the youngest one was drilled
17 in 1977. So these were old wells. You know, we kind
18 of produced for a long life and are depleted.

19 Q And so what conclusions did you draw from
20 your analysis with respect to the impact of the wells
21 on the remaining reserves to the El Mar Fields?

22 A My conclusion is that there would be -- not
23 be an impact due to the fact that the build -- it
24 should be depleted.

25 Q So it's your analysis and conclusions as far

1 as the Division's concerned that express with regard
2 to potential impacts to the wells on either existing
3 DMG production or future DMG production?

4 A Yes.

5 Q And what conclusions did you reach?

6 A Reached that there -- could you restate the
7 question?

8 Q Yeah. With regard to their concerns with
9 respect to those effect of the pilot wells on existing
10 and future DMG productions in the area?

11 A My conclusion is that -- that due to the
12 highly depleted nature of this field and the projected
13 short life remaining that our wells would not have any
14 impact on recoverable hydrocarbon.

15 Q Let's now turn to your analysis with regard
16 to the upper containment zone, which begins on
17 page 148 of the exhibits. The first substantive
18 exhibit is on page 149, where you discuss a leak-off
19 test. And could you explain to the commissioners what
20 that consists of, the work you did, and the
21 conclusions that you reached?

22 A Sure. I'd be happy to. So first it's,
23 like, for those who are not familiar with the -- with
24 an extended leak-out test just to walk us through it,
25 the typical behavior of leak-off tests, what kind of

1 data we -- we get. So you can see there there's a --
2 a couple of plots. The -- the central plot there on
3 the -- on the slide is a representation of typical
4 behavior as we conduct these tests.

5 So the first portion labeled by FIT there
6 stands for formation integrity test. This is
7 typically done to evaluate the strength and integrity
8 of the new formation. And it's the first step after
9 drilling a casing shoot.

10 Q And you're referring to the first graph on
11 the left?

12 A That's correct. After the formation and
13 access, the small amounts of fluid will be pumped into
14 the formation over a period of time. As that fluid is
15 pumped, the pressure is monitored. And the plot
16 there, the blue line -- sorry -- and the green there
17 down line at the bottom, that is the pump rate. The
18 blue line is the pump pressure.

19 So that first portion gives us our formation
20 integrity test. If we continue to pump oil and build
21 up pressure, we enter a region designated by LOT on
22 that line, which is -- stands for leak-off test. So
23 this is a test to determine that the -- the fracture
24 pressure of the open formation. So again, it's
25 conducted after drilling right below a new casing shoe

1 typically.

2 We continue to pump there. We'll actually
3 reach a point there at the apex of the graph, which is
4 the formation breakdown pressure. Again, just a
5 regular leak-off test is when that formation first
6 starts to take fluid. That formation breakdown
7 pressure is when it is completely compromised. You
8 will then see a relaxation in the pressure.

9 Q And that's shown there with the stars?

10 A That is correct. You'll see that relax of
11 that pressure. If you continue the test beyond that,
12 continue pumping, that's when you enter into the range
13 of the extended leak-off test or XLOT. And this
14 enables us to identify fracture closure -- closure
15 pressure, which is commonly referred to as fracture
16 parting pressure in a lot of the documentation that
17 we -- that we typically see in the industry.

18 Q Well, when did you conduct this test?

19 A Yes, I'll get to that in just a second.

20 What will happen with the XLOT is eventually
21 you stop the pump rate and watch the pressure decay.
22 There are some -- some transforms that we can do with
23 the pressure data and time in order to find some
24 trends. Not going to go into detail on that specific
25 analysis today, as this is just a summary of the -- of

1 the test.

2 But you will be able to find a point, which
3 is indicative of the fracture closure pressure. And
4 that's how we get that datapoint. And as to your
5 question, we conducted a test on -- in October of 2022
6 on a well in Texas. It'd be 174WA. That is in our
7 Delaware Ranch Field, which is if you think where the
8 Severitas location is, it's approximately 25 to 30
9 miles southwest that -- over in Texas.

10 The reason why we decided on a location is
11 that the DMG gets a lot shallower as you go to the
12 west. The -- the overburden thins, and due to how
13 much shallower the Lamar is at this point, less of an
14 overburden, this was considered a good spot test in a
15 conservative nature what the strength of that, that
16 Lamar is.

17 We expected it to be much stronger as it
18 gets deeper, and the overburden grows to the east as
19 is where our Severitas and Papa Squirrel wells were
20 located. So I mean, this kind of represents a more
21 conservative estimate of the strength of that -- of
22 the Lamar. You can see there that graph -- graph in
23 the top right of the chart or the slide, this is the
24 behavior of the actual XLOT test that we noted as
25 well. And you can see we saw the leak-off point, but

1 we never actually reached formation breakdown
2 pressure.

3 The -- the formation was so strong that our
4 pump capacity was reached in the pump tricks before we
5 were able to actually see the -- the formation
6 breakdown. That's a very good -- good information
7 that we have a very, very strong pump at Castile. The
8 surface pressure at that point was 2200 psi.

9 As you will recall from our request for
10 pressure for the Severitas and the Papa Squirrel,
11 we're -- we're talking, you know, 460 psi for the
12 Severitas and then the 925 psi for the Papa Squirrel.
13 So much lower than this 2200 psi.

14 Q Let's take a look at your next exhibit on
15 page 150.

16 A Yes.

17 Q There's a lot of data on here, but if you
18 could just briefly summarize it for the Commission?

19 A Yes. Yes, I would be happy to. So this is
20 the summary of our XLOT test. We actually did three
21 cycles of the tests on the Lamar and just collecting
22 more data there. You can see here a lot of the
23 details. Like our casing shoe depth was just at 1584
24 feet, so very shallow.

25 If I can -- sorry. If I can point you to

1 the red outlined boxes and the table there out of that
2 second one up from the bottom on the leftmost is,
3 like, 1.22. That was the minimum stress gradient or
4 the fracture closure pressure identified in Cycle 1
5 was 1.22 psi.

6 But Cycle 2, we would expect it to be weaker
7 since we've already fractured the rock in the first
8 cycle. It dropped down to 1.15. And then the
9 Cycle 3, a little bit hard to interpret, but it was
10 between 1.1 and 1.14. So we figured that's our --
11 that fracture parting pressure or that fracture
12 closure stress.

13 The other point that is interesting is that
14 we look at the -- at the other red box there, the
15 leak-out pressure and pounds per gallon. And actually
16 all it is, it's not actually in the table in psi per
17 foot.

18 But on the -- the third bullet down on that
19 right side, I -- I calculated when that ppg would be
20 and psi per clip, to identify that leak-off point,
21 which again is that point at which the -- the
22 formation first starts to become compromised and
23 starts taking fluid. And that wasn't until 1.5 to
24 1.53 psi per foot.

25 Q You're referring to the second bullet on the

1 right?

2 A I believe it's third bullet on the -- on the
3 right. Yep.

4 So if we take that -- yeah. So again, just
5 another -- another datapoint to share how strong this
6 formation is. Now, if we look at actual injection
7 operation in -- in the state of New Mexico -- and as
8 we know the initial estimate for maximum surface
9 injection pressure is determined by taking the top of
10 our injection interval. We multiply that by .2 psi
11 per foot.

12 So that gives us the maximum surface
13 pressure. We -- in order to understand what the
14 bottomhole pressure will be for the well, we need to
15 add the weight of the fluid and there's -- taking out
16 effects for a minute. If we -- to be a typical
17 injection water is roughly .5 psi per foot. And just
18 from its weight, you know, it can be a little bit
19 lower than that, a little bit higher.

20 But .5's a good -- good estimate. We take
21 that .5 and add it to the .2, you're looking at your
22 -- at the bottom of the well, approximately .7 psi per
23 foot. And again, leak-off -- leak-off pressure for
24 the Lamar is 1.5 psi per foot.

25 And then if we even look at the minimum

1 stress gradient, it's at the -- yeah, that 1.1 to 1.2
2 range, that parting pressure, again much higher. So
3 that -- I'll just direct you to the -- kind of the
4 summary box there on the bottom of the slide. This
5 gives us a safety factor of 1.57 to 1.74 depending on
6 if you're looking at the -- that 1.1 psi per foot for
7 minimum stress gradient or one of the higher numbers.
8 So all this to say that seal is very confident and we
9 don't see any chance of really breaking it down during
10 normal injection operations.

11 Q And again, it's much thicker in the areas of
12 the two wells of the pilot project than the wells
13 where you conducted the leak-off test?

14 A The Lamar itself, I'm not sure. I do know
15 that the -- relatively it's going to be the same. But
16 it's similar in thickness. The -- the question is the
17 overburden, since we're much deeper, there's just more
18 rock between the -- the Lamar and the surface.

19 And as Tom Merrifield pointed out in his
20 testimony earlier, we did see our subject matter
21 experts when they were analyzing this data did see
22 additional -- a lot of this additional strength. And
23 part of the Lamar was due to that Castile and the
24 overburdened formations that were right there. So do
25 expect it to be stronger to where we have our -- our

1 two wells pumped.

2 Q We can turn now to the injection modeling
3 that you did with respect to the two wells?

4 A Yes.

5 Q It begins on page 151. And let's turn to
6 page 152, which is the locator data.

7 A Yes. So in this next section, I'm going to
8 talk a little bit about rate transient analysis, what
9 that is, and how we used it for our -- to figure out
10 our analogs to then be able to stimulate the -- the
11 performance of the Severitas and Papa Squirrel.

12 Though just to orient everyone, you can see
13 on the map the Severitas well in green -- with the
14 green star and Papa Squirrel with the blue star. And
15 then there's these markers across the state line down
16 to Texas. Those represent wells that were -- were
17 used as our analogs, so those are all DMG SWD wells.

18 The reason why we were able to use these
19 wells is because they publicly reported data on these
20 wells on daily rates and daily pressures, which for
21 RTA analysis is what we would like to see.

22 Q And just for laymen's terms, what is rate
23 transient analysis?

24 A Rate transient analysis. So I will actually
25 get to -- get into -- it's a good segue to the next

1 slide. So what rate transient analysis is, is it lets
2 us take the rate data and pressure data from either
3 producer or injector -- in this case an injector --
4 and transform that data through derivatives, pressure
5 differences, different ways to look at time.

6 And we can plot out those -- those
7 transforms. And then we know that there's several
8 analytical solutions, the models of reservoirs that
9 will match the characteristics we see in that data.
10 And so what we're able to do is kind of pick and
11 choose these different reservoir models, match it to
12 the data, and -- and then finetune different
13 parameters such as our permeability, porosity,
14 thickness, the injection radius, or what -- how big
15 your -- big your reservoir is.

16 You can find it -- there's other parameters
17 we can -- we can tune. But we can do all of that and
18 essentially match the data to one of those reservoir
19 models. And that gives us a -- a good approximation
20 of what the reservoir looks like that the well is
21 injecting into.

22 Q And the parameters you described, are those
23 all shown on page 153?

24 A Yeah, these are some of the parameters, the
25 ones we -- we thought were most useful for the

1 subsequent steps of modeling. So again, with -- with
2 the rate transient analysis, the -- you know, we
3 mentioned earlier that, you know, permeability in the
4 hearing was a -- was a question. How can we
5 understand permeability?

6 So one way to major that is -- is through
7 this rate transient analysis, which you get
8 permeability goes directly into how much our wells
9 will improve from a rate standpoint. The other really
10 important thing when it comes to SWDs is how far do
11 they inject.

12 Most of these injectors can be described by
13 a relatively simple model. It is a -- essentially, a
14 radial flow model with the -- steady state radial flow
15 model. An easy way to think about that is I have got
16 a cylinder with my well right at the center of the
17 cylinder, and that cylinder represents my reservoir so
18 the -- it represents the storage tank.

19 And so at the edges of the cylinder and the
20 model, we have what is called a new flow boundary.
21 Just a point where the -- really, the end of the
22 influence of the -- the specific injector. We'll see
23 pressure influence beyond that or the -- the long-term
24 fluid influence beyond that, you know, flow boundary.

25 So we're trying to determine the -- how the

1 R2SWD wells will impact the surrounding reservoir, how
2 far out will the injection go. This was a way to
3 understand statistically what SWDs typically do. And
4 you can see there in the table kind of the summary of
5 those calculated values where kind of the median --
6 the calculated value for injection radius was 8,979
7 feet. Permeability was the -- in that median value
8 was about 13 millidarcy.

9 And then the other thing to -- to point out
10 is the cumulative injection number. So the other
11 thing rate transient analysis lets us do is forecast
12 the well out beyond his production history. So once
13 we've got -- or injection history in this case. So
14 once we have a good match on the -- for our model.
15 We're able to match that -- those actual rate and
16 pressure datas with the -- with the model.

17 We can then use that -- use the program to -
18 - the computer program we're using to do this. It's
19 called Kappa, and it's got multiple different software
20 suites. So let -- let's us do the rate transient
21 analysis and other things. Anyway the -- the software
22 will then allow us to forecast out the -- just what
23 the performance at this well or these injectors will
24 be like over a number of years.

25 And so we can essentially forecast that out

1 to the end of life by setting the maximum allowed
2 surface injection pressure, which is our constraint,
3 and then letting the model run and the driver behind
4 the decline that we see in the injectors is the
5 reservoir pressure within that no-flow boundary
6 increasing.

7 Eventually, that reservoir pressure will
8 increase such that it equalizes with the bottomhole
9 injection pressure with the well, and at that point
10 more fluid can go into the reservoir. And so that --
11 that tells us what the total storage is of the DMG
12 injector.

13 Q Let's now take a look at the actual modeling
14 you did for the two wells pilot project.

15 A Yes.

16 Q The first one begins on page 154 for the
17 Severitas well.

18 A Yes.

19 Q Would you just tell the commissioners what
20 this shows and the data and the conclusions you
21 reached?

22 A Yes, I will.

23 So the Severitas the -- is the headlining.
24 And the headline for this -- for this well is the
25 cumulative storage at this location is 28.8 million

1 barrels of water over the life of the well. The --
2 and that cumulative storage, as we'll see in a second,
3 it's really dependent on depth. And that's mostly
4 because the depth is directly tied to the maximum
5 allowable surface injection pressure.

6 So this well in particular, again, at that
7 location, you know, just under 29 million barrels, I
8 have here in the chart at the top right the outputs of
9 the great profiles for this well with the -- the three
10 different scenarios reflecting different
11 permeabilities.

12 So we set the model with the parameters of
13 the injection into the Bell and the Cherry with that
14 8,979-foot boundary radius, which correlates to about
15 1.7 miles. And with the corresponding porosity values
16 that we -- we got from our geologic assessments of the
17 area and then we applied the different permeability
18 here to understand what are low, mid, and high cases.

19 And you could see those by the blue line,
20 orange line, and gray line for this location. And so
21 we have a, you know, expected range of anywhere
22 between just under 4,000 barrels of water per day to
23 just over 12,000 barrels of water per day for this
24 well.

25 Q Did you also look at the effect of the

1 injection reservoir over time?

2 A Yes, we did.

3 Q If you could turn to page 155.

4 A So this assessment is to show how that
5 reservoir pressure within that no-flow boundary radius
6 will increase over time. So as you can see there, on
7 the plot and the Y axis, we have pressure that is --
8 represents the reservoir pressure taken at the top of
9 the Bell Canyon, which would be the top of our
10 injection interval, and then the X axis is the depth
11 of the investigation. So like depending on spatially
12 how far away I am from that injector what -- what I
13 would expect the reservoir pressure to be.

14 And you can see that travels out to just
15 below that 9,000 foot mark. So we end up using that
16 same kind of median injection radius there. Each line
17 represents a different amount of cumulative injection.
18 And this model was based on darcy radial flow, --
19 radial flow.

20 Q And so the bottom line conclusion that you
21 reached?

22 A Yes. So you can see there in the gray box
23 after years there even the colors are corresponding to
24 that low, mid, and high permeability cases that we
25 looked at on the previous charts. Just speaking to

1 the mid-case, which was that 13 millidarcy. You can
2 see how long it would take for this swell to pressure
3 up as a -- as this time goes by.

4 And so to get to that, that orange line
5 there, which represents 200 billion barrels injected
6 and roughly 300 psi increase from starting conditions
7 would take 13 years.

8 So we're looking at over a decade before
9 that, even a 300-psi increase would be realized in the
10 reservoir. But that is -- that's not very fast. A
11 lot of that's due to how -- how large the injection
12 radius as at that 1.7 mile approximate radius.

13 Q Let's turn to your analysis of the Papa
14 Squirrel well, which begins on page 156.

15 A Yes. So for the Papa Squirrel well, I
16 mentioned earlier, this well is much deeper. You get
17 a higher surface pressure, and in turn you get more
18 cumulative storage.

19 We've -- we've kept the same -- same size
20 reservoir, but you know, 8,979-foot boundary radius
21 using the thicknesses of the Bell and Cherry and the
22 corresponding porosities at this location. And then
23 we simulated the injection rates for the low and high
24 cases again, represented by the blue, orange, and gray
25 curves there on that run plot there at the top right.

1 Should have data correspond to 6 millidarcy, 13
2 millidarcy, or 30 millidarcy.

3 You can see the -- the predicted rates for
4 this well vary between as low as 9,000 barrels of
5 water per day to just about 20,000 barrels of water
6 per day. And yes, the storage here again is just
7 under 73 million barrels.

8 Q And if you see the same slow increase of
9 pressure of the reservoir on time?

10 A Yes, that -- yes, it -- this well for a
11 similar time period, in this case to inject 40 million
12 barrels, get sent to that green line. And that
13 represents about 450 psi increase. It took about 11
14 years. You know, it's just a little bit higher than
15 the increase of 300 psi in the previous well.

16 And that's just due to higher rates, higher
17 pressure, better rock quality due to increased
18 thickness and other items that we've talked about
19 already so far, so that rate -- pressure increase are
20 similar timeframe is slightly higher. That's still
21 relatively slow, only 450 psi over a decade.

22 Q The next subject of your testimony is
23 labeled "Surface Systems."

24 A Yes.

25 Q And what do you mean by that? What did you

1 look into?

2 A Yeah, so I -- this is to share with the
3 Commission and others present, just our -- how we
4 typically operate our SWDs. This is related to our
5 facilities and operations teams, and I'm relaying that
6 to you. So typically, how we -- and Davis reflects
7 that we operate shallow SWDs today out over Texas as
8 well as the deep SWDs that we still have here in New
9 Mexico and the -- the ones we saw over in Texas.

10 So typically, we have the central facility
11 or SWD facilities which process the water and, well,
12 talk about it. It's -- they also have filtered well
13 and clean it up at skim well off of the water to send
14 back for processing.

15 And then eventually the water is sent to H
16 pumps or horizontal pumps, positive displacement pumps
17 where it is pushing high pressure flow lines, which
18 carry it to a network of SWD wells. Each well is
19 controlled by locally by a production log controller
20 or PLC at the well site, they have two chokes which
21 can be set to determine the max pressures and the --
22 or the rates that we would like to send to each
23 individual well.

24 The flow rates are constantly monitored
25 onsite by flow meters. We typically set -- put our

1 injection pressure set point at about 25 psid before
2 the permit maximum allowable or whatever set point
3 we -- we choose. You know, we won't go up. We won't
4 set it above the permit, but we have it at a lower set
5 point for whatever reason that would have a similar
6 target.

7 We have automated processes and alarms so
8 that if the pressure increases above that permit for
9 more than 30 seconds above the set point, yeah, a call
10 is sent out to an operator. The operators that we
11 have are -- are based on our -- our field locations
12 and our -- yeah, our offices out onsite in the fields.
13 We also have a removed monitoring group in -- in our
14 Midland, Texas office, which monitors all of this data
15 in real time for all of our operations.

16 So anyway the -- that alarm triggers and no
17 one goes to visit the well within a half-hour, it will
18 automatically shut in until someone can get out there
19 and fix the issue. We also have a high-case scenario
20 where pressure goes greater than 110 percent pressure
21 for more than 30 seconds, the mobile off will shut in.

22 Q I think you mentioned data monitoring. If
23 you turn to example on the page 130, is that example
24 the data that you collect?

25 A Yeah, this is -- yeah, so this is a -- just

1 an example for the types of data that we look at in
2 real time. The shortlist data real time by our SCADA
3 units that -- and all of it's pulled into our
4 integrated operations center.

5 And so it -- data such as flow rate,
6 injection pressure, downhole pressures, control valve
7 pressures, casing pressure, temperatures, et cetera,
8 are a lot more monitoring that I'm not sure here that
9 we have at the actual facilities and the tanks favor
10 themselves. But I just wanted to give everyone a
11 sense of the -- the type of real time data collection
12 that we -- we have in place already, we plan to
13 implement on this new SWDs.

14 THE REPORTER: And by SCADA, what is
15 that acronym?

16 MR. TAYLOR: Sorry. I do not know. I
17 cannot remember off the top of my head.

18 MR. DEBRINE: I don't remember either.

19 BY MR. DEBRINE:

20 Q If you could turn to the next line, the page
21 161 where it says, "Discusses the handling of solids
22 to improve the quality of the alarms."

23 A Yes. So that makes sure that everything --
24 in order to improve the longevity of our SWDs we
25 recognize that the water we send down them has to be

1 as clean as possible. That would mean they don't want
2 to frac and solids are -- are particles that are so
3 big it will plug up the -- either the perforations or
4 once it gets out into the reservoir, the pour space.

5 And so to do that, we have a couple
6 filtration devices, which will collect one or two
7 particles. I think the current design is a hundred
8 mesh filters. It's always being looked at to be
9 optimized. It's the -- the toilets are flushed to the
10 point of tank where the solids settle out. On the
11 comb bottom foots, it's constantly monitored.

12 And then once it -- now solid that -- solids
13 that accumulate reach a certain level. I -- work will
14 be sent to operators. And then they can operate a
15 truck to come pull the solids off the -- off that
16 tank.

17 Which the solids are then removed to solid
18 waste facilities much like we could remove drill
19 cuttings or other -- other items left over from oil
20 and gas operations. And then all of the water in that
21 flush tank after it's rattled back to the charge cost
22 of the inject -- went through the cycle again.

23 Q And if I'm on page 162, is that a summary of
24 the conclusions that you reached as a result of your
25 study?

1 A Yes.

2 Q If you could just walk through this with the
3 Commission?

4 A Yes, I will.

5 So first and foremost, our -- our proposed
6 SWD wells are in the best interests of conservation,
7 prevention of waste, and will not impair our
8 correlative rights. The nearest DMG producers -- and
9 fields whose injectors are depleted, that Lamar
10 limestone is a very confident seal of the DMG which to
11 provide their containment looking for production
12 numbers that are associated with the SWD operations do
13 not come anywhere close to that fracture closures,
14 leak-off pressures, or breakdown pressures of Lamar.

15 Our DMG SWD analogs show that SWDs at the
16 DMG tend to influence the reservoir after about 1.7
17 miles, and reservoir pressure in that radius is
18 expected to increase slowly during the -- the
19 operation of our wells.

20 And -- and here you can see the great
21 summarized with Severitas and Papa Squirrel.
22 Severitas anywhere between 4 and 12,000 barrels of
23 water per day and 29 million barrels in total storage,
24 while Papa Squirrel, a deeper, better location
25 anywhere between about 9,000 to 20,000 barrels of

1 water per day and 73 million barrels of storage.

2 Chevron does -- our standard operations for
3 SWDs feature active monitoring and control logic to
4 ensure safe operations, with real-time -- and
5 real-time data collection. And finally, our -- our
6 SWD facilities are fitted with filtration systems to
7 improve injected water quality, utility, and life of
8 these SWDs with all solids removed to appropriate
9 solid waste facilities.

10 Q Were the exhibits we discussed on page 142
11 to 162 prepared by you or under your supervision?

12 A Yes.

13 MR. DEBRINE: Moving to the admission
14 of Exhibits 142 to 162.

15 MR. FUGE: Any objection?
16 They're admitted.

17 (Exhibit 142 through Exhibit 162 were
18 marked for identification and admitted
19 into evidence.)

20 MR. DEBRINE: And we'll pass the
21 witness for question.

22 MR. FUGE: Mr. Tremaine, do you have
23 cross?

24 MR. TREMAINE: I do have a couple
25 questions, Mr. Chair.

EXAMINATION

BY MR. TREMAINE:

Q Looking at the slide 143, map slide of --
producer producing wells in the El Mar Oil Field?

A Yes.

Q Can you provide any more detail as to which
part or zone out the DMG those wells are completed in?

A I do not recall. That topic -- I can defer
that to -- to Tom Merrifield.

Q That's what we need.

MR. FUGE: We can do it now.

Mr. Merrifield. Ask that question now and bring it
back.

MR. TREMAINE: Since he's already sworn
in, I think we'd be comfortable having him just answer
the question.

MR. BLOOM: No objection.

MR. FUGE: Yeah, no objection.

MR. TREMAINE: Thank you.

BY MR. TREMAINE:

Q And just a clarification here. It sounds
like from your exhibits and your testimony that there
is that proposed wells, you conceive a 1.7-mile
injection radius?

A Yes.

1 Q So the total area of impact would be
2 approximately 3.4 miles across?

3 A Yes.

4 Q Remind us what the radius was that Chevron
5 enjoys for its area of --

6 A So I know -- I know before our -- we used
7 that half-mile radius as dictated in the -- the rules
8 for notifications and then the -- internally, one of
9 the reasons why you kept seeing 2 miles kind of up
10 there as we were looking for offset producers was
11 partially because of this -- obtain analysis just to
12 give us a little bit extra of a buffer and just say
13 that they do not recall the exact radius for the --
14 for the AOR.

15 Q Thank you. And then I want to -- one more
16 question. I want to look at slide 159. Can you
17 explain the reason for the 30-minute delay for that
18 shutoff?

19 A That's -- yeah, that's just something to
20 call out. Standard practice, I guess. I'm intimately
21 familiar with the exact reason why my -- part of the
22 reason, though, is to give the operator time to
23 physically travel to the well site, which are -- which
24 are kind of the -- somebody has to drive out there.

25 I -- again, I'm not -- I don't know the

1 reason behind why 30 minutes was the number agreed
2 upon, if there would be a -- you know, a longer or
3 shorter duration that would be more optimal. It's
4 just our current -- current control logic.

5 Q Are you aware, according to the current
6 proposal, how much volume could be pumped during that
7 period?

8 A Could be calculated. It would depend on the
9 -- the time, the -- at what stage of the well's life
10 we're in where that could happen. They did -- they do
11 -- like to -- their rates looked -- I declined them
12 I'd say more rapidly than we would like, so I -- I
13 don't have that number off the top of my head, but it
14 could calculated from the -- the plots shown in the
15 exhibits.

16 MR. TREMAINE: Thank you. No further
17 questions. Thank you.

18 MR. FUGE: Ms. Hardy, do you have any
19 questions for this witness?

20 MS. HARDY: I have a couple of
21 questions.

22 EXAMINATION

23 BY MS. HARDY:

24 Q Hello. I just have a few questions for you.
25 If you can look at page 152. That's the

1 "Location of Wells with Sufficient Data for Rate
2 Transient Analysis"; right?

3 A Yes.

4 Q Can you confirm that Chevron's drilled DMG
5 SWD wells on its Texas acreage?

6 A Yes, we have.

7 Q And did Chevron perform similar testing as
8 that proposed in Mexico pilot in those wells?

9 A As far as rate transient analysis is
10 concerned?

11 Q Right. Who's out there testing and
12 monitoring this?

13 A So yes. The -- one of the reasons why we
14 didn't include our -- our own data in these areas is
15 that, you know, number one, due to the timing of this
16 analysis also our wells are relatively new and only
17 been put online in the last few months. And you -- we
18 typically like to see several months of -- of
19 continuous data before we can properly analyze a well
20 with rate transient analysis.

21 The -- really the shortest amount of time
22 I've seen is approximately four months or six months
23 to read is a lot better. It also depends on how high
24 quality your data is. Downhole pressure will just
25 make the process that much easier when you have

1 downhole pressure gauges and are Severitas and Papa
2 Squirrel well.

3 We do have Chevron wells, but then just you
4 had -- had some other operational issues that have
5 prevented them from operating that consistently that
6 first available to conduct that type of analysis. So
7 these wells that we -- we used for our analog study
8 again have the -- the sufficient history and the data
9 and the -- the daily orthographs to conduct your
10 transit analysis.

11 The shorter enrollment you have for your
12 datapoints, the better for this analysis. Daily is --
13 we would like to go more than daily. So there are a
14 lot of wells out there that report monthly data.
15 However, it takes four to five months to even see the
16 initial cycle of monthly data. You'd only have four
17 to five datapoints. You wouldn't be able to interpret
18 --

19 Q And so in Texas DMG SWDs, do you know what
20 intervals are being tested?

21 A Yes. All of these are either -- they're all
22 DMG shallow wells that we looked at. Don't recall if
23 it's -- some of these might have Brushy Canyon
24 targeted at or just -- just Bell and Cherry. These
25 wells in particular fall within some of the Texas

1 seismic review areas, which is why they're required to
2 report daily rate submissions.

3 Q And do you know what the bottomhole fracture
4 gradient in those wells has been?

5 A So there's a range. Part of the reason why
6 we conduct separate tests is to determine that
7 individual wells and say for our own wells we've seen
8 anywhere from, you know, .62, .65 psi per foot up to
9 .72 psi per foot. So that really does -- does vary.
10 I mean, those numbers sound like they're close, but
11 when the -- you're talking about the injection rates
12 that there can be a -- you know, a fairly -- have
13 fairly wide implications there.

14 And so again, that's a reason why we -- we
15 have -- agree with the OCD's direction to conduct a
16 separate test, find that fracture gradient, and then
17 face our maximum pressures alphabetically.

18 Q And I think you testified earlier the
19 average fluid gradient is .5 psi per foot?

20 A Yes.

21 Q And then if you add New Mexico service
22 pressure and gradient on .2 psis but you'd see a
23 bottle operating at .7.

24 A Yeah, and that remember is at the highest
25 possible case where you forced to not water down

1 against a -- a close pipe essentially. And -- and
2 since you actually do have flow that will go out into
3 the reservoir that will actually be the maximum
4 pressure that's slightly lower than that, but it's a
5 good rule of thumb for -- yeah, I have a whole lot of
6 some safety factors just to -- just to see how close
7 we're coming to -- to fracture pressures.

8 Q And if the bottomhole gradient was .7 psi,
9 is it correct that then you'd be fracturing the DMG?

10 A Yes, but according to the rules that, yeah,
11 we agreed with from the OCD, once we found that --
12 that fracture gradient, I think there's a, like, 90
13 percent safety factor that's applied to that. And so
14 our max surface pressure would be in -- you know, that
15 safety factor's set the load for that fracture.

16 MS. HARDY: Those are all of my
17 questions. Thank you.

18 MR. FUGE: Dr. Ampomah?

19 DR. AMPOMAH: Let's start with slide
20 147. So you've presented about why you believe that
21 Chevron believes that the DMG group is not ready for
22 that.

23 MR. TAYLOR: Yeah.

24 DR. AMPOMAH: So what is the typical
25 residual saturation for these areas that you analyzed?

1 MR. TAYLOR: I do not know. But that
2 is not -- not something that we had the current log
3 especially if you want your current log data to be
4 able to analyze it.

5 DR. AMPOMAH: Yeah. So you're saying
6 that we're meeting in place right now is a 1.3?

7 MR. TAYLOR: Yes.

8 DR. AMPOMAH: So if I want to believe
9 that we cannot produce any amount of -- I want to
10 know the vertical saturation right there. So you
11 talked about this going through primary, secondary.
12 So were there water injections earlier?

13 MR. TAYLOR: Yes, the -- in the 80s, as
14 I recall, there was a water flood. An injection was
15 implemented at the -- at the El Mar Field.

16 DR. AMPOMAH: Do you know the
17 injectivity of those injection wells?

18 MR. TAYLOR: I do not. I do not.

19 DR. AMPOMAH: And you did not analyze
20 that as part of your analysis?

21 MR. TAYLOR: No. Most of the wells, we
22 looked at from an injector standpoint. And we wanted
23 to look at modern day SWD wells. Typically, we would
24 look at these enhanced well -- recovery wells. They
25 inject at much smaller intervals. They're just

1 targeting, you know, tens of feet. We want to target,
2 you know, thousands of feet for injection.

3 We also noticed that the rates that
4 they see it and the maximum rates on their permits and
5 then at least on the Texas side and some of the
6 pressure that we've seen in New Mexico or -- or very
7 low so you're looking at, you know, typical injection
8 rates, about a thousand barrels a day.

9 The SWDs have their purposes to put
10 away a lot more water, to enable the oil productions
11 in the fields, and to much steadier intervals at much
12 higher rates for an SWD to be successful. So yeah,
13 really, the wells I presented for the -- from the RGA
14 standpoint, were the best analogs we can find in the
15 vicinity of modern day DMG SWD wells.

16 DR. AMPOMAH: So now Chevron owns these
17 wells that were analyzed?

18 MR. TAYLOR: No.

19 DR. AMPOMAH: And then the companies
20 that own these wells didn't already -- did you support
21 the analysis that you did?

22 MR. TAYLOR: I am not aware of any
23 feedback from those companies. But we -- we based
24 this of, like, data.

25 DR. AMPOMAH: Let's go to slide number

1 or page number 150. So I do have quite a number of
2 questions on this page. So the first one is what is a
3 stress gradient here?

4 MR. TAYLOR: Can you clarify?

5 DR. AMPOMAH: Yeah. Where is the
6 stress gradient in this area?

7 MR. TAYLOR: You mean in terms of the
8 SHMax?

9 DR. AMPOMAH: Yeah. But depending on
10 whether the SHMax lays on the SV, then there --

11 MR. TAYLOR: So the -- the stress
12 orientation is to put -- and I don't have my slides,
13 but in the other exhibits we've seen today, including
14 the ones that Jason shared, that's -- that's a stress
15 orientation of the southwest for these.

16 DR. AMPOMAH: No, I mean, I just want a
17 clear answer to what is the force of G in this area?

18 MR. TAYLOR: I -- I'm not the right
19 person to answer that question then.

20 DR. AMPOMAH: Can someone respond to
21 that?

22 MS. BENNETT: Mr. Comiskey can. Do you
23 want him to give input now?

24 DR. AMPOMAH: Yeah. It's very
25 important to all my other questions.

1 MR. FUGE: You can just walk up, just
2 get a little closer to the mic.

3 MR. COMISKEY: So if I believe I
4 understood the question correctly, it was what is --

5 DR. AMPOMAH: Based on the Anderson
6 theory.

7 MR. COMISKEY: Yeah. So and this is a
8 normal faulting environment. So what this means with
9 the vertical stress is greater than the horizontal
10 stretch beginning in the minimal stress. So it's a --
11 it's a normal faulting environment.

12 That's mostly dominated in the -- in
13 the Delaware Basin. It just needs to move into the
14 Midland Basin to get a little bit more of a -- of a
15 strike slip type in my -- slide my testimony it will
16 force that -- that theory as well.

17 DR. AMPOMAH: Yeah. So if it's a
18 normal routine, you do have SV all the same as your
19 minimum stress. So now I don't understand.

20 MR. COMISKEY: So we've seen in -- in
21 this area that minimum horizontal stress is somewhere
22 around .65 and .75 psi, which puts the magic number
23 horizontal stress around .9 and the vertical stress
24 around 1. And then -- formal breakouts -- also looked
25 at focal mechanism aversion for a moment just for

1 short breaks that tied that into the -- roughly
2 values. And they quarterly head back to -- as well.

3 DR. AMPOMAH: So let's say would that
4 be more like related to a normal reservoir? Because I
5 didn't know what that meant. Lamar is more like a --
6 right. So I just want to understand how the minimum
7 stress point is about 1.2 psi before, and then the --
8 too.

9 MR. TAYLOR: Yeah. I think part of
10 that might just come from mislabeling minimum stress
11 here. This is not to communicate that the minimum
12 stress is that work well. I guess it -- it's really
13 the minimum fracture closure pressure that we got from
14 the XLOT.

15 DR. AMPOMAH: So I don't take that as a
16 minimum result of stress?

17 MR. COMISKEY: Correct. Correct.
18 That's -- that's the closure stress gradient, not --
19 not the actual instance you stress test for.

20 DR. AMPOMAH: So do we need to do it to
21 make any adjustments to this? Because it's confusing
22 to me actually.

23 MR. TAYLOR: That -- you're requesting,
24 I guess, an update to the exhibit here?

25 DR. AMPOMAH: Yeah. Because, like,

1 let's say if someone takes your data then use that in
2 future, you don't see that little permission more or
3 less, agree to a minimum result of stress. Let's say
4 1.32 psi compared to SV of 1.2 psi. That would be --
5 I don't want to agree to that.

6 MR. TAYLOR: Understood that. Date the
7 -- update the label?

8 MS. BENNETT: Yeah, but you can do
9 that -- update the label. And I also need to fix a
10 typo in the slide about the last date drilled over DMG
11 so we can submit those two together.

12 DR. AMPOMAH: Okay. Thank you.

13 So on slide number or page number 152,
14 so I just want to clarify that the blue locations are
15 where you have the wells that you use for the
16 analysis?

17 MR. TAYLOR: Yes. Those are the
18 locations of the analog wells.

19 DR. AMPOMAH: Okay. The analog wells.
20 And all of these are in Texas?

21 MR. TAYLOR: Correct.

22 DR. AMPOMAH: So my first question is
23 what is the distance between the closest one to the
24 Papa Squirrel well?

25 MR. TAYLOR: Yeah, that's a good

1 question. There's not a scale on this map, so I
2 can't.

3 DR. AMPOMAH: I do live very close to
4 the --

5 MR. TAYLOR: Severitas?

6 DR. AMPOMAH: Yeah. I don't want to be
7 that close. But near Papa Squirrel. And I do see
8 also that he brings the analysis to propose 20,000
9 daily rate and a 50,000 daily rate. These are
10 analogous, each well analysis; right?

11 MR. TAYLOR: Yeah. So coming back to
12 what was submitted in the C108 versus the analogs
13 here. So the C108 analysis was done prior to having
14 this dataset completed. So we actually used it, no
15 one else's software and then a -- a much smaller
16 subset of -- of the analog SWDs to figure out what a
17 -- the productivity index or injectivity index would
18 be for the reservoir, where you applied that to the --
19 the well bore and depth conditions in both the
20 Severitas and Papa Squirrel to then calculate what the
21 rate would be.

22 And that was what was submitted into
23 the C108. You notice that that agreed quite well with
24 the Papa Squirrel range the Severitas, the analog well
25 that we used was a little bit optimistic in that case

1 and smaller subset at the time. So it had -- and
2 our -- and our filings are requested some rates that
3 were a little bit on the high side of the estimated
4 range from the numerical model. It was based on this
5 rate transient analysis.

6 DR. AMPOMAH: Yeah, so my biggest
7 concern is about the 20,000 and then the 15,000. So I
8 just want to be clear. Are you saying that -- let's
9 see. Is it your testimony today that your rate is
10 more or less comparable to the amount -- or analysis
11 from the 20,000?

12 MR. TAYLOR: So I think that notable
13 analysis of the C108s represent the high side cases.
14 And -- and yet if we turn to page 156, you'll see that
15 that high case peak of these Veritas wells, 20,000
16 barrels of water per day, in one case 50,000 barrels
17 of water per day, which agreed exactly with our -- our
18 assessment there on the C108. Or as noted on the
19 Severitas well, we -- we had our maximum at 15,000
20 barrels per day with our average at about 12,500
21 barrels a day.

22 You can see here from this plot on page
23 154 that the simulation is showing a -- the high case
24 at that 12,500 barrels a day. So you see why it may
25 be overstating the amount of injection that we can

1 potentially see in this location.

2 DR. AMPOMAH: Yeah, so that is my
3 concern. Because let's say we agree to 20,000 barrels
4 per day. Now, before I move on, let me ask. So these
5 were there to analyze what is the maximum injection
6 rate for either the maximum? I cannot recall.

7 MR. TAYLOR: So what I recall, I think
8 between 20 and 30,000 barrels of water per day.

9 DR. AMPOMAH: So I asked this question
10 earlier to your colleague. And then he told me -- he
11 told the Commission that in New Mexico, it is very
12 small. But the maximum he has seen in Texas has been
13 about 10,000. Yeah, that was part of the testimony.

14 MR. TAYLOR: Yeah, I -- I know there
15 are some wells that have injected 10,000 barrels a
16 day. Our Chevron wells and one of the ones that we
17 had actually has a similar maximum rate on it as -- as
18 what we would see in that -- I think in the Severitas
19 well. And it's a shallow one in Texas. It's been
20 averaging about 12,000 barrels a day.

21 So it -- it really depends on where you
22 are in the -- and there's a lot of wells there more
23 towards the -- the east closer to the Papa Squirrel
24 location that will put away 20 to 30,000 barrels a
25 day, some even higher than that just depending on the

1 permits that have been granted.

2 But important to keep in mind Texas has
3 a much higher maximum surface pressure that actually
4 results in the injection of bone fracture gradient.

5 DR. AMPOMAH: Yeah, not in New Mexico.

6 MR. TAYLOR: Right.

7 DR. AMPOMAH: So I just want to clarify
8 that the people -- said, you know, two to 4,000
9 barrels a day. And at the maximum that they see based
10 on the experience of our 10,000, that's been outside
11 the state lines. So I don't know. Because I feel
12 like 20,000 barrels a day, and there were based on
13 your analysis, you are not that close to that number;
14 right?

15 So my thought is would you agree to
16 what NMOCD's saying and then probably be granted a
17 lower rate and then the step-rate test down with that?

18 MR. TAYLOR: Yeah. We have no
19 objections to the rules that were -- were pointed out
20 by the -- use the separate test to guide the maximum
21 injection pressure. You know, the -- the rate, the
22 injection rates.

23 You know, there's a lot more wells than
24 just these that were used to -- in the RT analysis.
25 The report didn't really see it had -- but there's a

1 lot of publicly available data we can look up and
2 pull. But there's dozens and dozens of wells that are
3 injecting about 20,000, 30,000 barrels a day in Texas.

4 So the -- the DMG is capable of taking
5 a lot of water. However, as this -- you were pointing
6 out a lot of that -- then Texas is above the fracture
7 parting pressure, and so we're -- we are expecting
8 much lower rates here in New Mexico due to the -- the
9 guidelines set by the OCD.

10 DR. AMPOMAH: Let me ask. What about
11 your assumptions that you utilize in their key
12 analysis?

13 MR. TAYLOR: Can you be more specific
14 about the -- which assumptions?

15 DR. AMPOMAH: So the first one that I
16 saw is that there is a general system. So even that
17 one, how does that translate to, let's say, a highly
18 heterogenous system that you are used to dealing with.
19 You know, and if you are using that, you search more
20 like -- you explain more just why that conversation
21 ran that higher rate. You know, how is that shaping
22 up in terms of if they had continuous and then --

23 MR. TAYLOR: Yeah. Thank you for that
24 question. So the -- the approach that we're -- that I
25 like taking for these is the -- the simplest possible

1 for what would explain the data that we're seeing.
2 That -- and that's just to avoid a creative yet super
3 convoluted model that might match the data but not
4 really reflect reality.

5 And in a lot of cases, most every --
6 every case for RTA that we've looked at, they -- that
7 simple model that explains the dataset is a
8 homogeneous radial flow meshed with a cylindrical
9 boundary. The part of the reason why we're -- that
10 model shows up a lot is due to some of the noise in
11 the data.

12 So a lot of these are surface pressure
13 readings that we then have to convert into bottomhole
14 pressures. And using the -- the rate data that -- to
15 then be able to perform this rate transient analysis.
16 So the -- yeah, so that's why that homogeneous
17 assumption makes the most sense as our starting point
18 and that explains most of the data. I think you can
19 see some of that potential heterogeneity in the
20 reservoir reflected in the permeabilities that we
21 calculate.

22 As you recall, that core permeability
23 shared on an earlier side showed less than 1
24 millidarcy. We're seeing a rate transient analysis
25 arranged with that 6 millidarcy up to 30 millidarcy.

1 So what -- what could be the cause of that?

2 Sometimes natural fractures that --
3 that you asked about in a previous question that could
4 be present taking some -- some additional fluid out
5 here on these Texas wells. Specifically, it could be
6 due to induced fracturing from the high rates of
7 pressures that are present in the Texas. So those are
8 not -- that's kind of all reflected in this composite
9 permeability calculation that we get out of the data.

10 Some of the other assumptions that
11 we're using -- yeah, we're not really. Sometimes
12 we'll model these with well bore storage most of the
13 time. It doesn't really make much of a difference in
14 the final answer, so we tend to leave that off. We --
15 well, in these cases, some of them have time dependent
16 skin. That's when operations happen.

17 They -- and they'll do acid jobs
18 throughout the life of the well and see the skin
19 factors change. On all of our numerical simulations
20 that we're showing here on the exhibits today, we're
21 sending zero skins to represent the brand new well,
22 cleaned up a better casing --

23 DR. AMPOMAH: So nothing really that
24 different from the alternatives that you think is
25 helping to understand your two cases?

1 MR. TAYLOR: Yes, yes.

2 DR. AMPOMAH: So now what? If you look
3 at the testimony now presented in your analysis in the
4 area that you are proposing, you have -- the radial
5 .32 millidarcy?

6 MR. TAYLOR: Yeah.

7 DR. AMPOMAH: So I am expecting around
8 -- lower end. Should a range reflect that?

9 MR. TAYLOR: Yeah. And I -- and I do
10 understand that -- that concern. I think that these
11 models are very easy to -- to rerun with permeability
12 assumptions. It's the -- we wanted to honor the
13 analog data since we don't have, you know, really any
14 analogs in New Mexico under that pressure, where you
15 know, we have to use the Texas wells, which do have
16 some different operational conditions.

17 You know, part of the reason why we
18 want this pilot, they're requesting this pilot program
19 is to actually get that data in New Mexico operating
20 under the OCD guidelines to understand more about how
21 the rock is reacting to the -- to an injection. What
22 are we really seeing in terms of permeability?

23 You know, the -- the few core samples
24 that we do have, are those reflective of the entire
25 reservoir or not. And so there -- there's a lot of

1 unanswerd questions that we have right now. A lot of
2 uncertain data we are hoping to resolve in this pilot
3 project.

4 DR. AMPOMAH: So in the modeling that
5 you did for the two wells, do you know whether the
6 formation really took most of the water?

7 MR. TAYLOR: So since these models are
8 ultimately homogeneous and ultimately simple, it
9 really just comes down to -- it's mostly collated with
10 their thickness. We think upper, which is a Y, and
11 injection rate is correlated to -- to thickness.

12 So the thicker one would take more --
13 more water in the models, so in this case it would be
14 the -- the Cherry. The porosities do -- do impact
15 that a little bit. But being as how close these are
16 with these models, it's -- they give a thicker
17 interval tends to hold more water.

18 DR. AMPOMAH: Just so I understand, so
19 before the true potential injection zones, you
20 assigned the same porosity?

21 MR. TAYLOR: No. As you'll see on
22 slides 154 and 156 on the tables, those are the inputs
23 into the model so that you have different porosities
24 based on the -- from the geology at those locations.

25 DR. AMPOMAH: So what were the fracture

1 pressure ingredients that you utilized in this one for
2 either of the wells?

3 MR. TAYLOR: So this model did not take
4 into account fracture pressure. This is the very
5 simple radial flow homogeneous model.

6 DR. AMPOMAH: So in my mind, I'm trying
7 to correlate the significance of the arms to the rate
8 that you want -- So it sounds to me like this is a
9 very simplistic model. And looking at how simple-
10 looking it is, you know, maximum injection rate, it's
11 not really up to answering our question.

12 MR. TAYLOR: This -- I can agree that I
13 can thank the -- the rates that we requested were on
14 the high side and then we wanted to socialize those --
15 those high in potential numbers based on what we're
16 seeing in Texas and how this is possible in the DMG.

17 And just so that we're not -- we didn't
18 want to come in and request 5,000 barrels a day and
19 then have well, the potential for 20,000 barrels a
20 day. We thought it would be better to err on the
21 conservative side of requesting for more, higher rate
22 at these given pressures and then learn through this
23 pilot what is actually possible in -- in New Mexico.

24 There's just -- there's a lot of
25 uncertainty on the rates. Much more confident in

1 the -- the pressure assumptions and the total storage
2 in real life as well. But the rate is really a big
3 question. That just comes down to that -- that
4 uncertainty and permeability to have all these tracks
5 going forward.

6 What does the permeability really look
7 like on a macro level as the well accesses the
8 reservoir? And we won't understand that until we have
9 some injectors in the ground and we can do a similar
10 analysis on them.

11 DR. AMPOMAH: So I'm going to ask you
12 based on the analysis that you've done, in your
13 experience, you know, how is the high volume injection
14 in the shallower areas that you are proposing, how
15 will the impact -- you're going to build a pressure
16 pit. So how is that going to impact future injection
17 --

18 MR. TAYLOR: I -- I think this is why
19 it's important to space wells properly. I do agree
20 with the proposal that the OCD put forth that the
21 wells be at least a mile apart. You know, Chevron, we
22 see a lot of operators out there on the side in Texas.

23 They'll pack their wells really close
24 together in whatever position they have are being
25 that's wasted. The capital or really this here have

1 been injected into the exact same container. So we --
2 our view is to space our wells out appropriately right
3 now I think in the -- in our entire Harris, New Mexico
4 field, where Severitas is, we have a potential three
5 more locations we've identified with proper spacing
6 and which I think is at least about a mile and a half
7 to two miles apart.

8 But this is something that I don't
9 recall exactly off the top of my head, but I think
10 that's -- you know, relative to the -- the range of it
11 over in the -- near Papa Squirrel and our Salado Draw
12 field, we have two additional locations identified and
13 properly spaced out.

14 It's not our intention to pack these
15 wells in closer. I think I'm, you know, kind of
16 extrapolating your question a little bit. If -- if we
17 pack a lot of wells too closely, then the water
18 pressures will increase it a lot quicker. It's not
19 something we want to see, and we want to be able to
20 efficiently use the -- the reservoir in that storage
21 capacity. From my -- from my perspective, that
22 cumulative storage number is the most important
23 number. How much is this well going to be able to
24 take over its -- its entire life?

25 DR. AMPOMAH: So on page 157, you apply

1 the pressure showing us how the pressure needs to be
2 away from the well bore, but I really wanted to see
3 how the pressure is building up with regard to time.
4 You know, in the more, like, pressure so I can really
5 see how the pressure is building up based on the rates
6 that you are using. I'm sure you have that.

7 MR. TAYLOR: Yeah. Yeah, we can -- we
8 can for -- transform it into that. The way we
9 presented it here was the time is really represented
10 by those -- those different curves that we had. They
11 all go up on the chart. That's the time. And then I
12 tried to give a sense to that on the -- in the box
13 there, the -- be calculated that timing there, that
14 four-year, 11-year, 23-year et cetera.

15 Again, we -- the way we should have
16 presented this data was more in terms of distance, as
17 you said, rather than through time.

18 DR. AMPOMAH: Can you comment on the
19 boundary conditions? So I know that in your
20 application you said it's the closest.

21 MR. TAYLOR: Yeah.

22 DR. AMPOMAH: So is it really closed.

23 MR. TAYLOR: So based on the RT8 data
24 that we've seen, these wells really are our closest.
25 We haven't found one yet that is in the DMG that has

1 an arbitrarily large boundary. They all -- all of the
2 boundaries tend to just show up within a few months.
3 So we got to -- it's a finite here. They gave us each
4 model followed by that circular reducing on the wells
5 quite well.

6 In reality, the shapes get, you know,
7 oblong. They could be rectangular. We don't really
8 know. But the -- the important thing is that they are
9 finite and we can represent that finite, that
10 potential area of impact quite well through a
11 cylindrical reservoir model.

12 DR. AMPOMAH: Yeah. And you obviously
13 did hard work. You did an amazing analysis. So thank
14 you.

15 MR. TAYLOR: Yeah. Thank you for your
16 round of questioning.

17 MR. FUGE: Now, I take it there are no
18 questions?

19 MR. FUGE: I only have one. And it may
20 just be implied from the analysis here. But I'm
21 assuming when you did your sort of individual well
22 decline and then the El Mar Field remaining reserves,
23 a check was done. There are no pending applications
24 that would suggest any interest in this area or these
25 formations?

1 MR. TAYLOR: I don't recall. I -- I
2 did not do that exact -- that check even with the
3 outlines. We're back to -- look at that.

4 MR. FUGE: Yes, please.

5 MR. TAYLOR: So yesterday, we were -- I
6 went back -- some questions and just went back to see
7 when the last was -- and so it kind of tells me in --
8 in short what I think OCD kind of -- first of all, she
9 went -- with these Cherry Canyon behaviors -- didn't
10 even -- didn't even require -- we don't have an exact
11 -- I think there is some -- some --

12 MR. FUGE: Any other questions for the
13 witness?

14 MR. TREMAINE: No.

15 MR. FUGE: You may be excused.

16 I think I'm going to order to adjourn
17 for a short break. We will reconvene at 3:30.

18 Then you have one more witness?

19 MS. BENNETT: Right.

20 MR. FUGE: Mr. Tremaine, how long do
21 you expect you'll need for your first witness?

22 MR. TREMAINE: Our first witness will
23 be pretty quick, so maybe 15 minutes.

24 MR. FUGE: So at least coming in, just
25 sitting in, and so you know this at the outset.

1 Somebody had a harder stop at five today. But at
2 minimum, we're going to do Chevron's last remaining
3 witness and OCD's first. If we have some additional
4 time, we can discuss that as we're moving forward.

5 So we will return at 3:15. I mean at
6 3:30.

7 (Off the record.)

8 MR. FUGE: Let's get back going, folks.
9 And I know it's a little toasty in here. I have
10 submitted some request to central, wherever that is
11 located, to drop the temperature a little bit to the
12 extent they can.

13 But we will go ahead and get started
14 with Chevron's last witness.

15 MS. BENNETT: Thank you.

16 MR. FUGE: And since, Mr. Comiskey,
17 we've already sworn and recognized this, I think we
18 can just go into the substance of his testimony.

19 MS. BENNETT: Thank you very much.

20 EXAMINATION

21 BY MS. BENNETT:

22 Q Yes. Mr. Comiskey, you remember that you
23 were sworn in? Do you agree to tell the truth?

24 A Yes.

25 Q So this morning you gave us an overview of

1 the pilot projects and some of the work that's been
2 done. And now we're transitioning to a different part
3 of your testimony. And so what's the purpose of the
4 testimony you're about to give?

5 A So a part of my own projects, one of the
6 things you'll notice, we did a -- and took a very
7 thorough review of seismicity at the Permian Basin.
8 This is one of the cornerstones of -- of, you know,
9 why we're looking into this kind of project for
10 produced water optionality. It's partly due to the
11 fact of the increase of induced seismicity
12 attributable to somewhere across the Permian Basin.

13 So through these pilot reviews we undertook
14 -- and we'll go through the review that I undertook to
15 assess seismicity risk for these two pilots and just
16 an overall setting of seismicity through the Permian
17 Basin.

18 Q Thanks. And let's start out with your first
19 slide, which is a seismicity review slide.

20 MS. BENNETT: And for the Division --
21 I'm sorry -- for the Commission, for reference, and
22 for our other parties, we're starting on page 126 of
23 the materials.

24 BY MS. BENNETT:

25 Q So let's start with page 126. And if you

1 could orient the Commission to the slide.

2 A Yeah. So again, the map on the right is
3 just the map you've seen probably a dozen times
4 already today of the two locations, so I won't harp on
5 those. The thing on the left is modified from Zhai,
6 et al. And it's -- it's focusing on Permian Basin.
7 So what I did is just -- it does a good job of
8 explaining, I think, the major operational practices
9 going on on today's Permian Basin.

10 And so if you look at that, we start with
11 the caprock, which we touched on a little bit. And
12 then we get into the -- the shallow disposal layer,
13 which in this case is the DMG. Below that are the
14 Avalon, Bone Spring, and the Wolfcamp production
15 intervals. And then you go further below that into a
16 deeper disposal interval, which is typically referred
17 to as the slurry or admission carbonates or deep
18 disposal. And then below that is a basement.

19 And so what I've annotated on there are kind
20 of three colored blocks, a pinkish, reddish that looks
21 a the shallow injection. And roughly the depths here
22 in Southeast New Mexico of about five to 7,000 feet.
23 Production again that's referring to major
24 unconventional development and production of roughly
25 about 6500 to 12,500 feet.

1 And then deep injection is roughly about
2 17,000 feet to about 20,000 feet. And then what I've
3 labeled there below is that seismicity, which I'll
4 show in the -- in Southeast New Mexico it's roughly
5 located about 20,000 feet or greater.

6 So you can see just the vertical
7 differentiation between shallow disposal in the
8 Permian and then the deep earthquakes that have been
9 attributed to deep disposal. And so this kind of just
10 sets the -- you can see the schematic there kind of a
11 little bit on the left side.

12 You've got, you know, disposal and pressure
13 front perturbation, which my colleague Bryce mentioned
14 on just a minute ago. You've got production, which
15 also creates a -- a pressure response and then deep
16 disposal again. So your -- you have various sources
17 and sinks of pressure as fluid is withdrawn or -- or
18 molecules are withdrawn or rejected, given a -- a
19 specific operation.

20 Q One last turn to your next slide, which is
21 slide 127. And can you briefly describe this slide,
22 and in particular where this information comes from
23 and what it represents?

24 A Yeah. So this comes from the OCD oil and
25 gas map. So what I've labeled here obviously this is

1 the locator. I've -- I've labeled the -- the two
2 locations for the pilots there with the blue stars,
3 and then the colored bullseyes represent the current
4 seismic response areas or SRAs in Southeast New
5 Mexico.

6 So the colors there represent different
7 radius around that, so the also yellow and/or red or
8 orange circles, if you look. The small circles are
9 earthquakes of a certain magnitude. Those are either
10 2.5 to 2.9 magnitude. That's 3 to 3.4. So 2 to 2.9
11 are yellows, the oranges are a 3 to 3.4, and then the
12 reds -- there's two reds -- are above the magnitude
13 3.5.

14 Those levels are defined by the OCD's
15 seismicity protocol that was announced back in 2021.
16 The associated colored bands of red and orange and
17 yellow represent different radiuses around those
18 events, representing red for 3 miles, orange for 6 and
19 yellow for 10. And again, those are derived from the
20 OCD's seismicity protocol from 2021.

21 And so what this is trying to show about the
22 various seismicity protocols within Southeastern New
23 Mexico, and we'll go through some of the slides and
24 looking at in particular one of the SRAs, which I've
25 labeled a county line, state line SRA, which is --

1 borders Eddy and Lea County and also Loving and Lea
2 County.

3 Q And so those depict the Papa Squirrel as it
4 is within one of the SRAs?

5 A Yes, it does depict Papa Squirrel as to be
6 within one of the SRAs. However, as I'll show in
7 future slides, the SRAs focused only on deep injection
8 and not shallow.

9 Q Let's turn to the next slide then. And can
10 you orient the commissioners to what this slide is
11 then and what you're showing here?

12 A Yes. Again, so here's an inset map looking
13 at Eddy and Lea County, and also the northern part of
14 the Delaware Basin of Texas. Again, I've highlighted
15 the two proposed titled SWD locations with blue stars.
16 I've also highlighted the county line/state line SRA
17 and a -- and a black oval.

18 The earthquakes on this map are -- are
19 colored circles represented from a magnitude 2.5 to a
20 magnitude 5.0. So what I'll go on this is the source
21 of this information is the USGS website. They are the
22 authoritative source on earthquakes in Southern New
23 Mexico. They're not in Northern Texas. That is the
24 TexNet, but TexNet or USGS reports of Texas. So the
25 USGS is essentially now the -- a one-stop shop.

1 So those earthquakes are colored by
2 magnitude. Most of those earthquakes occurred from
3 2019 onward. The two plots on the right if you look
4 on the -- the histogram, you'll notice the label is
5 depth of the event over time. So it's depth in feet
6 from surface level. And so the top of hot is
7 referencing just the events within the county
8 line/state line SRA.

9 The bottom is year, and you can see the
10 events with the necessary started within 2019, kind of
11 regressed since then. It started to pick up really in
12 late 2020 and has progressed fairly consistently until
13 late 2022/2023 where we saw a -- a reduction, and I'll
14 show that in a future slide.

15 The bottom plot is -- is looking at the
16 Northern Culberson/Reeves SRA, Texas. The reason for
17 showing this is it's also an area of seismicity that's
18 been attributed to deep disposal operations. And you
19 can see the number of earthquakes there. There's
20 obviously quite a few more earthquakes over time in
21 this plot.

22 But again, it just relates to the depths of
23 the event. So both plots, you can see the depths are
24 well over 18 to 20,000 feet. That is many thousands
25 of feet deeper than -- than conventional development

1 and/or shallow disposal, which I'll show in a future
2 slide.

3 But the main purpose of this is just to
4 orientate everybody with the seismicity that's going
5 on within the area of interest, the magnitudes, and
6 the trends over time and the depths.

7 Q And so turning to the next slide, because
8 you've taken a closer look at some of the events that
9 have occurred in the area?

10 A Yes.

11 Q Why don't you walk us through this slide?

12 A So I'll start on the -- on the right of the
13 slide first so that -- this is a depth of operations
14 versus seismicity. The depths that you'll see here
15 from the formations are derived from well tops. So
16 there's a fairly accurate -- so the step goes from 0
17 to roughly 30,000 feet, again from surface.

18 So the first color block on there is -- is
19 relation to the Papa Squirrel. So the proposed
20 injection interval that you've seen is the Bell and
21 Cherry Canyon formations, roughly 4600 feet to 7,000
22 feet.

23 Below that, you'll see the Avalon
24 production, roughly about 9,000 feet, the Bone Spring
25 production, roughly about 10,000 feet, the Wolfcamp

1 production, roughly about 11,000 feet. And then below
2 that again are deep injection. And that's again
3 roughly 17 to 20,000 feet.

4 Even below that again are earthquakes. So
5 the earthquakes that occurred and you referenced the
6 map on the left to see the location of the earthquakes
7 in XY. The location of earthquakes are again well
8 below the proposed DMG location interval and again
9 below the -- the deep SWD interval.

10 If you look on the map on the left, you see
11 the earthquakes again colored by magnitude. That
12 magnitude scale is consistent through all the slides,
13 I should note. The -- the red dash outline is roughly
14 the -- the county line/state line SRA.

15 And then the blue boxes are deep disposal
16 wells. As I've mentioned this -- the SRA did not
17 impact any shallow disposal wells. It was only
18 focused on deep disposal wells given the preponderance
19 of information that was put forth a couple years ago
20 from those -- the industry.

21 So all the blue wells in that area have been
22 impacted by the SRA either through enhanced data
23 reporting, curtailments, or shut-ins depending on the
24 distance from the earthquakes. The reference there,
25 there's that orange/reddish circle right there. Yes,

1 that is a magnitude 4.0 event that occurred in July of
2 2021. That was really the catalyst for the -- the
3 SRAs and the -- the change in the protocol in
4 establishing this SRA.

5 I'll talk a little more about the -- the
6 evolution of this SRA over time. But the main purpose
7 of this slide is just to orient to begin within the
8 county line SRA and in particular the Papa Squirrel as
9 it is in the SRA. The depth of the proposed injection
10 interval, the depth of the production, the depth of
11 the deep injection, and when the seismicities occur.

12 Q Thanks. And down here, this is the part?

13 A The Papa Squirrel, yes. The Papa Squirrel
14 is the black diamond on the map label.

15 Q Right. Anything else you want to tell about
16 the slide? If not, we can move on.

17 A No.

18 Q So the next slide discusses curtailments,
19 which you were just alluding to, so why don't you take
20 it away and talk a little bit more about curtailments
21 and why that's relevant to today's discussion?

22 A So when we look at seismicity, the question
23 is what's inducing the earthquakes; right? And
24 there's a multitude of hypotheses that can be looked
25 at with inducing earthquakes. Not just on the -- in

1 the Permian Basin, but anything due to anthropogenic
2 events. And anthropogenic meaning human caused.

3 So when we looked at seismicity in Southeast
4 New Mexico as it began to -- to take an uptick, we're
5 starting to look at -- see the correlation between,
6 you know, analog studies, correlation between deep
7 injection and the seismicity, things like that.

8 So there's a couple key things on this that
9 I think add -- give us a better understanding of the
10 correlation between deep disposal and the seismicity.
11 So the same map on the -- that was on the previous
12 slide is shown. However, there's a blue kind of
13 colored in circle-ish oval. And what that's depicting
14 is just the initial seismic response around the
15 initial magnitude 4.0.

16 The reason why the red area is much larger
17 is that's incorporating events that trend up towards
18 the south, southwest over time towards the state line.
19 That's created a much broader polygon. But the
20 initial kind of AOI was that -- that shaded -- roughly
21 shaded curtailment area.

22 And so if you look down below, you see the
23 magnitude 2.0. That's within the initial 4.0
24 response. And again, it's just magnitude 2.5 and
25 above on the USGS. And you can see the events over

1 time.

2 The dashed line that is noted on that plot
3 on the bottom with OCD becomes labeled is the point at
4 which the OCD enacted their response, thus curtailing
5 deep disposal within that area. If you look up at the
6 plot above, this is a plotted SRA. The county
7 line/state line SRA deep volumes and barrels of water
8 per month from the OCD website dating back to January
9 of 2017 essentially through reporting in October
10 roughly.

11 And you can see that trend continuing up
12 over time, reaching a max of nearly 8 million barrels
13 a month in early 2021. However, you can see a sharp
14 drop after that OCD curtailment in essentially
15 December of -- of 2021, January of 2022.

16 And so if you look at that OCD curtailment
17 drop and you look at the -- go back to the bottom
18 plug. You can see the seismicity before the
19 curtailment and the seismic reactive curtailments
20 are -- are very different.

21 And you notice that there's only one event
22 on that bottom plot kind of after that April 13 date.
23 We -- I pulled the date up until just a few weeks ago.
24 There just haven't been any events. So that's why the
25 plot stops. There just haven't been any earthquakes

1 in that -- in that oval.

2 If you go and look now on the county line
3 SRA earthquakes over 2.5, this is taking into account
4 the whole county line SRA. Again, I note the OCD
5 curtailments. You still see seismicity has continued.
6 You could probably say it's probably equal to what it
7 was before. Again, that's representative of the
8 seismicity has migrated. Again, the curtailments have
9 only impacted a certain area, not the whole, broad
10 area.

11 The -- but the key to this slide though is
12 that within the area curtailments on the deep disposal
13 volumes only -- and I want to reiterate there was no
14 shallow curtailments in this -- there seems to be a
15 strong correlation between the curtailments of the
16 volumes from the OCD and the seismicity within that
17 immediate response area.

18 And this is analogous to other areas
19 globally that have seen responses in injection due to
20 seismicity, curtailments, or shut-in, and the
21 mitigation of seismicity over time.

22 Q So this preserved -- that we intended to
23 talk about earlier, but it's here as well, so why
24 don't you describe this slide to the commissioners,
25 and why was it included in here as well?

1 A So this is -- this is somewhat a cornerstone
2 of the pilot program. It just kind of relates to --
3 to, you know, where this water's going. So you've
4 seen curtailments. Production has continue to go.
5 I'm sure, you know, New Mexico should be very proud of
6 being the second largest oil-gas producer in the
7 United States.

8 So the plot on the bottom -- this is just
9 focused on Southeast New Mexico, so this isn't
10 representative of the entire state, just focusing on
11 Southeast New Mexico in the Permian.

12 You can see an increase in - in green. That
13 shows up as green. But oil production, that's BOE
14 equivalent per day. 2019 obviously till 2023 when
15 pulled the data, and that's roughly about 3 million
16 barrels a day or so. BOEs again.

17 The darker blue line, that is average water
18 injection. Again, this is Southeast New Mexico. And
19 so you can see that premise is roughly flat, but did
20 come up a little bit in 2022, then it's roughly been
21 flat. However, you know, for every BOE that's
22 produced in the Permian Basin, roughly it's anywhere
23 between two and a half to five bags of water.

24 So -- and you expect to see that trend
25 increase relative to production. So if you look up

1 the total water production trend, seems to -- you
2 know, kind of relates to that. So you can see that
3 Delta is roughly about 2.5 to 3.5 four to one. So
4 where is that water going?

5 You have increased oil production, and the
6 injections here will be flat. Most of that water is
7 moving across the state line. It's being injected
8 into Texas roughly to the tune of about 3 to 3 1/2
9 million barrels a day is being injected.

10 And I -- I would argue that probably 90
11 percent if not 95 percent of that water is being
12 injected into DMG disposal wells. So when we think
13 about, you know, reductions in -- in, you know, we've
14 -- we've talked about limited DMG disposal and
15 Southeast New Mexico as we document its -- today, talk
16 about predominantly deep disposal in Southeast New
17 Mexico.

18 However, the rise of seismicity has
19 curtailed several areas of deep disposal. It's put
20 more -- more pressure -- pun intended -- on the
21 disposal network. And there's been a big move to move
22 a lot of that water across the state line into Texas.

23 Q Thanks. This slide is entitled "Chevron
24 Undertook In-Depth Technical Review." And this slide
25 isn't designed to go through that technical review,

1 but maybe more or less to be a summary of the
2 technical review?

3 A Yes. This is just a graphical
4 representation of the technical review. And so the
5 previous slides talked about the seismicity, where
6 it's occurring and operational things. Things that we
7 can observe, things that we can -- we can see.

8 This is trying to look at, you know, what's
9 causing the earthquakes and what are the earthquakes
10 telling us about the earth? What are they telling us
11 about the relationship to stress, relationship to many
12 different properties we look at.

13 And so all red -- everybody to the -- again,
14 the plot on the right -- the figure on the right is
15 the same figure again on -- and I'll talk about that
16 dash line here in a second.

17 But if you go to the figure on the left, the
18 map, you can see that this is again a map of roughly
19 the same area of Lea and Eddy County and Northern
20 Texas and the Delaware Basin. And then I've -- I've
21 labeled several things on here, so I'll walk through
22 that.

23 If you notice the -- the blue triangles
24 here, those blue triangles are seismic monitoring
25 stations. This is Chevron's and the industry's

1 operator network that many companies have subscribed
2 into. And essentially, it's a -- a very robust
3 network of seismic monitoring stations.

4 Across the Permian overall, Chevron has
5 access to over 220 seismic monitoring stations, which
6 gives us a very robust understanding of where the
7 earthquakes are occurring. Space and time, but also
8 very highly accurate understanding of the depth, which
9 is very consistent.

10 A lot of the times, you'll see the -- either
11 through other public reporting agencies the depths are
12 off. They could be off by 10,000 feet because they
13 don't have enough stations to detect the earthquakes
14 accurately. And this has been around for several
15 years, and it's actually expanded into Mexico more
16 frequently in the last couple years because of the
17 increase in seismicity.

18 The second thing I want to note on this are
19 the colored -- we call them beach balls in -- in
20 seismology. They're actually moment tensor focal
21 mechanism solutions. But you can see they're colored.
22 They're colored according to the magnitude scale. And
23 I apologize that it's hard to read. But the -- the
24 darker colors are lower magnitude starting at about a
25 magnitude 2. The warmer colors go up to I believe a

1 magnitude 3.8 or 9 on this map. And so that's just
2 the magnitudes, so the beach balls are colored by
3 magnitude.

4 What the beach balls tell us and how you can
5 see they're slightly different shaded -- and again on
6 the scale it might be difficult to see. But you can
7 also -- if you take a glance at the map on the middle,
8 you can see similar kind of gray beach balls. And
9 what these moment tensor beach ball solutions tell us
10 is how faults are moving.

11 So when an earthquake occurs, there's
12 different -- different stations to detect different
13 first motions and locate the earthquake. And that
14 amplitude either up or down tells us how the fault
15 moves each direction.

16 The -- the very key component to this, it
17 tells us the geomechanical orientation of the fault on
18 the subsurface. And so for several representative
19 focal mechanisms, what I've done is I've labeled the
20 spike, dip, and the rake. And those are key
21 components of structural geology.

22 But what these tells us is which way's the
23 fault leaning, so which direction is the fault? Which
24 way is it dipping? And those can tell us about so log
25 information, about the stress information in the

1 subsurface. Is it a normal faulting environment based
2 on the orientation of these mechanisms? Is it a
3 reverse fault environment? Things like that.

4 But it's very critical understanding the
5 stress 'cause that tells us how faults are stable and
6 subsurface unstable. Some faults are stable. You
7 could -- you could increase the "rosavar" [ph]
8 pressure to a million psi and it'll never move.

9 Some faults are unstable. You could
10 increase the "rosavar" [ph] pressure by one psi and
11 they will move. So understanding that in relation
12 to -- to the geometry is very important when we're
13 thinking about induced seismicity and what may or may
14 not cause it. So that -- that's a key component.

15 The figure on the top is just a
16 representation of Andersonian faulting. And this is
17 just a broad representation of the fault, this roughly
18 dipping that we've interpreted here. They kept kind
19 of becoming SRA area. The deep fault moved. And it's
20 roughly dipping about 50 degrees, striking about 65
21 degrees, which is roughly parallel to SHMax.

22 So the -- the red lines on this map are
23 interpreted based on many different types of data, but
24 the SHMax in the direction's roughly about 70 degrees.
25 So 65 degrees for the strike. Background stress is

1 roughly 70, so they're very well aligned.

2 So in a normal faulting environment, when
3 you have a fault that's probably parallel to SHMax,
4 it's more prone to slip, meaning it's more likely for
5 movement to occur than fault let's say on an
6 orthogonal map and I'll show a simplistic model on the
7 next slide on -- on that. The -- the map in the
8 middle is a publication from Jens, et al., and Mark
9 Zoback at Stanford. This was 2016. There's been a
10 subsequent update to this.

11 But this just shows a very good example the
12 stress direction accomplished of multiple data, some
13 of which -- a lot of which industry provided,
14 including Chevron, to this. And this just gives a --
15 a good understanding of the stress direction. So
16 the -- the cue in the map in the background is colored
17 by normal to strike with faulting environment.

18 And then the -- the indicators that
19 directional arrows on the map roughly indicates a
20 stress direction, the maximum horizontal stress
21 direction, again, which is very critical to
22 understanding fault.

23 So if you -- if you look at all that, the --
24 the kind of the dash line is something we've
25 interpreted on this as a deep basement fault that

1 moved. And so that's just kind of based on all this
2 information, we're able to ascertain from the geology
3 ascertain the strike and the fault, the dip, the
4 background stretch direction, the stretch direction of
5 the fault, and those two limitations, what's prone to
6 slip, what's not prone to slip.

7 So when we think about how we manage new
8 seismicity, this is a very critical component to
9 constructing your risk management plan when you think
10 about, you know, disposal operations or anything in
11 particular that has a -- a net change on the reservoir
12 or pressure change.

13 So the next two slides to go through are
14 just basic seismicity reviews of -- of two locations.
15 So the -- the Papa Squirrel. There's a 10-mile area
16 of review on that. You can see the earthquakes again.
17 We've talked about this before. You know, the
18 earthquakes are -- are deep. Again, the injection
19 interval for the Papa Squirrel's about 4500 to 7,000
20 feet. Earthquakes here are well over, you know,
21 20,000 feet or so, so there's significant separation
22 between the two.

23 I should note that the separation between
24 those are many thousands of feet at very tight on
25 impermeable rock. Obviously, we have to use

1 hydraulics to stimulate the out of commission
2 reservoirs. They won't flow on their own. So there's
3 a lot of impermeable rock between the shallow
4 injection or goal and where these deeper quakes are
5 occurring. And then Papa Squirrel, the closest neck
6 to two and a half is roughly 5 1/2 miles away from
7 that bed.

8 The next slide is probably one of the more
9 boring slides we'll see today. Thankfully there is
10 no -- there are no events in New Mexico within the
11 10-mile AOR. I did pull up some events in Texas.
12 Those are pretty small magnitude events. I did label
13 again, as reference, this is again just -- the numbers
14 have changed here relative to the Severitas 2 State
15 SWD 1 location.

16 In the depths -- you could see the depths of
17 the earthquakes here very deep. You will note that
18 the plot stops in 2022. It's not because I didn't --
19 I didn't want to pull anything more recent. It's just
20 there were no -- there had been no earthquakes within
21 this 10-mile AOR over that timespan.

22 So that was kind of a review of kind of the
23 seismicity review around this. I -- I will be remiss
24 if I didn't talk about shallow DMG disposal. And
25 based on the exhibits from OCD, I'm glad I brought

1 this -- this paper up.

2 And so there -- are there -- there is
3 earthquakes in Permian Basin attributable to shallow
4 disposal. Absolutely. And I will go through a very
5 good case study from Horne, et al., that was published
6 a year ago and looked into this in much detail.

7 So the map on the left has a lot of
8 information on here, the reference is there and all
9 the references I've used are -- are cited. I would
10 recommend that Commissioners go and -- and look at
11 this if more interested. There's a lot of information
12 on it, so I'm not going to go through every component
13 of that. But what I'll note is I did the zoom in and
14 you can see the red arrow. And this is looking at
15 Southern Reeves County.

16 Southern Reeves County, the earthquakes here
17 are -- are much shallower. They are in the Delaware
18 Mountain Group. And so, you know, the question had
19 come up, you know, we have earthquakes due to shallow
20 injection here. Why not, you know, in Southern New
21 Mexico or other areas? And the answer is geology and
22 stress.

23 So as I mentioned before, faults that are
24 oriented roughly parallel to the stress direction are
25 more prone to slip. And at Permian Basin, the stress

1 orientation rotates. See down here, it's roughly --
2 the stress direction is roughly north/northwest to
3 south/southeast. So it's roughly -- if you look at
4 it, it's roughly oriented about, you know, 330
5 degrees. Whereas as I just showed you recently in
6 Southern New Mexico the stress orientation is about 70
7 degrees.

8 The stress rotates. It is very unique to
9 the Permian Basin. There are a lot of scholars out
10 there that are trying to understand exactly why it
11 rotates. There's a lot of hypotheses I'm not going to
12 get into today. But it does rotate. Which means
13 its -- one fault in a certain area may be stable. One
14 fault in the other area, same direction may be
15 unstable.

16 Look at the faults in Southern Reeves. You
17 can see their trend on the seismic cross sections.
18 The two slides there. One is black and white. The
19 other is colored. Just looking at a deaf slice and a
20 coherent slice of seismic data. And you can see those
21 faults are roughly trending about 330 degrees, right,
22 north/northwest. They are -- they are oriented and
23 they have -- it makes them prone to slip.

24 The -- the bottom plot and the colored
25 scheme down marked E shows numerous shallow injection

1 wells in the yellow and green intervals. Those are
2 the -- oh, sorry, the -- in the light green colored
3 interval, those are active shallow injection wells
4 that are injecting into the Delaware Mountain Group
5 where those stalls are posted.

6 And the likely hypothesis there is that
7 those are increasing the far pressure reservoir, which
8 reduces the effective stress on a fault. And that --
9 when that happens, it becomes unstable, and it moves,
10 generating earthquake.

11 So this is the unique set of circumstances,
12 we talked about faults. And you'll note that we have
13 -- we have not shown any slides like this because when
14 you go in and interpret these, these faults in
15 Southern Reeves County are -- are very obvious in
16 seismic data.

17 When you move to other parts of the basin,
18 we cannot see these structures. And there's likely
19 just because of the different faulting and the
20 different stress domain when the basin was formed,
21 these are thin-skinned faults. These are young.
22 These do not connect into the basement. They tip out
23 into the Wolfcamp. It's likely because the timing of
24 the basin range extension those dates, the deposition
25 of the Wolfcamp.

1 But they are there, but we cannot see these
2 similar type structures in Southern New Mexico, at
3 least on the -- on the distribution on the scale that
4 we see down here in Southern Reeves County. That's a
5 very distinct -- also cannot see these in the Midland
6 Basin either.

7 Q So when you say we don't see them or you
8 can't see them in the Permian or Midland, what does
9 that mean exactly? Does that mean that you literally
10 can't see them or they don't exist or you don't have
11 to be as concerned about them?

12 A We can't see them with this fidelity.
13 They're not as -- they're not as clear-cut. These
14 are -- these are very clear. They offset
15 stratigraphy. You can see them very blatant in the
16 seismic data.

17 You could bring a lineup from ten
18 geophysicists and eight of them would agree. You
19 can't get all ten. But eight would agree that you
20 could see those. If you brought up a similar cross
21 section in Southern New Mexico or other parts of the
22 Permian Basin, it's much more harder to distinguish
23 them.

24 And the thought is it's -- there's a change
25 in the structural geological in this area. There's

1 definitely change in the stress direction as well.

2 Q We're about to move off. Well, we have a
3 couple more slides on there.

4 A Yes.

5 Q So let's talk about those, and then I think
6 what I would like for us to discuss is your
7 conclusions based on these slides once we finish up
8 with this, the orienting on this one.

9 A So the next slide, which is I believe 136 in
10 the packet, this again looks at that. So this is from
11 the same study. At least the figures on the left are.
12 And so again, we're looking at SHMax, the direction
13 here again is roughly 330 or 140 degrees, depending on
14 which way you look at it. Northwest-southeast.

15 And again, the -- the researchers here took
16 the fault planes. They interpreted those two figures
17 in the panel next to the rose diagram, and you can see
18 that these are almost vertical faults. The different
19 values are colored roughly 60 to 70 degrees, even
20 higher. And these are oriented roughly parallel to
21 SHMax, so again making it more prone to slip.

22 But down the right is using a model. This
23 is from FFP, some publicly available program. And
24 it's very simplistic, but it does a very good job of
25 visualizing the differences in how important stress

1 direction is.

2 And so I've drawn two orthogonal faults with
3 each other. And its stress direction here again is
4 roughly about 140 or 330 degrees. And you can see
5 that the yellow fault, just based on its orientation,
6 the core pressure model for it to slip is about
7 300 psi.

8 A fault orthogonal to it is roughly about
9 900 psi. And so just based on those two conditions
10 alone, you can see the difference -- the difference in
11 the two and how important just the stress direction is
12 on fault stability.

13 Again, one of the things I want to note here
14 I think is a very good part of the articles. If you
15 look at the Coalson events that are colored on the
16 bottom plot with the -- the beach ball diagrams again,
17 that actually is today where the -- where the
18 magnitude 5 reoccurred as well in this area.

19 You can see the colors of those events.
20 Those events are roughly -- the beach balls are
21 roughly light to medium and dark green. The bottom
22 plot of that corresponds to the depth of about 7 to
23 9 kilometers in depth from the surface.

24 If you look down further into Southern
25 Reeves County, you can see that the beach balls were

1 numbered 11, 12, 13, 23, 5, 17, and 16. They're
2 roughly orange-ish color, which means they're roughly
3 about 3 to 4 kilometers in depth.

4 So there's a strong depth differentiation
5 between larger earthquakes you see in the Culberson
6 SRA, which I noted before, and the events in -- in
7 Southern Reeves County. These are shallower. They're
8 not as large, and there's a depth depreciation I'm
9 getting off initially.

10 The plot on the right is modified from
11 Zoback and Gorelick. And I think this is a very
12 important plot when I think about the potential size
13 of earthquakes. It is very difficult to get a large
14 earthquake in a very small hole. When you think about
15 earthquakes globally, the large earthquakes, the San
16 Andreas Fault, the earthquakes that occurred down in
17 Mexico, in Japan, those are on faults that are
18 hundreds and hundreds and hundreds of miles long.
19 They generate very large magnitude 7 quakes.

20 There's a direct relationship -- and this is
21 what this plot is -- is showing -- between the -- the
22 length of the fault and stress built up in the fault
23 and magnitude. And the correlation is to have big
24 earthquakes, you have to have big faults.

25 So we're thinking about shallow disposal,

1 shallow seismicity. When we think about shallow
2 lineaments or faults or subsurface. They don't have
3 the stress built up over time to degenerate large,
4 appreciable earthquakes. That's just because they're
5 young. They're not as cranky. And they're -- they
6 just don't have the stress built up.

7 When you get larger earthquakes, magnitude 5
8 3, magnitude 5 4. Those are on larger faults, and
9 those are generally buried deeper because they have a
10 higher stress built up. And that's just a general
11 trend in -- in seismology in relationship to faulted
12 pods.

13 Q And so we're about to move on from
14 seismicity. So I was hoping you could find a summary
15 of your conclusions for admission, and then I'll have
16 a follow-up question after that.

17 A So when we look at seismicity in -- in
18 relationship to the Permian Basin, we did a thorough
19 review, looking at, you know, what's -- what's
20 inducing earthquakes across the Permian? We recognize
21 there's a concern. We're concerned as well about the
22 increase in seismicity and how it relates to -- to
23 saltwater disposal operations.

24 And when we look at, you know, shallow
25 disposal operations and reflect on seismicity, there's

1 key components we have to consider. It's the fault
2 orientation. It's the -- the fault length. It's if
3 there's a fault there. It's the pressure change model
4 to understand what potentially slip is and how those
5 are oriented in respect to each other. And so looking
6 at all those criterion together, you know, we feel
7 that there's a very low risk of -- of appreciable
8 seismicity associated with -- with these two locations
9 or a shallow disposal in Southeast New Mexico.

10 There is, however, as documented, a much
11 larger risk of seismicity from deep disposal, which
12 again has been documented and has been implemented to
13 through the OCD's protocols around seismicity. And so
14 I -- we feel that this, you know -- looking at these
15 pilots provides an optionality to support disposal in
16 a manner which will mitigate seismic risk.

17 Q So one of the things that I noticed when I
18 looked at your slides is that there is a lot of
19 information on these slides. But you've also come to
20 a conclusion. So Chevron wasn't just wanting to show
21 the Commission this end result; right? You wanted to
22 also show the Commission the depth of analysis that
23 you undertook to reach this conclusion. So you sort
24 of wanted to show your math?

25 A Yes, that's correct. Yes.

1 Q And are you familiar or have you reviewed
2 OCD's conditions of approval or conditions for
3 approval of administrative applications in Exhibit 11?

4 A Yes, I have.

5 Q And was there a condition of approval or
6 condition for administrative applications that
7 assessed seismicity?

8 A Yes, there was.

9 Q And do you feel like the seismicity review
10 that you did for these two wells would be consistent
11 with that requirement?

12 A Yes, I do.

13 Q Let's move on then to the next two sets of
14 slides, which relate to your data collection and first
15 of all your response protocol.

16 A Yes.

17 Q So if you could explain to the commissioners
18 what this slide is and how you developed it?

19 A Yeah, so -- so this is -- this was work that
20 was undertaken, I mentioned earlier today, through the
21 NMOGA work group. And so I'd like to apply industry,
22 several of which are in the room here from other
23 organizations that helped support this framework. And
24 I think this is an excellent opportunity for industry
25 to work together and with -- with regulators and

1 others on managing turned around disposal.

2 And so what this -- what this puts together
3 is essentially taking the culmination of what you
4 heard today on concerns around disposal interactions
5 with potential production intervals, you know,
6 potential seismicity, things like that, and it puts
7 together a framework which industry can work through
8 and work together on to not only document, collect
9 data, assess, report, and then manage potential risks.

10 And so I -- I won't necessarily walk through
11 all the text on the right. I'll mainly just focused
12 on the -- the colored letter -- the colored words on
13 the -- on the left side. But essentially, this is
14 looking at, you know, once -- once the pilot starts up
15 and starts injecting and monitoring, and we'll talk
16 about the data collection. If there's an event that
17 kind of triggers this response, this is how this will
18 go in theory.

19 And so if there's an offset producer that --
20 and this is mainly getting focused on -- on impacts to
21 production, quarterly rights, things like that -- if
22 there's an offset producer that determines that
23 potential interference is occurring and we note that,
24 you know -- we know we can work with monitoring our
25 own producers.

1 We hope that other operators, if they see
2 something that changes in their -- in their production
3 profiles or their -- their watercuts overtime or any
4 of those information you're bringing a spore to us,
5 we'd like to set up a discussion. We'd like to
6 review. Again, we -- we provide information on -- on
7 FSI in this case or fracture stimulation interference
8 or FDI. We'd like to review that and rule that out if
9 that's a case of that -- that change. Today will be
10 looking at the -- the stimulation times of offset
11 wells.

12 And then if we ruled that out, potential
13 additional data collection -- I think it's been
14 mentioned, tracers, other data collection options to
15 -- to ascertain potential communication. If we look
16 at -- if there's no, you know, communication, you
17 know, then -- then potentially no further interaction.
18 But if there is, we'd take remedial action.

19 And those can be a number of things. It
20 could be reduction in the pressures. It could be a
21 reduction in the injection pressures and a reduction
22 in the injection rates over time. It could be
23 potentially plugging back some of the well. It could
24 be a combination of all -- many things. Again, all of
25 this could be documented to the OCD and to industry as

1 we progress this.

2 And then if -- if none of this is
3 successful, you know, we -- going down, we seek -- you
4 know, seek resolution with OCD. We recognize the OCD
5 has the authority to suspend operations at any time,
6 and we support that.

7 But this is a -- I think a robust framework
8 industry could work on in laying out a pragmatic
9 data-driven approach to manage issues around
10 injection -- in this case around shallow injection
11 into the DMG in Southeast New Mexico.

12 Q And again, this was derived from stakeholder
13 engagement?

14 A Yes.

15 Q And as you mentioned that there are
16 operators in the room, outside of the room. And
17 you've shared this with the Division in past meetings
18 with the Division, this framework?

19 A We have shared this with not only OCD but
20 also with State Land Office and other -- and industry
21 as well.

22 Q You've been talking a lot about data today
23 and how that's one of the key aspects of the pilot
24 project. So if you wouldn't mind discussing the slide
25 for Commissioners and giving the commissioners more

1 information about the data you intend to get, but also
2 why you think the data is important?

3 A So as you've heard many times today, we are
4 -- Chevron has a vested interest in collecting a
5 robust data program with these two pilot wells.
6 There's been a lot of work. They've talked about a
7 lot of uncertainty in shallow injection.

8 My colleague Bryce Taylor did some work on
9 some RT wells, and he only used a few. 'Cause there's
10 only a few wells that have actual data we can leverage
11 out of thousands in the Permian. So we look at this
12 as a very important opportunity to collect a lot more,
13 a very robust dataset, not only for us but for
14 industry to understand the potential issues.

15 Someone down here has listed out -- and I
16 will note this is -- this is not necessarily every
17 single piece of surveillance. We looked at these, and
18 these are the things that we think are high priority.
19 Doesn't mean there may not be other things on the
20 table, you know, depending on what we'd look at. But
21 these are the things that we think are high priority
22 and part of our data collection plan.

23 So I'm going to briefly run through these
24 and just their surveillance and what we're -- what's
25 going to be taken in purpose. And I'm going to kind

1 of label these into the -- the static perspective and
2 the dynamic perspectives.

3 So first we have the -- the wire line
4 logging procedure that's -- that's fairly standard in
5 the industry. And so this is, you know, the quad
6 combo logs, gamma ray resistivity, neutron density,
7 porosity, sonic. And that's looking at, you know, the
8 overall lithology and the reservoir, quality of the
9 reservoir, stress, things that are core building
10 blocks of the -- of the geology.

11 Or else they're going to run the XMRI log,
12 which looks at fractures. We talked about natural
13 fractures and things like that. It's important to
14 understanding that, how it goes to mechanic worth
15 model. There were some questions earlier about
16 understanding the frac geometry. This is very
17 critical to understanding that.

18 One of the things here, we're going to have
19 downhole pressure gauges. Chevron as a program and
20 any of our shallow disposal wells we drill in the
21 Permian, we -- part of our standard protocol is to
22 install downward pressure gauge.

23 It's very important to understand how
24 pressure changes if we inject over time dynamically.
25 Dynamically being a key component of that. Not once a

1 month, not once a year, but continuously. Spinner
2 surveys are something we've also looked at,
3 understanding, you know, high prime interlay zones
4 where the water is going through injection over time.

5 Water chemistry. Chevron has a robust water
6 chemistry program. We look at produced water. This
7 seeds into our -- into looking at other things that we
8 look at around -- around potential beneficiary use and
9 things like that. So this is a robust program.

10 As -- as colleagues we would be running
11 defense and separate tests as well. So those are a
12 lot of the somewhat static information that we could
13 be collecting, some of the more dynamic data that we
14 could be collecting based on information or tracers.
15 Again, we talked about if there's -- you know, try to
16 trace where potentially water is going -- is going out
17 of zone, out of confinement. This is a good
18 opportunity to try to understand that.

19 We have downhole gauges, deployed producers,
20 monitor pressure changes or communication then
21 production monitoring. This is something that, again,
22 one of the -- the highlights and what I talked about
23 earlier in locating these wells where we did and
24 trying to take into account many different variables
25 is locating these on top of our own wells.

1 It's very challenging sometimes for
2 companies to share production data for obvious
3 reasons. But given that these are on top of our own
4 wells, we -- we can share data with ourself. And so
5 this gives us the opportunity to have a really high
6 quality rich dataset looking at production changes
7 very proximal to the -- to the well locations.

8 So again, this -- we feel this is a
9 cornerstone of our pilot program. We think this --
10 this is going to add a lot of value not only
11 internally but also to the industry understanding, and
12 not just in Southeast New Mexico, but across the
13 Permian in general. This can be applied a lot of
14 places. So we're very, very excited about this, but I
15 think it's very important.

16 Q So the pilot project is a two-well pilot
17 project. And so does the data collection sort of
18 dovetail with the fact that you chose two wells as
19 your pilot project?

20 A Yes. It -- it does.

21 Q And why is that? Do you expect different
22 data from the different wells?

23 A We expect -- we expect different results
24 from different wells, I think. Obviously, we talked
25 about the geology difference in the modeling we came

1 up with was different. So this allows us to be able
2 to look at two different locations.

3 You know, it's very hard to form a trend if
4 you only have one datapoint. And so we're starting
5 with two. We might need three, but we -- we felt that
6 this was adequate to try to further our understanding.
7 It also dovetail in with other data collection we're
8 doing in Texas with our operations as well.

9 Q Let's go ahead and talk about the next slide
10 about the timeline for your data collection efforts.

11 A So this is -- this is a proposed kind of
12 guideline. You'll notice it's kind of pre-spud
13 execution. Injections start up and down the road.
14 And so this should be looked at as a notional kind of
15 timeline.

16 There's certain data that you will collect
17 at one point in time. The logs will be run, and those
18 are the logs, right, when we drill the well. There's
19 other pieces of information like pressure data,
20 production monitoring, you know, other data that will
21 be collected over longer periods of time. They'll
22 report it.

23 And so -- so this is just a -- just an
24 overview of kind of how things will lay out from a --
25 from a general timeline as far as execution. So yeah,

1 obviously, when we drill the well, we'll be logging
2 it. We'll be doing the DFITs and the step-rate tests.

3 When we start injection, you know, we'll be,
4 you know, performing, you know, and slowing down all
5 pressure gauges, looking at how the pressure's
6 changing, and doing some of the treatments,
7 understanding how that is running spinner surveys,
8 things like that, to understand how the dynamic well
9 performs over time.

10 I'm feeding into, again, my colleague Bryce
11 report on rate change analysis. So I'd say collect
12 data, be able to execute that modeling work to see how
13 the well is performing, looking at offset producers.
14 So this is kind of a just a notional timeline that
15 looks at how data will be collected over a period of
16 time.

17 And this is -- this is, I think, very
18 important to understand that some day it will come at
19 once. Some day it will come over time. Some day it
20 will -- will come continuously just based on the --
21 the nature and the flavor of the data being collected.

22 Q And so one of the things that you mentioned
23 is a desire to be transparent and to share this data
24 in a collaborative fashion. Can you explain a little
25 bit more about that to the commissioners?

1 A Yes. So at a -- at a very high level that
2 we're committed to work with OCD in providing this
3 data in a public format so that everybody can -- can
4 work on. This is one of the big conversations here
5 about the industry on -- on how to proceed with this.
6 I think this is a little bit new for a lot of -- of
7 us.

8 And -- and maybe the OCD on collection and
9 dissemination of -- of such a rich dataset. And so we
10 look forward to -- if moving forward put the pilots
11 working with the OCD on setting up a plan to -- to
12 store and host data in a certain way.

13 Q And then the final slide that you prepared
14 gives a summary of the key takeaways from your
15 testimony.

16 MS. BENNETT: And I don't want anyone
17 to get the wrong idea that it means his testimony is
18 over though, because I do have a bunch of questions to
19 ask him.

20 BY MS. BENNETT:

21 Q But I would love to hear your key takeaways
22 from your testimony.

23 A So I believe I talked on -- on several of
24 the seismic already, so I'll -- I won't belabor those.
25 But I will continue that again. When we think about a

1 lot of the data that's been proposed today. And
2 Chevron is committed to collecting and providing a
3 very robust and transparent dataset with these.

4 We feel it's very important not only to the
5 overall success of the pilot program, but -- but just
6 to the further understanding of some of these
7 uncertainties that we've talked about and being able
8 to provide a lot more granular information to perform
9 more higher-level modeling to perform more in-depth
10 analysis than we are able to just because we don't
11 have enough data.

12 And we're modeling uncertainty on top of
13 certainty when we could be actually modeling, you
14 know, actual constrained information. And -- and so
15 we support that -- we support that as part of our
16 conditions of approval on -- on collecting data and
17 disseminating it as well.

18 Q Thanks for that. One of the things that we
19 talked about earlier today was -- this is kind of
20 going back to a question that was posed to
21 Mr. Merrifield about how many wells were analyzed to
22 come up with a net porosity. And do you have an
23 answer to that question?

24 A Yes. It was -- so that -- that worked to
25 look at the overall DMG geological understanding took

1 into account hundreds of wells across the Permian
2 Basin.

3 Q The next kind of questions I wanted to ask
4 you about were OCD Exhibit Number 11. Have you had a
5 chance to review that?

6 A Yes.

7 Q And I just want to ask you some pretty
8 general questions about it, correcting that I do not
9 have them in yet. So you reviewed it and -- well, let
10 me take a step back and talk about what Chevron did to
11 prepare for coming to this hearing today.

12 Chevron evaluated offset DMG production;
13 yes?

14 A Mm-hmm.

15 Q And it evaluated potential impacts on offset
16 Avalon production?

17 A Yes.

18 Q And ensured adequate lower and upper
19 containment?

20 A Yes.

21 Q Evaluated faulting and lineaments that
22 connect as pathways?

23 A Yes.

24 Q Assessed seismicity to the extent relevant?

25 A Yes.

1 Q Ensured adequate well bore design to protect
2 SDWs?

3 A Yes.

4 Q You have come up with reporting for faults?

5 A Yes.

6 Q Safety monitoring and mitigation measures?

7 A Yes.

8 Q So looking at the -- well, do you think that
9 those analyses are consistent with -- consistent with
10 the Division's proposed guidance in -- in Exhibit 11?

11 A I believe so.

12 Q Would you consider those to be some sort of
13 touchstones for the Division to follow when evaluating
14 future shallow DMG applications?

15 A I believe so.

16 Q Let's see. I just wanted to take a quick
17 look at paragraph 2, "Criteria for selection of the
18 injection interval, excluding the Lamar limestone from
19 an inclusion and department interval." Is that
20 something that Chevron has done or is willing to do?

21 A Yes.

22 Q Excluding the lower Brushy Canyon from the
23 permitted interval? Is that something that Chevron
24 has done?

25 A Yes.

1 Q Review of the AOR and assessment of evidence
2 of natural frac systems or faults, is that something
3 that Chevron has done?

4 A Yes.

5 Q So in terms of the well bore design and
6 construction -- I'm not going to read all of this.
7 But are these consistent with the well bore design
8 that you have put forth today?

9 A Yes, it is.

10 Q We already talked about limiting the two
11 main to 5 foot, 5 inches. We already talked about
12 craving stimulation, additional testing and
13 monitoring, conducting a cement bottom log for each
14 casing string. Is that something that you had
15 proposed to do in your original application?

16 A Yes.

17 Q Conducting a suite of open-hole logs over
18 the approved injection interval and submitting this
19 information to you if needed. Is that part of your
20 reporting protocol?

21 A Yes, it is.

22 Q Conducting a successful step-rate test
23 before injection commences. Is that something that
24 Chevron is willing to do?

25 A Yes, we are committed to conducting a

1 step-rate test, so I really would like to review some
2 of the exhibits proposing this temporary test
3 procedure.

4 Q And that's not because you disagree with
5 doing a separate test. You just have some questions
6 about how it is to be performed?

7 A That's correct.

8 Q Some inconsistencies in the volumes to be
9 performed?

10 A Yes. That's correct.

11 Q Some inconsistencies in the volumes?

12 A Yes.

13 Q And then every two years after commencement
14 of the injection permits, you shall obtain a status on
15 the pressure and review the summary on the performance
16 including analysis by fault on a visit. Is that
17 something Chevron's willing to do?

18 A Yes.

19 Q And publicized monitoring where the new well
20 location is covered. It sounds like you already have
21 a very robust monitoring program in place.

22 A Yes, we do.

23 Q And then I think I've touched on everything.
24 So it sounds like with the exception of wanting to get
25 some clarity about the actual mechanics of the

1 step-rate test, Chevron is or is willing to comply
2 with all of the conditions in Exhibit 11?

3 A Yes.

4 Q Did you review the OCD's pre-hearing
5 statement?

6 A Yes.

7 Q Did you see the statement that the Papa
8 Squirrel is located in an area not favored for DMG
9 disposal due to resource potential?

10 A Yes.

11 Q Is that something that you agree with based
12 on your own review and based on your team's review?

13 A No.

14 Q And why is that?

15 A So when we look at the -- the review of the
16 resource, I think we look back at some of the
17 historical previous reviews of that, they -- they
18 brought examples that there are things that are more
19 complicated than when you first look at.

20 Look at the -- if you only look at SWD
21 interactions with production, you're only going to
22 come up with SWD interactions with production. If you
23 only look at potential Wolfcamp to Avalon, as an
24 example, interactions, you're only going to come up
25 with Wolfcamp to Avalon interactions.

1 And so looking at everything consistently
2 under, you know, a new light of what's going on in the
3 basin, what's produced water issues. We feel it's
4 important to re-look at that and continue to evaluate
5 it as things change over time. That -- that's our
6 view and -- and the big reason why we're doing this
7 pilot program.

8 Q Did you see the Division statement about
9 Papa Squirrel being between two areas where increased
10 water saturation has been reported?

11 A Yes.

12 Q Is that a concern that Mr. Parizek addressed
13 today?

14 A Yes, I believe so.

15 Q The final questions I have for you -- well,
16 is there anything that you would like to say before we
17 conclude our time together?

18 A Yeah, just want to reiterate to -- to the
19 commissioners that we feel this is a very robust data
20 collection program and our pilots. We feel that it
21 will provide a lot of opportunities to learn, not only
22 from -- again, from our perspective, industry
23 perspective, but from the -- from the OCD's
24 perspective as well as it looks at, you know, the --
25 the important issue around produced water management

1 in Southern New Mexico.

2 Q Were the exhibits that we discussed prepared
3 by you or under your supervision?

4 A Yes, they were.

5 MS. BENNETT: At this time I'd like to
6 move the admission of Exhibits 126 to Exhibit 141.

7 MR. FUGE: Any objection?

8 MR. TREMAINE: None.

9 MR. FUGE: Exhibit so rendered.

10 (Exhibit 126 through Exhibit 141 were
11 marked for identification and admitted
12 into evidence.)

13 MS. BENNETT: Thank you.

14 And I pass the witness for any
15 questions.

16 MR. FUGE: Mr. Tremaine, do you have
17 questions for the witness?

18 MR. TREMAINE: I have two questions,
19 Mr. Chair.

20 BY MR. TREMAINE:

21 Q Mr. Comiskey, thank you for walking through
22 some of your observations on Exhibit 11. Independent
23 of Exhibit 11, your recommendations of the OCD, do you
24 or Chevron feel that DFIT tests should be performed on
25 all proposed DMG wells?

1 A I think -- we think it's a very important
2 understanding to collect dynamic data on stress in the
3 reservoir properties. Yes.

4 Q Would Chevron be willing to incorporate that
5 into the recommendation in addition to what we've seen
6 this before in Exhibit 11?

7 A Yes, I believe so.

8 Q I want to ask you a follow-up question
9 generally about this stress orientation that you're
10 talking about and the seismicity in slides 135 and
11 136. One of the Division's concerns and in
12 presentation -- we'll get into that more later or
13 tomorrow -- is areas of uncertainty and knowledge of
14 the geology in the area.

15 And I would argue that present communication
16 with Chevron today actually corroborates some of that
17 concern that there are certain areas where more data
18 is necessary. When we hear your presentation related
19 to seismicity, I think it's fair to say that you state
20 or implied a relatively high level of confidence that
21 there are not unstable faults in the proposed
22 injection area.

23 I'm just wondering if you can articulate and
24 help explain, like, what could be seen as kind of a
25 delta in that confidence. Why, when we're talking

1 about an area with geologic uncertainties, are we
2 relatively certain about the lack of faults or lower
3 risk seismicity?

4 A So when we think about fault, right,
5 that's -- that's a feature that you can map in 3D.
6 You can connect up those datapoints. It has -- it has
7 an aperture, it has closure. When we think about some
8 of the lineaments or some of the mechanisms that have
9 been discussed have made -- have been conduits to --
10 to water pool, those are not what we'd call faults.

11 And so the ability for a lineament to -- to
12 generate an appreciable seismic event, it's -- well,
13 it's very limited. And that's because again, the --
14 the stress built up in that. How much stress is -- is
15 there, you know, over time, the orientation of those.
16 And so the differentiation between fault and lineament
17 is a key thing.

18 When we think about faults, we think about,
19 you know, whether it's big, you know, the magnitude 4
20 quake or the larger earthquakes seen in front of me,
21 those are on things that are rooted, large features
22 that we can map. And my colleague Jason Parizek
23 showed a -- a map of a large fault right through the
24 area. We can see those. We can handle those.

25 When we think about lineaments or fracture

1 system, those are two different things. And so the
2 ability for a fracture system necessary to generate a
3 large earthquake is -- well, it's not applicable.

4 MR. TREMAINE: Thank you for that.

5 No further questions. Thank you,
6 Mr. Chair.

7 MR. FUGE: Ms. Hardy, do you have any
8 questions for the witness?

9 MS. HARDY: I do not. Thank you.

10 MR. FUGE: Dr. Ampomah?

11 DR. AMPOMAH: Yes, sir. I do have a
12 couple.

13 So let's start from page 126. I will
14 probably skip to 127. So on this particular page,
15 definitely you showed that the Papa Squirrel is within
16 that SRA?

17 MR. COMISKEY: Yes.

18 DR. AMPOMAH: But the Severitas 2 State
19 SWD 1 is not in that area?

20 MR. COMISKEY: Yes.

21 DR. AMPOMAH: So considering if you
22 look at the deeper zones, where there's a lot of
23 micro-seismic events happening, why would you not
24 consider building this well that's not dealing the SRA
25 rings, they're deeper. You know, why would you not

1 consider building that all the way to Devonian because
2 there's no micro-seismic event there?

3 MR. COMISKEY: Chevron has two
4 Devonian deep SWD wells located very proximal to
5 Severitas 2 SWD 1 already. And I won't speak to -- to
6 economic thresholds on drilling deep wells and the
7 cost and impact. So I -- I won't speak on those, but
8 we are -- we do have two deep disposables right there
9 already.

10 DR. AMPOMAH: Thank you. Now, you
11 showed a slide where you were comparing a map of
12 seismic events in Texas and in New Mexico.

13 MR. COMISKEY: Yes.

14 DR. AMPOMAH: What is New Mexico doing
15 better than Texas?

16 MR. COMISKEY: I won't -- I won't
17 necessarily speak to better. I think that would be
18 more of an opinion. But I -- I will say the -- the
19 geology in the basin is different.

20 So if you look -- if I go to slide --
21 well, if we go to slide 131 or document 131, one of
22 the things to do is there's a lot more water being
23 disposed in Texas than in New Mexico. There's a lot
24 more water coming across the state line from New
25 Mexico into Texas. So there's a lot more disposal.

1 The likelihood of induced seismicity from -- from
2 disposal operations is -- is I would argue higher.

3 But also too the geology's different.
4 In that seven part of Culberson County, that's the age
5 of the -- of the Permian Basin roughly. There's a
6 large set of old reverse faults. They extend up.

7 And some of those are -- are visible on
8 the -- on a foreign figure on slide 135. If you
9 look -- if you look over, you can see near where it --
10 it says the Apache Fault Zone. Those are deep fault
11 zones. So there's a large set of deep faults that are
12 roughly -- yes, yes.

13 You see the earthquakes just above it.
14 There's a large set of -- of reverse faults that
15 extend in that part of the basin. And so the -- the
16 hypothesis there, again, when you think about the --
17 the deposition and the thrust that kind of formed the
18 basin back during the -- the order mission and the
19 Silurian and Devonian time.

20 Those faults were -- were activated.
21 They're reverse faults. Now they're -- now they're
22 activated normally. And they're oriented in the
23 manner based on focal mechanism data that are roughly
24 parallel to the stress direction. And so that area
25 has a unique set of -- of circumstances. It might not

1 be a big fault.

2 You have a mechanism, which is deep
3 disposal, and then you have the orientation of the
4 fault is roughly parallel to the stress direction. So
5 you know, combining those ingredients together makes
6 that area very sensitive to -- to perturbation. And
7 we've seen through modeling work and there's been some
8 papers published that modeled on the order of roughly
9 10 psi change in those deep formations is enough to
10 induce slip.

11 In Southern New Mexico, we obviously --
12 there are deep faults. There are earthquakes, but
13 it's a slightly different set of ingredients in
14 Southern New Mexico, so we haven't seen the
15 proliferation. But again, the disposal volumes are
16 quite different between Southern New Mexico and the
17 northern part of the Texas Permian Basin.

18 DR. AMPOMAH: So in your slide 129,
19 page 129, as we all know, the deep injection is in the
20 one here, but the micro-seismic events is way deeper
21 than that. So based on your expertise, what is really
22 causing that?

23 MR. COMISKEY: So the -- the faults
24 that are down here that are moving, they extend up
25 into the Silurian/Devonian. We can see them. And so

1 they're acting as conduits of water.

2 A fault isn't all that it was. It --
3 if you think about -- if you think about the San
4 Andreas fault, we often think about it as one long
5 continuous fault, but we know there's earthquakes in
6 Los Angeles and there's earthquakes in the Bay Area;
7 right? But the whole fault doesn't move.

8 Very similar here. I mean, think about
9 these faults that are in the basement. The whole
10 fault doesn't move. Only portions of that fault move
11 during a period of time.

12 And so is injection or pressure
13 actually the pressure. It's not direct fluid contact.
14 It's the pressure. As that pressure goes into those
15 formations and diffuses out, that can create a more
16 lasting change in the reservoir. Can also create a
17 drip pressure, i.e. reducing the effective stress.

18 And that lead me through to direct
19 transformation into the -- the basement just through
20 the -- through the interval or into some of these
21 faults. Down the fault, coming to a point where the
22 fault is even more critically stressed, inducing slip.
23 And we've seen that recently, where you have a fault
24 that has moved several different times along the
25 transect of that fault.

1 DR. AMPOMAH: On your page 137, you
2 talked about the framework that industry has a
3 preference. I want to know at what point does NMOCD
4 come see?

5 MR. COMISKEY: Well, we also have down
6 here, "Seek OCD resolution." But our goal as the --
7 as the industry -- and again, the -- we will be
8 collaborating and communicating with the OCD through
9 all of this. We're more than willing to be
10 transparent on working with industry. Again, this is
11 an industry problem on produced water management.

12 And so in vision the OCD could come in
13 at any point. We like to keep the OCD or hope to keep
14 the OCD engaged. But we do recognize that, you know,
15 at some point if there's -- there's scrambling with
16 the other resolution that already is going to agree to
17 the OCD has the ability to -- to implement and remove
18 the permit or act. And we recognize and support that
19 authority.

20 DR. AMPOMAH: Yeah, because when I look
21 at it, you know, on your lefthand side, if let's say
22 no interference, then that means no action is needed;
23 right? But I don't see where there is a communication
24 to NMOCD about let's say even anything happened.

25 MR. COMISKEY: So again, I think when

1 we look at this, this is just a -- this is just kind
2 of a high level, you know, just -- just flow. The
3 whole -- the premise of this is that the stakeholders
4 would be engaged on this. And it can be the
5 stakeholders that are involved in the well, could be a
6 mobile working group, and -- and also the OCD for some
7 process.

8 DR. AMPOMAH: Let's look at the data
9 that surveillance program. So I want to ask how often
10 are you using poly DFMI to identify natural process?

11 MR. COMISKEY: I'm -- I'm pretty
12 confident. We've -- we've had good results in using
13 FDMI logs across the Permian to identify open and
14 closed heel fractures. We have a -- we have a very
15 robust in-house technology group and our technology
16 company that -- that's what they do every day that
17 that's what they do every day is look at image logs
18 around the world.

19 So I -- I feel very confident. We've
20 had a good success of -- of recognizing fracture
21 systems, fracture networks within those concealed,
22 closed, you know, open.

23 DR. AMPOMAH: So you want to use the
24 spinner someday to identify the --

25 MR. COMISKEY: Yes.

1 DR. AMPOMAH: And is it you will
2 compare with the log data?

3 MR. COMISKEY: Yes.

4 DR. AMPOMAH: So which log data are you
5 going to compare that to?

6 MR. COMISKEY: So when we think about
7 the high -- again, these are -- these are sandstone,
8 so we can look at the transects. My colleague Tom
9 Merrifield noted that.

10 So we can look at the porosity trends
11 in these sands, depositional geology if you're in a --
12 you know, if you're looking at a Bouma sequence
13 looking at those upper finding sequences and looking
14 at where the high porosity, thick channeling sands,
15 blocky sands, so we can look at that from the -- the
16 porosity and neutron density.

17 And they correlate that to permeability
18 that we -- there are -- I would probably defer to my
19 colleague Tom Merrifield on any more detail on that.
20 But it's a pretty standard processing and sands and
21 then relating that to -- to, you know, high clean
22 zones for water.

23 DR. AMPOMAH: Yeah. For water, that is
24 -- I still feel, just a suggestion, but you might want
25 to still consider recording some of these productive

1 loss, like some of these injector zones. It could be
2 easy comparing.

3 MR. COMISKEY: And -- and to add to
4 that, we do have cork that we have collected in other
5 either disposal wells -- or not disposal wells, but
6 wells we drilled through the DMG to help constrain the
7 models for those pour process. It's not like we don't
8 have any core at all. We do have core to it but.

9 DR. AMPOMAH: So it's an accident then.

10 MR. COMISKEY: That's right.

11 DR. AMPOMAH: Now, so when I look at
12 your program, I see a lot of stunted data collection.

13 MR. COMISKEY: Yes.

14 DR. AMPOMAH: Less than our data
15 collection. But I do see you do have the production
16 monitoring.

17 MR. COMISKEY: Yes.

18 DR. AMPOMAH: So I want to know he --
19 I'm just going to recommend that you should consider
20 dynamic modeling, simulation, and also coupled with
21 your mechanics too.

22 MR. COMISKEY: So we -- we do have that
23 list. We are going to take that. So we're doing --
24 we are currently doing mechanic worth modeling in
25 this. And so this dynamic data will help feed into

1 that mechanic worth model over time.

2 My colleague Bryce mentioned some of
3 the RTA work. This will help feed that. And so we
4 are -- we do have robust data modeling. My colleague
5 Jason Parizek, he showed some of the modeling work
6 that was done on the -- on the line -- the line frac
7 modeling.

8 We have -- we do -- again, are -- are
9 expanding upon that modeling work as we get more
10 dynamic data to be able to, you know, constrain the
11 models and be able to push the models further. So
12 we -- we are looking at that in-house as well.

13 DR. AMPOMAH: Yeah, but you said you do
14 the mechanics. But what about the hydrodynamic? More
15 complex than the one that Kappa will give you and then
16 the fracture and then also the potentially gone?

17 MR. COMISKEY: So when we think about
18 going to more complicated modeling, I think the
19 limiting factors are the data quality and the data
20 abundance. You -- we can go to a very, very
21 complicated dynamic model, but if the data we have
22 isn't robust enough to support that, the results, I
23 would argue, are -- are fairly ambiguous.

24 So we've seen a lot of high value and
25 -- and running more simplistic models for the

1 questions you're trying to get after. Think when we
2 take a step back and look at the overall status of
3 just disposal and data collection associated with
4 that. It's very limited.

5 And so taking a step to collect this
6 data I think is a big step. We hope to continue to
7 progress that. I mean, to more data acquisition than
8 others. Maybe we'll get more -- more complicated
9 modeling efforts. But thinking of the current
10 position we're in right now with just the data we
11 have, I see a lot of value for the more simplistic
12 models and a lot more uncertainty in the more
13 complicated models just because the data we have
14 doesn't necessarily support that.

15 DR. AMPOMAH: So in regards to the
16 tracer, so based on the earlier analysis, you didn't
17 have control over the other well. Are you saying that
18 you're going to have control over the wells to be able
19 to perform the tracer test?

20 MR. COMISKEY: Yeah. Yeah, one of the
21 key things is, you know, we start running. We can --
22 we look at this and we need -- we see the need to run
23 tracers. Obviously, we're going to have the wells,
24 you know, next to us so. And when we execute a tracer
25 program, if you're trying to understand a particular

1 question or understand something, having the, you
2 know, control of the wells nearby to be able to test
3 that is very important.

4 If you have other -- other operators or
5 companies, trying to get on the same page sometimes
6 can -- can be a challenge. So that's a -- that's a
7 strategic advantage and part of the reasons why we
8 picked these locations.

9 DR. AMPOMAH: I don't believe I can ask
10 questions related to the Exhibit 11 because they don't
11 talk about it.

12 MR. FUGE: The witness testified to it.
13 So you can ask questions.

14 DR. AMPOMAH: So if we can go to that
15 one. And I do have some few questions.

16 So as we review Chevron's application,
17 my first question is so you can go to OCD isn't it?

18 MS. BENNETT: Oh, OCD. I'm sorry about
19 that.

20 DR. AMPOMAH: So the first question
21 that I have is the first one. You know, number one,
22 approved locations outside the identified well
23 productions till deleted by the -- and provided by the
24 -- as an except, so in one of your wells, you are
25 within that area.

1 MR. COMISKEY: I believe we're actually
2 in that area in both wells.

3 DR. AMPOMAH: You're in that area in
4 both, yeah. In both wells in that area.

5 MR. COMISKEY: Yes.

6 DR. AMPOMAH: So does your
7 communication satisfy the admonition?

8 MR. COMISKEY: It does not. And -- and
9 again, the reason why we're trying to re-look at this
10 is that, you know, we -- we understand there's concern
11 on this. But generally, drawing a -- a big circle on
12 a map and saying, "Don't go in here anymore" is -- is
13 maybe not the best approach when we think about a
14 long-term strategy of produced water management.

15 We understand there's risks. That's
16 why we -- we come here today. That's why we're
17 presenting this robust data collection program.
18 That's why we're disseminating it. We think that
19 again having a data-driven pragmatic approach to
20 disposal is probably a better and more advantageous
21 way to understand the risks. So that is why -- that's
22 why they're pushed together.

23 DR. AMPOMAH: Was Chevron part of that?

24 MR. COMISKEY: I believe Chevron was
25 part of that, yes. I -- I was not a part of that

1 group. I was not employed at Chevron at the time.

2 DR. AMPOMAH: So was it more like a
3 general knowledge or is a settled group -- like, yeah,
4 I'll buy them back?

5 MR. COMISKEY: So I -- I would argue
6 that things change. When this -- when this was put
7 up, there was -- there was good work that was brought
8 forth in my opinion on this.

9 I think we provided testimony that
10 again if you only look at disposal related
11 interactions with production, you're probably only
12 going to come up with disposal related questions. If
13 you only look at fracture driven interactions or FSIs,
14 you're only going to -- you're only going to come up
15 with that. So looking at everything holistically, is
16 just probably a good approach.

17 I mean, also too, I would also suggest
18 that in 2015, 2016, 2017, the concern around produced
19 water management was not what it is today. The rise
20 of seismicity has definitely impacted industry. It's
21 created I think a step change in how we need to handle
22 it.

23 The amount of water that we're handling
24 on a daily basis is -- it's never been worked at
25 before in the history of our industry on this scale.

1 And so I think re-looking at all options and how we
2 can -- can manage that is very important. So I think
3 it's a multitude of things.

4 DR. AMPOMAH: So does that mean that if
5 the commission agrees to Chevron's request, that one
6 needs to be struck down or something?

7 MR. COMISKEY: I would argue that maybe
8 it's more of a taking a data-driven approach to
9 disposal within -- within the -- the Avalon production
10 area. I think that's the way that Chevron is
11 advocating for this. We -- we aren't advocating for a
12 free for all in disposal. We're -- we're advocating
13 for again a data-driven, pragmatic approach to -- to
14 understanding disposal in -- in the area.

15 DR. AMPOMAH: So on 2Bm, exclude the
16 lower Brushy Canyon formation from the interval. So I
17 know that you said Chevron was saying it's just going
18 to be different. "We are not going to do any
19 injection there." But it's still part of what you
20 want the canyon for.

21 MR. COMISKEY: Yes, and I -- I believe
22 we're not drilling -- we're not drilling into the
23 lower Brushy. We're drilling into the upper portion
24 of the Brushy. The Brushy is roughly 1,000 feet
25 thick.

1 DR. AMPOMAH: So there is a separation?

2 MR. COMISKEY: Yes. Yes. We're not
3 drilling through the whole Brushy. We're not drilling
4 into the lower Brushy. We're drilling into the top
5 portion, logging it, collecting the data, and then
6 again, as was common early in testimony, it will be
7 sealed off.

8 DR. AMPOMAH: Now, 3C. You've planned
9 oxidizing. You've planned oxidizing as part of your
10 demolition plans. That's --

11 MR. COMISKEY: I -- I don't believe it
12 does. I mean, we're committed to -- to adhering to
13 the permit. And we keep making sure that the fluids
14 are complying within the injection interval for the
15 UIC program.

16 DR. AMPOMAH: So NMOCD is also
17 proposing 4F. So OCD should establish a process to
18 allow the use of existing data imaging in disposal
19 wells as exploration wells, including pressure
20 monitoring. Now, when I looked at -- I need to know
21 definitely you were going to have the pressure
22 measurement. Is it downhole or?

23 MR. COMISKEY: It's -- we'll have
24 service injection pressure monitoring and also
25 downhole reservoir pressure monitoring. Yes.

1 DR. AMPOMAH: So do you support that
2 point? Can Chevron agree to that?

3 MR. COMISKEY: Absolutely. If -- if
4 there are abilities to look at existing DMG disposals
5 for monitoring, absolutely.

6 DR. AMPOMAH: Thank you, and thanks for
7 you knowledge on micro-seismicity. It was exact.

8 MR. FUGE: Mr. Bloom?

9 MR. BLOOM: Yeah, just a couple
10 questions. If we go back to 3C for a second.

11 Does an acid treatment create new
12 fracture systems?

13 MR. COMISKEY: No. I mean, the acid
14 treatment we're looking at is mainly on the cleanout
15 side. It's to -- you know, it was common earlier to
16 look at skin, you know. You know, clean up some of
17 the near well bore. Things like -- that's the purpose
18 of the action. Acid injections.

19 MR. BLOOM: Just wanted to clarify
20 that. Thank you.

21 I appreciate your analysis on the
22 future proposed seismic monitoring program. I hope
23 that that data is publicly available or that there's
24 some way that the Land Office can access that as you
25 put out the program.

1 We have -- OCD has its SRA to pick
2 through and does analysis, but the Land Office, we
3 also have an in-house review that we do before we
4 issue any salt water to federal easements. So I don't
5 know that we need all the data dumped on us, but
6 having a system where we can get in and see what
7 you've sent over and be very smart of you to be
8 helpful.

9 MR. COMISKEY: Absolutely.

10 MR. BLOOM: Thank you.

11 MR. COMISKEY: And in the present?

12 MR. BLOOM: That's it.

13 MR. FUGE: I just have a couple. I'm
14 on page 137, the sort of notional structure. I think
15 this makes sense as sort of a decision tree and
16 appreciate the notion of, you know, keeping the OCD
17 involved but sort of limiting, you know, direct
18 engagement so, like, we can't sort through it
19 ourselves. So I sort of appreciate that in the
20 structure.

21 I do have a question about the first
22 one, and more just well, I have two questions. One,
23 how will new producers in the area know about this and
24 other structure? Or do you think that universe is
25 well-defined, that when we issue the approval, the

1 universe of producers that might be impacted are going
2 to be already known?

3 MR. COMISKEY: So obviously, we -- we
4 can only communicate this through the -- the DMG work
5 group, but there's NMOGA. And so that helps a lot.
6 We also reach out in IPAM. So I'm -- I'm engaged in
7 the -- the deep -- the working group that covers that.

8 And so and then too obviously through
9 -- through our work with Rowena [ph] Group, we would,
10 you know, be happy if -- if we felt like we had
11 available to notify any operators through any of that,
12 we've reached out through our main contacts to make
13 that establishment.

14 MR. FUGE: That's helpful. Thank you.
15 And then would the potential interference, the sort of
16 producer potential interference and I sort of see some
17 examples of data. It reads to me a little bit kind of
18 the first time I looked at it is, is this a stumbling
19 block? Like we're going to argue about whether
20 there's potential interference?

21 Or is this is sort of like she suggests
22 that maybe interference either via watercuts or other
23 changes, and then you immediately jump into the green
24 box, which is sort of the intent. They come in with
25 some data that "Hey, we're seeing increased water

1 production," you'd go into that sort of resolution
2 process?

3 MR. COMISKEY: Yes.

4 MR. FUGE: Just want a clarification in
5 the testimony. I'm on page 138. You talked through a
6 lot of the sort of various data collection
7 surveillance portions of the program. I guess in your
8 sort of affirmative direct testimony, I took the last
9 three as things that might be done. But then in your
10 exchange with Dr. Ampomah, it sounded like those were
11 things that would be done as part of the deployment.
12 Which is it?

13 MR. COMISKEY: So -- so if we look at
14 -- so tracers -- tracer things that may be run. The
15 reason for it is if we don't -- we're just pumping
16 tracers in the ground, we're not seeing anything, we
17 could pump forever. And there's money.

18 But downhole gauge and the offset
19 producers, we already have those deployed. Those were
20 already hand monitoring wells, and so those are there.
21 And then production monitoring is something we -- we
22 do continuously. So -- so the bottom two are
23 happening. The tracers are something we -- we may
24 deploy if -- if there's a reason for it. Yes?

25 MR. FUGE: On page 140, you talked

1 about sort of data reporting and other things like
2 that. Just to clarify here kind of in the -- maybe I
3 was just a little confused with sort of the last two.
4 Is there a suggestion that OCD would be getting sort
5 of a distilled version of the dataset that operators
6 were getting, or would y'all be getting the same?

7 MR. COMISKEY: So and this -- this
8 would be an opportunity we'd love to engage the OCD
9 on. We would like to put all the data in one
10 location. We don't -- we don't want to manage a share
11 point for every operator and every financial
12 stakeholder.

13 So we would like to provide all the
14 data, interpreted, raw data. We -- we look at this as
15 maybe having quarterly updates on this with OCD, so
16 everybody's looking at the same data. There isn't
17 "you looked at this, I looked at that." And one
18 location, a one-stop shop.

19 MR. FUGE: And then just to clarify one
20 comment. You don't need to pull it up. But there was
21 one in OCD's Exhibit 11 about sort of a requirement to
22 provide some publicly available seismic -- I think you
23 answered it you do have a robust network but my
24 understanding is the robust network you have is
25 private micro-seismic, which is a little trickier. So

1 do you have a position on the public aspect?

2 MR. COMISKEY: So -- so the agreement
3 that we had with the provider and the companies is
4 that we can provide that. We can provide the -- the
5 locations of our first quakes and exact attitude to
6 OCD. And we -- we have before.

7 So -- so that is -- again, we also
8 support expanding the New Mexico territory we've
9 discussed as well. But -- but that -- that data, you
10 know, if -- if needed can be provided.

11 MR. BLOOM: And then I think the last
12 component, and this is just sort of a, you know,
13 conceptual piece. And again, it's a question I asked.
14 I forget of which witness. It may have been you in
15 your first round of testimony.

16 When I think pilot, there's sort of
17 like a lesson learned component with the data and a
18 firm commitment to sort of report out at an interval.
19 And so I see and it's not sort of reporting out on
20 every kind of triggering event that's there.

21 But what I'm not seeing in the proposal
22 is a sort of like "Five years out, we will give a
23 rollup like the Commission has seen for certain" acid
24 bath well. I can think of more recently to talk about
25 it as a component. Am I missing that element, or is

1 it not present?

2 MR. COMISKEY: It's -- it's probably
3 not present. And we -- that'd be something we'd love
4 to work on if -- if the permits are -- are approved
5 with -- with you and your staff just -- just to work
6 out a plan on designation, we kind of envisioned
7 having regular updates and then -- and then as you
8 mentioned maybe more milestone updates as well.

9 MR. FUGE: Yeah, I mean, I think at
10 least from where I'm sitting now, I mean, if the
11 Commission were to issue an order with a pilot, I
12 think I would want at least -- just putting out there.
13 Would you be open to if we put in a sort of -- there
14 was a milestone report at some meaningful number of
15 years out where it's going to open a discussion there
16 to incident five, ten, you know, milestones?

17 MR. COMISKEY: Yes, we would be open to
18 something like that. Sure, UGS.

19 MR. FUGE: I have no further question.
20 And mindful of --

21 Ms. Bennett, do you have a?

22 MS. BENNETT: Yes. May I do two really
23 brief redirects?

24 MR. FUGE: Yeah. Yep.

25 //

EXAMINATION

BY MS. BENNETT:

Q So on Exhibit 11, Mr. Ampomah asked you a question about whether you fit within or Chevron fits within the 1A because your two locations are within the DMGRA. But as I read this, it says that it's the recommendation for administrative review, not approval, per se. Is that a fair rating of this 1A is limited to administrative applications?

A I believe looking at that that's correct.

Q And you're here before the Commission on a full hearing and not seeking administrative approval of these applications?

A Yes, that's correct.

Q And would you be willing to move forward with hearings to the extent required in the future for other DMG disposal wells that were within the DMGRA?

A Yes, we would.

Q And then Dr. Ampomah also asked you a question about whether the NMOGA DMGRA is sort of like this set in stone, exclusionary -- for lack of a better word -- that the operators sort of acceded to over the years.

And that made me think of the fact that there are multiple operators who were a part of that

1 working group who have supported your projects. So do
2 you know if XTO was part of that original working
3 group?

4 A I believe they were. Yes.

5 Q How about Cimarex?

6 A I believe they were.

7 Q Mewbourne?

8 A I believe they were.

9 Q Chevron?

10 A Yes, Chevron was.

11 Q So do you think it's fair to say that
12 there's been an evolution in thinking since 2016
13 that's shared by more than just Chevron?

14 A Yes, I believe so.

15 Q And that evolution in thinking is what
16 you're presenting to the commission at this time?

17 A Yes.

18 MS. BENNETT: Thank you. Those are the
19 only redirect questions I had.

20 MR. FUGE: Are you reserving?

21 MS. BENNETT: Yes. I would like to
22 reserve with the opportunity to recall Mr. Comiskey as
23 a rebuttal witness if necessary.

24 MR. FUGE: Well, in light of the time,
25 I think we're at a natural breaking point since

1 Chevron, I believe, is finished presenting its
2 witness. So we will resume tomorrow morning at 9 a.m.
3 with OCD's witnesses.

4 For those listening in, and this was in
5 all of the announcements announcing the meeting, there
6 is a different link for tomorrow morning's meeting.
7 Just go to the agenda, click on it. Just click on the
8 link for Day Two. And we will start promptly at nine.

9 Thank you.

10 (Whereupon, the meeting concluded at
11 4:57 p.m.)

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I, JAMES COGSWELL, the officer before whom the foregoing proceedings were taken, do hereby certify that any witness(es) in the foregoing proceedings, prior to testifying, were duly sworn; that the proceedings were recorded by me and thereafter reduced to typewriting by a qualified transcriptionist; that said digital audio recording of said proceedings are a true and accurate record to the best of my knowledge, skills, and ability; that I am neither counsel for, related to, nor employed by any of the parties to the action in which this was taken; and, further, that I am not a relative or employee of any counsel or attorney employed by the parties hereto, nor financially or otherwise interested in the outcome of this action.



JAMES COGSWELL

Notary Public in and for the
State of New Mexico

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I, KIRSTEN FITZGERALD, do hereby certify that this transcript was prepared from the digital audio recording of the foregoing proceeding, that said transcript is a true and accurate record of the proceedings to the best of my knowledge, skills, and ability; that I am neither counsel for, related to, nor employed by any of the parties to the action in which this was taken; and, further, that I am not a relative or employee of any counsel or attorney employed by the parties hereto, nor financially or otherwise interested in the outcome of this action.


KIRSTEN FITZGERALD

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[talk - term]

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