1	STATE OF NEW MEXICO
2	OIL CONSERVATION COMMISSION
3	HEARING DAY 01
4	
5	Agenda No. 11-23
6	
7	
8	Moderated by Dylan Fuge
9	Wednesday, November 8, 2023
10	9:09 a.m.
11	
12	
13	Pecos Hall Hearing Room
14	Wendell Chino Building, 1st Floor
15	1220 South Saint Francis Drive
16	Santa Fe, NM 87505
17	
18	
19	
20	
21	Reported by: James Cogswell
22	JOB NO.: 6304851
23	
24	
25	
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1 A P P E A R A N C E S	1	I N D E X	
2 List of Attendees:	2	EXAMINATION	PAGE
3 Dylan Fuge, Commissioner/Chair - Oil Conservation	3	By Ms. Bennett	39
4 Commission	4	By Mr. Tremaine	55
5 Greg Bloom, Commissioner - Oil Conservation Commission	5	By Ms. Bennett	63
6 William Ampomah, Commissioner - Oil Conservation	6	By Mr. Tremaine	102
7 Commission	7	By Ms. Hardy	106
8 Daniel Rubin, Attorney - Oil Conservation Commission	8	By Mr. DeBrine	123
9 Darin Savage, Attorney, Abadie & Schill PC - Cimarex	9	By Mr. Tremaine	158
10 Energy Company	10	By Ms. Hardy	159
11 Adam Rankin, Attorney - Colgate Production LLC,	11	By Ms. Hardy	176
12 Northwind Midstream	12	By Mr. DeBrine	178
13 Jesse K. Tremaine, Attorney - Oil Conservation	13	By Mr. Tremaine	210
14 Division	13	By Ms. Hardy	210
	15	By Ms. Bennett	238
15 Dana Hardy, Attorney, Hinkle Shanor LLP - Targa	16	By Ms. Bennett	313
16 Northern Delaware LLC	10	by MS. Defined	515
17 Deana Bennett, Attorney, Modrall Sperling - Chevron	17	EXHIBITS	
18 Earl DeBrine, Attorney, Modrall Sperling - Chevron	1	NO. DESCRIPTION	ID/EVD
19 Cody Comiskey, Chevron			
20 Bryce Taylor, Chevron	1	Exhibit A C108s	102/102
21 Jason Parizek, Chevron		Exhibit B Applications	102/102
22 Tom Merrifield, Chevron		Exhibit 98-108 Slides	102/102
23		Exhibit 109-123 Slides	158/158
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25	25	Exhibit 142-162 Slides	209/209
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2 PAGE	2	MR. FUGE: I'm going to call the	ne
3 Ms. Hardy 8, 36	3	meeting, the November 8th and 9th meet	ing of the New
4 Mr. Rankin 9, 22	4	Mexico Oil Conservation Commission to	order.
5 Mr. Savage 12, 19	5	Welcome, everyone. This is the	e first
6 Ms. Bennett 20, 28, 31	6	meeting in a long time back in the Wende	ell Chino
7 Mr. Tremaine 23, 34	7	Building. We are in Pecos Hall. Still we	orking on
8	8	final tech filled out, but excited to be here	e.
9	9	Just wanted to cover a couple of	f
10	10	administrative things because we're new	and we're
11		getting to the agenda. If you need to get	
12	1	wi-fi, it's "NMEMNRD public." And the	
13		"security first," all one word. You will n	-
14	1	pop-up screen that says you agree to the	
15	1	conditions and responsible use. But that	
16		you on the wi-fi.	<i>C</i>
17	17	For parties presenting cases, ple	ase
18		log into the Webex meeting. That will en	
19		share your material in the room on the lar	
20		With commissioners here and other I ju	-
21	1	you mute your audio when you log in with	
22	22	And then the last item and I'll	_
23		bring this up a little closer to because of	
24	1	family commitments, I have a very hard s	
25		So I will checking in with parties if we ar	-
Page 3	23	so I will enceking in with parties if we al	Page 5
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<sup>2 (</sup>Pages 2 - 5)

1 presenting testimony at four to just make sure we can	1 Northern Delaware for Rehearing of Order R-13507-E,
2 get through it within that hour. Otherwise, we'll	2 and specifically a request that the Oil Conservation
3 continue it to the next day. As everyone saw in the	3 Commission reconsider conditions included in Order
4 notice, we made allowance for two days given that it	4 Number R-13507-E.
5 originally looked like this was going to be a	5 And from our last meeting, the parties
6 relatively large docket.	6 including the Division were potentially going to come
7 And with that, I'm going to send it	7 up with a sort of consensus or unopposed set of
8 around to the first item on the agenda, which is	8 condition revisions. So I'll turn it over to the
9 approval of the agenda for today.	9 parties.
10 And we'll see with my fellow	10 MS. HARDY: Thank you, Mr. Chair.
11 commissioners. Do you have any comments or changes to	11 MR. FUGE: Please introduce yourself
12 the agenda?	12 for the court reporter.
13 DR. AMPOMAH: Did you read the roll	13 MS. HARDY: Dana Hardy with Hinkle
14 call already?	14 Shanor on behalf of Targa Northern Delaware LLC.
15 MR. FUGE: Oh, sorry. Forgot to do the	15 MR. TREMAINE: Jesse Tremaine with Oil
16 roll call.	16 Conservation Division.
17 Commissioner Ampomah.	17 MR. FUGE: Ms. Hardy.
18 DR. AMPOMAH: Present.	18 MS. HARDY: Thank you.
19 MR. FUGE: Commissioner Bloom.	19 MR. FUGE: What's the status of the
20 MR. BLOOM: Present.	20 discussion regarding the order conditions?
21 MR. FUGE: Let us reflect that the	21 MS. HARDY: We are still working with
22 entire Commission is present in person.	22 the Division on the conditions. I suspect we'll be
23 And then let's go to the agenda. Does	23 able to reach an agreement. It's just a matter of
24 anyone have any comments on the agenda or changes?	24 going back and forth a little bit more and making sure
25 DR. AMPOMAH: No.	25 that we have agreement on all the issues.
Page 6	Page 8
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3 (Pages 6 - 9)

1 MR. RANKIN: Yes. And I don't know if	1 correct. I did file a Motion to Reconsider the
2 you want to let Mr. Savage also introduce appearance.	2 Commission's decision to amend Order 21629C and
3 MR. FUGE: Oh, Mr. Savage, please go	3 pointing out that in our view, there were some
4 ahead.	4 fundamental errors in the Commission's decision
5 MR. SAVAGE: Yes. Good morning,	5 granting the rehearing and modifying Order 21629C.
6 Mr. Chair, Commissioners, Counsel. Darren Savage with	6 So with that, we had filed that Motion.
7 Abadie and Schill appearing on behalf of Cimarex	7 And it is our hope that the Commission will reconsider
8 Energy Company. And I assume you can see me as well	8 its track in this case. We believe that the
9 hear me?	9 Commission has gotten a little bit off track in its
10 MR. FUGE: Yes, I can.	10 decision there. In light of that, I think you may see
11 MR. SAVAGE: All right. Thank you.	11 more what's happening here, which is an application by
12 MR. RANKIN: Mr. Chair, good morning.	12 Mewbourne to revoke an order that's been in place for
13 In this case, this case has been pending for some	13 more than two years. And we think that's a little bit
14 time. It took me a little while to review fully the	14 off course.
15 convoluted procedural history here. There is a matter	15 So with that, Mr. Examiner I
16 before the Commission for de novo review. And that	16 apologize Mr. Chair, I'll let Mr. Savage respond
17 case was brought by Cimarex seeking de novo review of	17 with any questions or concerns he may have.
18 an order approving compulsory pooling for Colgate.	18 MR. FUGE: Mr. Savage.
19 Parties have had a double hearing in	19 MR. SAVAGE: Mr. Chair, thank you. I'm
20 that matter addressing whether or not Colgate was	20 glad that Colgate talked about perceived being off
21 within its rights to proceed and pool Cimarex. That	21 course. We feel that the last-minute Motion this
22 order was entered before the Commission. I believe	22 status conference was designed and stated as the final
23 it's 21629C.	23 status conference. And we were expecting to have a
24 Cimarex filed a Motion for Rehearing.	24 contested hearing date set. All the Motions, all the
25 Upon the filing and briefing and arguments on that	25 competing applications have been approved and in
Page 10	Page 12
1 Motion, the Commission issued a Revised Amended	1 place, and they have moved from the Division to the
2 Order 21629D. We, subsequently after some time that	2 OCC for hearing.
3 that case was continued repeatedly Holland and Hart,	3 Colgate had a substitution of Counsel.
4 that entered appearance on behalf of Colgate I believe	4 That was on March 22, 2023. They have had eight
5 in May of this year, substituted for counsel for	5 months. They have been in this proceeding for eight
6 Colgate.	6 months. They have never mentioned in any manner a
7 Parties have been in discussions since	7 Motion to Reconsider. They have asked for a number of
8 we substituted, Mr. Chair. Mewbourne has filed a case	8 continuances, which Cimarex has accommodated on every
9 with the Division, Case 23688, in which it seeks to	9 occasion, although expressing our interest in having
10 revoke Colgate's order approving its compulsory	10 an expedited, expedient hearing. We have accommodated
11 pooling and to pool itself some overlapping acreage	11 them, and then at the last minute here, the last 24
12 there.	12 hours, they have filed a 23-page Motion to Reconsider.
13 So now we have a case pending before	13 Now, Mr. Chair, these issues that the
14 the Division pursuant, I believe, to the Commission's	14 Motion addresses. I have not had a chance to fully
15 order that it should hear all these competing pooling	15 digest everything and analyze everything. But it
16 cases together. And that now is pending before the	16 looks to me like these have been addressed thoroughly
17 Division. So Colgate has been in discussions with	17 by the Commissioners previously in the rehearing
18 Mewbourne trying to resolve that issue.	18 setting. And they have made rulings.
19And that case is now before the	19 And these rulings were pursuant to the
20 Division. It's set for a status conference on	20 statute of limitations of Statute 7225, in which we
21 November 16th's docket before the Division. So I'm	21 made an application for rehearing within the 20-day
22 not sure exactly. I don't have an update on the	22 limitation period. And we believe Colgate has not
23 discussions there for you between Mewbourne and	23 abided by that statutory 20 days. They have waited
24 Colgate. My hope is that we can get that resolved.	24 over eight months to file a final Motion.
25 In the meantime, Mr. Chair, you are	25 We think that the minimum contested
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4 (Pages 10 - 13)

1 hearing date should be set. We ask that we move	1 Mr. Rankin to be arguing this without us having the
2 forward with these contested hearings based on	2 opportunity to review and respond.
3 circumstances. Thank you.	3 But Mr. Chair, it is correct that there
4 MR. FUGE: Maybe a point of	4 is a case pending by Mewbourne. I have talked to
5 clarification. Mr. Rankin, you referenced a case.	5 counsel from Mewbourne. I don't believe he is here to
6 Mr. Savage suggested that all of the cases are done at	6 comment. But as I understand it, that's very close to
7 the Division with conditional orders up and, you know,	7 being settled by the parties.
8 his position probably before the Commission.	8 In fact, they were trying to decide
9 You mentioned there was a Mewbourne	9 whether or not even the case on November 16 was going
10 case that was set to go up before the Commission next	10 to go forward. And if it does go forward on November
11 week for same acreage, overlapping acreage, related	11 16, I believe that if we do set a contested hearing
12 acreage? Can you provide a little more color on what	12 date that that case could be directly moved to be
13 that pending case is?	13 included as a contested hearing on that particular
14 MR. RANKIN: Sure. The case is Case	14 date, whatever the OCC decides to set.
15 Number 23638. It is set for a status conference	15 And if it's resolved, which it looks
16 before the Division on November 16th. That case seems	16 like it will be based on the conversations I've had,
17 to pool some of the acres at issue here. It overlaps	17 then it would be a moot point. And so it wouldn't
18 partially with the acreage subject to Colgate's order	18 impact the proceedings. Either way, I don't believe
19 that was on de novo review.	19 it would impact the proceedings. I believe they could
20 So I think potentially it has	20 be accommodated within the contested hearing date, or
21 complicated resolution of the competing pooling cases	21 it would be a moot point.
22 that have been pending before the Commission.	22 MR. FUGE: Looking to my fellow
23 MR. FUGE: So is it your position that,	23 commissioners if they have questions.
24 setting aside your Motion that was filed but if it	24 But maybe Commission Counsel, we got
25 was to go forward, that the Commission would need	25 the motion last night. I don't recall in our rules
Page 14	Page 16
1 23688 to go to order before we could hear the de novo	1 what would be a normal opportunity to respond to a
2 hearing if we decided to in this case?	2 party in it. Do they prescribe that?
3 MR. RANKIN: So Mr. Chair, when you	3 MR. RUBIN: I don't know offhand if the
4 read the Motion for Reconsideration that we filed, we	4 rules do. But it would be an abundance of caution to
5 do believe that there's a fundamental problem with	5 allow a written response, I think the point with the
6 hearing Cimarex's competing pooling cases before the	6 Counsel is well taken that we go and set the
7 Commission. The only matter before the Commission was	7 Commission set a hearing, hear the motion. At that
8 Colgate's Case Number 21744 and the order that was	8 onset of that hearing, there's nothing in the rules
9 issued by the Division, Order R21575.	9 that prevents that.
10But the Commission has authority.	10 MR. FUGE: My fellow commissioners, any
11 Parties who are adversely affected have the right to	11 questions on this one to the parties?
12 seek de novo review for matters that went before the	12 MR. BLOOM: No, Mr. Chair. But I did
13 Division and were heard before the Division examiner	13 not have an opportunity to review the materials that
14 and are subject to a Division order. That's the case	14 were sent last night or yesterday. In addition, this
15 with the Colgate matter.	15 case has been frustrating. No.
16The Commission fully heard that case as	16As far as I knew, Mr. Rankin, you're
17 a de novo matter and issued an order. So our view is	17 new to this. But I think in the past we've seen
18 that, as to Mewbourne's case, which is now pending	
To that, as to file woodine's case, which is now pertaining	18 moments where Counsel has struggled to even summarize
19 before the Division, if the Commission were to take	<ul><li>18 moments where Counsel has struggied to even summarize</li><li>19 this case which has gone on for so long. So getting</li></ul>
19 before the Division, if the Commission were to take	<ul><li>19 this case which has gone on for so long. So getting</li><li>20 up here and not being able to tell us where this is at</li><li>21 is frustrating as a commissioner. So I hope that this</li></ul>
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<sup>5 (</sup>Pages 14 - 17)

1 Commission and advice from Counsel, Mr. Savage, and	1 well in advance of the agenda at the next scheduled
2 arguments from both Mr. Savage and Mr. Rankin, we	2 hearing. So if you get your filing in prior to any
3 would I guess I'd like to put forward a motion	3 deadline there, that should be just fine.
4 directing Mr. Savage to file a response within two	4 MR. SAVAGE: Okay. Thank you.
5 weeks.	5 MR. RUBIN: And we request that you
6 MR. RUBIN: Mr. Chair, the examiner for	6 guys all arguments on the Motion if it's not on the
7 today. Of course he came. It was 72-hours advanced	7 agenda.
8 notice of the agenda. So this motion was not on the	8 MR. FUGE: Yes.
9 agenda. All we have on the agenda for this matter is	9 So that Motion just consistent with
10 the setting of a final hearing.	10 practice is likely to be on the agenda for the
11 MR. FUGE: Fair.	11 December 14th meeting. That would be clear when that
12 I think to move this case along,	12 agenda comes out. Thank you.
13 because it's been sitting for a while and we've got a	13 I'm going to go to what I think it was
14 Motion, I say we put it for a final hearing. I'm	14 mooted by a subsequent filing, but I'm going to look
15 going to Motion to put it on the docket for a final	15 at Case Number 23942, Application of Avant Operating
16 adjudicated hearing at the January 11th meeting.	16 LLC for Hearing De Novo of Case Numbers 23640 through
17 I would just preserve for the record,	17 23645. And my understanding is that Avant made a
18 Mr. Savage, you have an opportunity to respond to	18 filing earlier that was a week withdrawing that
19 filings and other pieces. And the Commission,	19 application.
20 consistent with its rules, will provide some guidance	20 MS. BENNETT: Yes. Good morning,
21 how it's going to address those in subsequent agendas.	21 Mr. Chair and Commissioners. Deana Bennett on behalf
22 Is everyone comfortable with a	22 of Avant Operating LLC. And I did file a Motion
23 January 11th date between my fellow commissioners for	23 yesterday, I think it was, requesting dismissal of
24 hearing this case?	24 this de novo application.
25 MR. BLOOM: That will work.	25 MR. FUGE: And I'm assuming that
Page 18	Page 20
1 MR. FUGE: And I think I can reiterate	1 request is uncontested?
2 what we've heard up here. We would like a resolution.	2 MS. HARDY: Yes, Mr. Chair. Dana Hardy
3 This case has been kicking around for a long, long	3 for Colgate Production, and the request is
4 time.	4 uncontested.
5 Thank you.	5 MR. FUGE: I think the request is
6 MR. RUBIN: Mr. Chair, I think this	6 granted then.
7 would be better to have a Motion. Is that fair?	7 MR. BLOOM: I'm sorry, Mr. Chair.
8 MR. FUGE: Can I get a Motion to set	8 Which case number is this? The numbers get a little
9 let's read them out so we've got them. Can I get a	9 jumbled.
10 Motion to set De Novo Case 21744 and the associated	10 MR. FUGE: Case Number 23942.
11 cases 22018 and 22019 for adjudicated final hearing on	11 All right. Thank you.
12 January 11, 2024.	12 MS. BENNETT: Thank you very much.
13 MR. BLOOM: Mr. Chair, I so move.	13 MS. HARDY: Thank you.
14 DR. AMPOMAH: Mr. Chair, I second.	14 MR. FUGE: Next up is Case Number
15 MR. FUGE: Let the record reflect	15 23943, Application of Northwind Midstream Partners LLC
16 Motion was approved unanimously.	16 for Approval of Redundant Acid Gas Injection Well as
17 MR. SAVAGE: Mr. Chair, if I may add an	17 Required under Order Number R-20913 as Amended in Lea
18 additional comment, I would like to respond to the	18 County, New Mexico.
19 Motion. Mr. Rankin has had months to review the	19 And can I have the parties appearing
20 procedural history in the matters of this case. Could	20 for Northwind Midstream come up to counsel table?
21 I request three weeks as a time period to respond	21 Any other party entering an appearance
22 instead of the two weeks that was mentioned?	22 in this matter?
23 MR. FUGE: I'm going to look at	23 MR. TREMAINE: Jesse Tremaine for the
24 Commission Counsel, but I think that the proceeding	24 Oil Conservation Division.
25 was filed. On Motions, we typically consider filing	25 MR. RANKIN: Mr. Chair, Commission,
Page 19	Page 21

6 (Pages 18 - 21)

	Adam Rankin appearing on behalf of the applicant in	1	So based on that review, it's the
2	the case of Northwind Midstream.		Division's position that the Commission has already
3			essentially approved this well, and that there are
1	the status conference and scheduling, can you just		technical changes. So it is appropriate for
	give us a brief overview of the filing and kind of a		administrative review of this with one additional
1	high-level assessment of sort of anticipated hearing		clarification. The application was appropriately
7	time needed?		styled because this well was originally conceived as
8			redundant to I believe it was AGI Number 1, which was
9	Mr. Chair, Commissioners.	9	Devonian/Silurian well.
10		10	This is intended, the deeper injection
	Division on that very matter. We have reviewed the		AGI. This one is intended to be the primary injection
12	underlying orders that are subject to the proceedings	12	well. And the DMG well is intended to be redundant or
	in this case. We filed an application to approve the	13	a backup. It will be online first and utilized first,
14	second AGI Number 2 in this case out of an abundance	14	but then at some point, it will be redundant to the
15	of caution.	15	deeper injection AGI solely.
16	Having reviewed the orders, it's a	16	The application, like I said, was
17	little bit ambiguous. It's a little unclear, but we	17	appropriately styled because this has always been
1	believe the Commission may have intended to authorize		called the redundant well. But the USC group wants to
19	the Division to approve the AGI Number 2	19	clarify to the Commission that it is no longer the
20	administratively. So we have prepared the Motion in	20	redundant well. And so I think we can clarify that in
21	discussion with the Division to request clarification	21	a proposed order submitted to the Division.
22	and for the Commission to issue an order expressly	22	I have reviewed that proposed order,
23	remanding the AGI Number 2 to the Division for	23	and I think it's satisfactory. I'll make any final
24	administrative approval.	24	recommendations to that, and I think the parties can
25	5,	25	submit for admissions approval if the Commission's in
	Page 22		Page 24
1	stand. We don't think it's necessary at this point,	1	agreement that this is given the nature of the
2	unless the Commission disagrees, for this matter to	2	modifications to the second AGI's C108 that it is
3	occupy time before the Commission. And we believe the	3	appropriate for administrative approval.
4	intent was potentially to remand to the Division for	4	MR. FUGE: So it sounds to me, in
5	administrative approval. This is in line with other	5	listening to the presentation of the parties, that
6	recent AGIs where the second AGIs were authorized by	6	there may not be the need for a contested hearing in
7	an order in the Pinon and Meredith case where the	7	this matter and that you are close to filing a sort of
8	Commission expressly authorized the Division to	8	joint order with the Commission, you know, resolving
9	approve the second AGI administratively.	9	this matter or at least positioning it appropriately
10	So with that, I'll pass it off to	10	from the Division's and the applicant's perspective.
11	Mr. Tremaine, who can discuss more directly the	11	MR. RANKIN: Yes, Mr. Chair. We have
	Division's position on it.	12	prepared a joint motion specifying or outlining the
13			specific language in the order that indicates the
14	agree with what Mr. Rankin said. There's in the order		intent potentially to authorize the applicant to
	section I don't have the order number up in front		submit a C108 for the second well to the Division for
	of me right now. I apologize. But in the order		approval. And that's in Order 20913D, which has been
	section, there is a reference to Division approval and		subsequently amended.
1	there's a reference to Commission approval. I have	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	There's two technical changes to that.		cite to it. But there is a paragraph that
22			Mr. Tremaine referenced. It's ordering paragraph
	feet. And the second being that they've modified		number 1-E in that order. That states that "After
	their plan to drill through a zone that was		OCD's approval of the C108," then it goes on.
1	problematic for the previous as well.	25	So the intent appeared to have been to
25			

7 (Pages 22 - 25)

1	authorize the Division to administratively approve that C108. So after further conferring with	$\begin{vmatrix} 1 \\ 2 \end{vmatrix}$	MR. FUGE: Any other parties either in the room or online entering an appearance?
1	Mr. Tremaine and the Division, we will likely be	$\begin{vmatrix} 2\\ 3 \end{vmatrix}$	Hearing or seeing none, Ms. Bennett,
	filing a joint motion if that meets with the		you're on.
	Commission's approval, requesting that the matter be	5	MS. BENNETT: Thank you very much.
	referred to the Division for administrative approval.	6	Thank you all for being here. We
	And we will propose an order addressing that at the	-	really appreciate the opportunity. Again, my name is
	same time.		Deana Bennett. And I'm with Modrall Sperling law
9			
	MR. FUGE: Looking at my fellow		firm. And I'm here with my colleague Earl DeBrine. And we're here on behalf of Chevron USA, Inc. in these
10	commissioners if they have any questions. MR. BLOOM: No questions, Mr. Chair.		two cases.
11	DR. AMPOMAH: No questions.	11	
12			I did want to just say how great it is to be back in person and in Pecos Hall. I might
	MR. FUGE: Based on the status report from the parties, I don't see the need to set this for		
	hearing. And we will keep it on the docket waiting		stutter on the P a little, but it's great to be back.
	for that joint motion, but I think that can be		Great to see people in person. Great to have the
			opportunity to mingle with our colleagues again, so
	resolved just on the papers. So we'll look forward to		very much appreciated.
18	that from the parties. MR. TREMAINE: Thank you.	18 19	Chevron and ourselves appreciate the
	-		
20	MR. FUGE: And that moves us through our status conferences. And we now have two cases up	20	
1	-	21	
1	for adjudicatory hearing, 23686 and 23687.	22	I do have a few logistical matters that
23	I'm going to give a short ten-minute		I wanted to talk to before we get started. And some
	recess for the parties to just reconfigure and set up,		of that may involve the other parties as well in terms
25	because this will have witnesses and other components. Page 26	25	of brief opening statements, and I'll get to that in Page 28
			¥
1	So I'm just going to put the line on mute but leave		just a minute.
	the portal open and allow the parties to go.	2	So first I did just want to kind of
3	And we will reconvene. Let's call it		introduce the Chevron team, if that's okay with the
	12 minutes at 9:50.		Commissioners.
5	(Off the record.)	5	MR. FUGE: Yes.
6	MR. FUGE: Welcome back, everyone.	6	MS. BENNETT: We have several people
	Next items up on the agenda, and these were both set		from Chevron here, and I'll just run through that
	for adjudicatory hearing, Case Number 23686 and 23687.		quickly. And some of them are witnesses, and some of
1	My understanding is the same parties have entered		them are not. So first, Cody Comiskey, Bryce Taylor,
10	appearances in both cases. And I'm going to ask a		Jason Parizek, Tom Merrifield, Fred Burner [ph], Ochi
11	question, but I'm just confirming what it appears from		Achinivu. And we might have some on the phone as well
1	the primary statements and the like that the cases		on Zoom, but for now, this is the team that's present.
13	will be presented together as opposed to jointly.	13	And this is just a handful of the team,
14	Then I'm going to look at Counsel for		though, that worked on this. I just spoke with Cody
	Chevron first with that question.		this morning, and he mentioned to me that over 24
16	MS. BENNETT: Thank you. Deana Bennett		subject matter experts have worked together in a
1	on behalf of Chevron USA, and we do intend to present		collaborative way to put together the presentation and
1	the cases together in a consolidated fashion.		the people behind the project.
19	MR. FUGE: Can I have the parties in	19	So the next thing I wanted to just
20	the case who are entering an appearance just identify		discuss is whether the Commission would like to swear
21	themselves?		in our witnesses as they testify or as a group before
22	MR. TREMAINE: Jesse Tremaine for the		each one testifies.
23	Oil Conservation Division.	23	MR. FUGE: Our practice has been to
24	MS. HARDY: Dana Hardy on behalf of		swear them in as they testify. And we'll ask the
25	Mewbourne Oil Company.	25	court reporter to administer an oath when they're
	Page 27		Page 29

# 8 (Pages 26 - 29)

1 ready to go.	1 that OCD has raised in its materials as well. And
2 MS. BENNETT: Great. Thank you.	2 Chevron's been working on this project since 2021, so
3 And then I mentioned this briefly to	3 this is a long time in the making to get to the
4 several of the commissioners individually, but just	4 Commission.
5 for the group's benefit, our pagination that we had	5 Chevron has undertaken this
6 put on the exhibit packet that we prepared is likely	6 investigation of shallow disposable number of
7 different than the pagination that appears to the OCD	7 reasons, primarily because of the need for additional
8 filing system. And so we intend to use the references	8 disposal options to address the high volumes of
9 to the OCD filing system, which is in the upper	9 produced water from the spring and volcanic
10 righthand corner. And so as we're moving through the	10 formations.
11 exhibits, we'll be referring to that as the exhibit	11 And the goal here is to come up with
12 number. And I did pass out hard copies of the exhibit	12 disposal options that do not impair correlative rights
13 packets.	13 and that do prevent waste. So in the testimony you'll
14 We did make some revisions to the order	14 hear today, the areas around these two pilot project
15 of our witnesses yesterday, as well as some slight	15 wells are not favorable for DMG production. The DMG
16 revisions to the order of exhibits. And so what I	16 there is either depleted or the geology indicates a
17 will do is refer to the exhibit number in the upper	17 low likelihood of unknown DMG reserves. So taking
18 righthand corner and wait for everyone to get to the	18 into consideration correlative rates and waste, you'll
19 same page before we start talking about it. But there	19 be hearing a lot of testimony about that today.
20 will just be some little I'd say some ebbs and	20 We'll also be talking about the low
21 flows in the PowerPoint as we move forward.	21 potential for induced seismicity from these particular
I did file the exhibits timely, and our	22 shallow wells based on the geologic studies that the
23 exhibit packet contains six tabs. And we'll walk	23 Chevron witnesses have undertaken. And these wells
24 through each of those tabs with the Commission.	24 will also be protective underground sources of
25 And with that, I think that is all of	25 drinking water.
Page 30	Page 32
1 the logistical items I had to discuss with	1 So Chevron has presented this plan to a
2 Commissioners, but I would like to have the	2 number of stakeholders and a number of operators. And
3 opportunity to present a brief opening statement. And	3 the operators from whom Chevron has received feedback
4 I understand that some of the other parties may like	4 are supportive of the project. In fact we submitted
5 the opportunity to do that as well. So I wondered if	5 several letters of support for the project in the
6 the Commission is amenable to that.	6 exhibits that we submitted.
7 MR. FUGE: I have no concern with that	7 So there are letters from Coterra, and
8 approach, so go ahead, Ms. Bennett, and we'll let the	8 yesterday we submitted letters from OXY supporting the
9 other parties go.	9 project. We just received those letters yesterday.
10 MS. BENNETT: Thank you very much.	10 And then Mewbourne, I understand from their
11 So I have on the slide on the screen	11 pre-hearing statement, is supportive of the project.
12 the location, the map of this two-well pilot project	12 But I'll leave that to them to also discuss.
13 that Chevron is proposing and that we'll be discussing	chevron's also met with the New Mexico
14 today. And the Chevron witnesses will go into more	14 State Land Office and the New Mexico OC.
15 detail about the location of the map. But I did to	15 So I'm going to skip some of these so
16 the location of the two wells before I started my	16 we can get to the meat of our presentation with the
17 opening presentation.	17 subject matter experts. But I did just want to also
18 So as I mentioned briefly, this is an	18 highlight that Chevron, you'll be hearing a lot about
19 SWD pilot project. It's a two-well pilot project. So	19 data gathering and data analysis today, because that's
20 Chevron is proposing two wells to target the DMG, see	20 the key element of the pilot project.
21 shallow injection.	21 Chevron intends and is proposing a
22 As I alluded to and you as you can see	22 request data gathering system or protocol and then
23 from our team here today, Chevron has undertaken a	23 intends to share that data with the Division and other
24 very extensive review of the surface and subsurface	24 operators, not just in the spirit of transparency, but
25 seismic geological factors that are at issue here and	25 in the spirit of collaboration to make sure that this
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9 (Pages 30 - 33)

1 is a thoughtful approach to DMG disposal,	1 present three witnesses today. First will be Brandon 2 Denuell John denute director for Denute Commen
2 understanding that there are historic concerns about	2 Powell [ph], deputy director for Brushy Canyon.
3 DMG disposal. But Chevron's witnesses will address	3 Next, we will have Phillip Goetze [ph], the UIC Bureau
4 that.	4 chief. Then we will have Mr. Million Gebremichael
5 And just so we're all on the same	5 [ph] testify.
6 terminology, DMG is Delaware Mountain Group, just to	6 We anticipate OCD's presentation taking
7 make sure. So that's that. And we'll have some	7 approximately an hour and a half. Try to stick to
8 exhibits that show exactly where the Delaware Mountain	8 that.
9 Group is within the geologic strata.	9 Basically, that's a brief outline of
10         So Chevron is also proposing monitoring	10 OCD's concerns and where we're going with the
11 programs to address any impacts to their rise to	11 presentation. So I'll leave it there for now.
12 correlative rights and waste. And so this is a	12 MR. FUGE: Ms. Hardy, do you have any
13 thoughtful, multidisciplinary approach to the request	13 opening remarks you'd like to make on behalf of
14 to have this two-well pilot project approved by the	14 Mewbourne?
15 Commission.	15 MS. HARDY: Yes, thank you, very
16 And so with that, I look forward to the	16 briefly, Mr. Chair.
17 discussion with the commissioners today and with the	17 As set out in Mewbourne's pre-hearing
18 Chevron witnesses. And we look forward to any	18 statement, Mewbourne's reports, Chevron's
19 questions that the Division and Mewbourne may have for	19 applications, as long as appropriate conditions are
20 our witnesses.	20 imposed on the injection and monitoring occurs to
21 Thank you very much.	21 ensure the protection of correlative rights.
22 MR. FUGE: Mr. Tremaine?	22 And we did cite in our pre-hearing
23 MR. TREMAINE: Thank you.	23 statement the Commission and Division objection rule,
24 This is Jesse Tremaine on behalf of the	24 Rule 26, which requires that be maintained in such
25 Conservation Division. Good morning, Mr. Chair,	25 a manner that allows the fluids to be confined to the
Page 34	Page 36
1 Commissioners.	1 injection interval. So that's critically important
2 The Oil Conservation Division	2 here to Mewbourne.
3 intervened in this case. And it does not oppose the	3 And in addition regarding OCD's
4 applications. But regarding the nature of the geology	4 recommendations, Mewbourne fully supports OCD's
5 and summarizing the Delaware Mountain Group, OCD	5 proposed procedures regarding the administrative
6 believes that certain safeguards for these wells are	6 approval of DMGSTWD permits that are set out in OCD
7 required above and beyond what might be typical for	7 Exhibit 11. Mewbourne believes these procedures will
8 saltwater disposal wells that are injecting into other	8 minimize the risk of waste and protect correlative
9 zones.	9 rights.
10 We'll get to that in quite a bit of	10 Mewbourne also has some other
11 detail once we get into the Exhibit 11 and 12. But	11 recommendations that I will ask OCD's witnesses about.
12 very briefly, as we've gotten in the pre-hearing	12 Really, they are that OCD seek the support of NMOGA,
13 statement, OCD's concerns relate primarily to	13 its DMG disposal capacity reexamination workgroup, to
14 projection of correlative rights, prevention of waste,	14 create a DMG type log and stratigraphic cross sections
15 and identifying a very key need that Ms. Bennett has	15 to ensure consistent DMG layer picks across the basin
16 already identified, the need for additional data	16 and also that OCD consider the requirement to perform
17 regarding injection into the DMG.	17 a new SRT test, a step-rate test, any time the tubing
18This is an area where I believe the	18 diameter on the well is upgraded or additional DMG
19 Commission will be informed today the geological	19 preparations are added below the current disposal
20 information and our understanding of the Delaware	20 interval.
21 Mountain Group is evolving over time. And there's	21 So with the proposed conditions,
22 quite a bit of additional information that is	22 Mewbourne does support the applications. Thank you.
23 necessary and prudent prior to, you know, a rather	23 MR. FUGE: And I just want to check
24 increased injection development within that zone.	24 before we go through just to make sure. I believe the
25 The Oil Conservation Division will	25 State Land Office entered an appearance, but I don't
Page 35	Page 37

10 (Pages 34 - 37)

14       THE REPORTER: Will the witness please         15       raise your right hand.         16       WHEREUPON,         17       CODY COMISKEY,         18       called as a winess and having been first duly sworn         19       to tell the truth, the whole truth, and nothing but         20       the truth, the whole truth, and nothing but         20       the truth, the whole truth, and nothing but         20       the truth, the whole truth, and nothing but         20       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       ba some information on the detailed analysis that         2       has gone into this pilot project. And then he's going         3       to com 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 doy ou work?         11       A C		
3       A       Yes, it was.         4       UNDENTIFIED SPEAKER: Mr. Jared Levy       Smatter of record?         6       MR. FUGE: Ms. Bennett, then. TII       Smatter of record?         7       turn it over to you.       Smatter of record?         8       MS. BENNETT: Thank you very much.       G A haves a Bachelor's of Science degree from         9       At this time. I would like to call our       The A have.         10       for winessen, Mr. Cody Comiskey.       The A have.         11       MR. FUGE: Can I have the court       The Xes Tech University focused on geophysics and         11       MR. FUGE: This bes' ready.       The Xes Tech University focused on geophysics and         14       THE REPORTER: Will the winness please       The Xes Tech University focused on geophysics. and         15       riab court of the trant, was examined and testified as follows:       The A lob oy our responsibilities include SWD         19       to tell the truth, the whole truth, and nothing but       Q       A do your responsibilities include SWD         20       MS. BENNETT: Mr. Comiskey is tucky.       G       A do your responsibilities include SWD         21       MR. FUGE: Thank you.       Q       A do your responsibilities include SWD         22       MS. BENNETT: Mr. Comiskey is tucky.       Q       A A nadarko Petrokent wor	1 see counsel for the State Land Office here or online.	1 A Yes, I have.
4       Q       And were your credentials accepted as a         5       MR.PUGE: MS.Bennett, then. JII       5         7       WR.PUGE: MS.Bennett, then. JII       7         7       WR.BENNETT: Thank you very much.       9         9       A this time. I would like to call our       10         10       first witness, Mr. Cody Comiskey.       17         11       MR.FUGE: Can. I have the court       11         12       reporter to administer an outh to Mr. Comiskey?       13         13       Think he's ready.       12         14       THE REPORTER: Will the witness please       15         15       aise your right hand.       16         16       WHEREUPON,       17       A Yes, they do.         17       A Yes, they do.       19       0 ded the truth, was examined and testified as follows:         21       MR. FUGE: Thank you.       20       A Yes, they do.         22       MS. BENNETT: Mr. Comiskey is lucky.       23       A Anadarko Petroleum Corporation.         24       Q And what did you of for Anadarko?       24       Q And what did you for for Anadarko?         25       FXAMINATION       19       4 cody comistoal as a resume in this matter?         1       wall as some information on	2 But just want to open up that ask in case they have	2 Q And is that the Texas Railroad Commission?
5 [ph] will not be in attendance today.       5 matter of record?         6       MR. FUGE: Ms. Bennett, then. Fill       6         7       Q Can you provide a summary of your         8       MS. BENNETT: Thank you very much.       9         9       At this time, I would like to call our       9         10       first wilness, Mr. Coly Comiskey.       10         11       MR. FUGE: Can I have the court       11         12       reports to administer a ond the Mr. Comiskey?       11         13       Think he's ready.       11         14       THE REPORTER: Will the wilness please       13         15       as winess and having been first duly sworn       10         19       to let the truth, the whole truth, and nothing but       10         20       ther security was examined and testified as follows:       21         21       MR. FUGE: Thank you.       21       Q And do your responsibilities include SWD         23       be is going to be signing to regiver.       21       Q And do your responsibilities include SWD         24       So he is going to be egiving an initial overview of the so going to be egiving an initial overview of the so going to be egiving an initial overview of the so going to be tasther in the duly to discuss sincity.       4 solonal techn	3 opening remarks. Give a second.	3 A Yes, it was.
6       MR. FUGE: Ms. Benneti, then. T11         7 murit 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 have the court         12       reporter to administer an oub to Mr. Comiskey?         13       Think he's ready.         14       THE REPORTER: Will the witness please         15 raise your right hand.       16 cubter areview of seismic review?         17       COPY COMISKEY,         18       called as a witness and having been first duly sworn         19       the truth, the whole truth, and nothing but         19       the truth, the wole truth, and nothing but         20       MR. FUGE: Thank you.         21       MR. FUGE: Thank you.         22       MS. BENNETT: Kr. Comiskey is tucky.         23       because he's going to be testifying for y'all twice.         24       So he is going to be testifying for y'all twice.         24       So he is going to be testifying for y'all twice.         25       pilot project and, like, the ago to accute to accute the adaption this pilot project. And then he's going a the troday.         3       to come back later in the day to discuss seismicity.	4 UNIDENTIFIED SPEAKER: Mr. Jared Levy	4 Q And were your credentials accepted as a
7       Ium ii over to you.       7       Q       Can you provide a summary of your         8       MS. BENNETT: Thank you very much.       8       educational background?         9       At this time, I vould like to call our       10       Trans Tech University focused on goophysics and         11       MR. FUGE: Can I have the court       11       tectonics. I graduated cun laude from Texas Tech. In         12       eporter to administer an outh to M. Comiskey?       13       University in geophysics, carthquake scismology, and         14       THE REPORTER: Will the witness please       15       Q       And do your responsibilities include SWD         16       WHEREUPON,       16       include a review of seismic review?       17       A       Yes, they do.         17       MR. FUGE: Thank you.       18       Q       And do your responsibilities include SWD       19       development and permitting?         20       the whole truth, and outhing but       20       A       Yes, they do.       21       Q       And do your responsibilities include SWD       19       development and permitting?         21       MR. FUGE: Thank you.       21       Q       Beanter Struct Constexy is lackly.       23       A       Anadarko Petroleum Corporation.         24       So he is going to be giving an init	5 [ph] will not be in attendance today.	5 matter of record?
8       MS. BENNETT: Thank you very much.       9       A thus time, I would like to call our         9       A thus time, I would like to call our       9       A Thave a Bachelor's of Science degree from Texas Tech. I         11       MR. FUGE: Can L have the court       11       tectonics. I graduated cum laude from Texas Tech. I         12       reporter to administer an oah to Mr. Comiskey?       11       11       tectonics. I graduated cum laude from Texas Tech. I         13       Think he's ready.       11       tectonics. I graduated cum laude from Texas Tech. I         14       THE REPORTER: Will the witness please       15       Q And do your responsibilities at Chevron         16       WHERKUPON,       16       include a review of seismic review?         17       CODY COMISKEY,       17       A Yes, they do.         18       called as a winess and having been first duly sworn       18       Q And do your responsibilities include SWD         19       to ell the truth, me whole truth, and nothing but       19       development and permitting?         20       MR. FUGE: Thank you.       21       Q Before you worked at Chevron, where did you         21       MR. BENNETT: Mr. Comiskey is lucky.       23       A hand avariety of roles. I worked in our         23       be socien finto may tou for y all twice.       3	6 MR. FUGE: Ms. Bennett, then. I'll	6 A Yes.
9       At this time, I would like to call our       9       A Thave a Bachelor's of Science degree from         10       first winness, Mr. Cody Comiskey.       10       Texas Tech University focused on geophysics and         11       MR. FUGE: Can Have the court       11       tectorics. I graduated cum laude from Texas Tech. I         12       reporter to administer an oah to Mr. Comiskey?       12       have a Master's of Science degree from Baylor         13       Think he's ready.       13       thiversity in geophysics, carthquark essimology, and         14       THE REPORTER: Will the witness please       15       Q       And do your responsibilities at Chevron         16       WHEREUPON,       16       include a review of selsmic review?       17       A Yes, they do.         19       to let the truth, the whole truth, and nothing but       19       development and permitting?         21       MR. FUGE: Thank you.       21       Q       Before you worked at Chevron, where did you         23       beas seign to be testifying for yill twice.       23       A       Andadrako Petroleum Corporation.         24       Q is one back ther in the day to discuss seismicity.       24       Q       And darko foreso on more         25       FXAMINATION       5       usoworked in oru machofina gain later today.       1	7 turn it over to you.	7 Q Can you provide a summary of your
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1 and geophysics.	1 shows Chevron's acreage within the Permian Basin. So
2 MR. FUGE: So recognized.	2 we have a very large acreage position that Chevron
3 MS. BENNETT: Thank you.	3 either operates or has has daily working interest
4 BY MS. BENNETT:	4 in. So we're very broad broad organization
5 Q Let's talk about your initial testimony that	5 operating in both Southeastern New Mexico, the Texas
6 we're about to go through this morning, setting aside	6 portion of the Delaware Basin, and also the Midland
7 the seismicity testimony from later on today. What is	7 Basin as well.
8 the purpose of your testimony this morning?	8 Bottom right shows a forecast from our
9 A So the purpose is to present an overview of	9 report from 2020, second quarter of 2023, just showing
10 Chevron's view on water produce water management	10 on a half sheet. And it's important to note that we
11 optionality in the Permian Basin. We recognize that	11 have a significant vested interest in the State of New
12 there's a growing concern around produced water	12 Mexico and are committed to the State of New Mexico
13 management. See the rise in seismicity. Induced	13 operating.
14 seismicity has been attributed to to produced water	14 Q Thank you. So let's talk about why Chevron
15 management as a growing concern amongst many.	15 chose these two specific locations for the pilot
16 So Chevron's view is looking at this pilot	16 wells. And again, this is on page 98 of the materials
17 program as a component of water optionality within the	17 and using the upper righthand corner pagination. So
18 state of New Mexico. To be able to continue to	18 page 98 of the materials.
19 develop the resources that are critical to the world,	19 If you can just briefly describe why Chevron
20 doing it in an environmentally responsible manner, and	20 chose these two specific locations?
21 being forthcoming on information data about so that	21 A So the two it shows two locations in
22 everybody can understand, you know, the issues and	22 general. We want to accelerate our pace of learning.
23 finally the opportunities that we have.	23 So we know that geology does vary across the Basin.
24 Q Great. And earlier today I mentioned that	24 And so one of the locations in the Papa Squirrel is
25 Chevron's been working on this pilot project since Page 42	25 located in what you would call more of a core portion Page 44
1 2021. Have you been working on the pilot project	1 of the Basin within the Delaware Mountain Group, the
2 since 2021?	2 DMG.
3 A Yes, I have.	3 There's there's a tremendous amount of
4 Q I have on the screen the location map of the	4 shallow disposal just adjacent to it south along the
5 Chevron pilot project wells. Do you see that?	5 Texas-New Mexico border. The basin roughly produces
6 A Yes, I do.	6 about 30 million barrels of water a day. And roughly
7 Q And can you just briefly orient the	7 about 17 million of that are injected. And roughly
8 Commission to where the wells are supposed to be	8 about 60 to 70 percent of that is injected just along
9 located?	9 the state line. And so it's very practical then in
10 A So the Papa Squirrel well is in very	10 New Mexico.
11 Southern Lea County, New Mexico close to the Texas-New	11 As mentioned earlier, we have considerable
12 Mexico state border. And it's at Veritas 2 State	12 operations along along the within the Papa
13 SWD 1 that's located Eddy County, again, proximal to	13 Squirrel AOI. So it gives us a lot of leverage to
14 the Texas-New Mexico border.	14 collect data. We also have existing service
15 Q And these wells, are they located within	15 facilities there that we can leverage. So it reduces
16 development areas that Chevron has surface control	16 our service impact. We don't have to go out and build
17 over?	17 new facilities to support this location.
18 A Yes, they are.	18 The Severitas too is a little more on the
19 Q And actually, I meant to ask you before we	19 western edge of the Basin. So the the geology is
20 even got to this slide. But if you can briefly give	20 just different. And we'll we'll show those through
21 an overview of Chevron's operations and its presence	21 exhibits. It's a little shallower.
22 in the Delaware Basin?	22 But again, some of the similar things.
23 A Absolutely. So the the map in the upper	23 There's a considerable amount of injection just to the
24 left is just a broad Permian Basin map I think	24 south of it in the Delaware Mountain Group. It's an
1 25 everybody's probably familiar with The bottom right	
25 everybody's probably familiar with. The bottom right Page 43	25 area where Chevron has also been drilling shallow Page 45

<sup>12 (</sup>Pages 42 - 45)

1 disposal wells in Texas and operating. And again, it	1 much as we can to reduce any more service impact and
2 allows us to leverage our footprint from service	2 and areas where we have future operations, so we
3 facilities we have already existing in the area as	3 can leverage the wells for use as well. So taking a
4 well as operational synergies that we have.	4 multitude of considerations into account was was
5 Q Thank you. When you say existing service	5 kind of a driving factor for these two locations. So
6 facilities, are you talking about existing SWDs?	6 it's a it's a hybrid of multiple factors that went
7 A Yes, I am.	7 into selection.
8 Q And are those deep SWDs?	8 Q And as part of your proposals, have you met
9 A Yes, they are.	9 with other operators in this area?
10 Q So what I think you're getting at is that	10 A Yes, we have.
11 you will be able to use some of those existing service	11 Q And what has been the response of the other
12 facilities for these SWDs rather than having to start	12 operators?
13 fresh?	13 A As noted, we received positive feedback from
14 A That's correct. Yes.	14 a few operators who have issued support for this pilot
15 Q I think we talked about this a little bit,	15 program. Late last year, there was a DMG working
16 about why there's a need for SWDs generally, which is	16 group that I believe was mentioned earlier that was
17 for disposal options. But why is there a need, in	17 stood up and had numerous companies to operate the
18 your opinion, for Delaware Mountain Group SWDs?	18 state of New Mexico.
19 A So through the last several years, there's	19 And we presented our plan for the pilot
20 been a considerable rise in the number of earthquakes	20 program back in I believe March of of this year on,
21 associated with deep disposal. In in Southern New	21 you know, leveraging, going through the work that
22 Mexico, most of the disposal is deep.	22 we've gone over to look at these locations.
23 And so looking at optionality, if we have	23 And believe the feedback was positive in our
24 concerns on deep disposal longevity, continuing to	24 ability to not only accelerate our learning as an
25 face a large amount of produced water, shallow	25 industry, provide data publicly, collect a lot of
Page 46	Page 48
1 disposals, one of the options we're looking at to be	1 information to accelerate our learning for some of the
2 able to continue to develop the resources but also	2 issues. But the but the feedback was positive from
3 mitigate the potential concerns around seismicity.	3 the industry group that has been working on this.
4 Q One thing I meant to ask you earlier about	4 Q Is part of the reason that you or I
5 is that these wells are not proposed for commercial	5 understand from speaking with Chevron that there was
6 wells; right? These are just for Chevron's use?	6 an earlier working group that had expressed that the
7 A That is correct, yes.	7 OCD and OCC should take greater care when considering
8 Q I mentioned earlier that Chevron has been	8 disposal in the Delaware Mountain Group. Are you
9 assessing the viability of these pilot projects since	9 familiar with that working group?
10 2021, and you've been involved in that assessment?	10 A I am familiar with it, yes.
11 A That's correct, yes.	11 Q And what is your understanding of that
12 Q And can you briefly restate or in your own	12 working group's goal or recommendations?
13 words state for the Commission what that assessment	13 A My understanding is that group was was
14 has taken into consideration?	14 looking at, you know, the the potential impacts
15 A It's taken to further review both surface	15 from Avalon and and Brushy Canyon production
16 and subsurface considerations. Looking at the geology	16 potentially associated with with shallow disposal
17 in the area. Broadly speaking, looking at the	17 impacts.
18 geology, looking at some of the reservoir parameters,	18 And and I believe the the view of the
19 looking at opposite operations, looking at own	19 group was to, again, look at more care for permitting
20 operations in areas again where you can, you know,	20 future disposal wells within within an area that
21 actively collect more data that we have control over	$\mid$ Z $\mid$ Was established, holed as Divity restricted area or Divity $e^{\Delta}$
21 actively collect more data that we have control over 22 instead of having to work in a field with maybe 20 or	21 was established, noted as DMG restricted area or DMGRA 22 that that was established. I think most people are
22 instead of having to work in a field with maybe 20 or	22 that that was established. I think most people are
<ul><li>22 instead of having to work in a field with maybe 20 or</li><li>23 30 operators within an area that limits our ability to</li></ul>	<ul><li>22 that that was established. I think most people are</li><li>23 aware of.</li></ul>
<ul><li>22 instead of having to work in a field with maybe 20 or</li><li>23 30 operators within an area that limits our ability to</li><li>24 kind of have control.</li></ul>	<ul> <li>22 that that was established. I think most people are</li> <li>23 aware of.</li> <li>24 But I think the view of the group was not</li> </ul>
<ul><li>22 instead of having to work in a field with maybe 20 or</li><li>23 30 operators within an area that limits our ability to</li></ul>	<ul><li>22 that that was established. I think most people are</li><li>23 aware of.</li></ul>

<sup>13 (</sup>Pages 46 - 49)

1 additional data and more care provided on permitting	1 the analysis that would support a careful review of
2 process and execution of such wells.	2 whether these two type wells are appropriate for
3 Q And has that been kind of your driving force	3 disposal in the DMG?
4 is to exercise that care and gather the additional	4 A Yes, I do.
5 data to demonstrate that disposal within the DMGRA is	5 Q In your opinion is the Papa Squirrel SWD
6 appropriate under certain circumstances?	6 Well Number 1 appropriate for disposal in the DMG?
7 A Yes. Chevron Chevron is committed to	7 A Yes, I believe so.
8 to safely operating and acquiring a multitude of data,	8 Q And in your opinion, is the Severitas 2 SWD
9 disseminating it to to everybody, to to the OCD,	9 Number 1 appropriate for disposal in the DMG?
10 to industry, for us to learn about the potential risk,	10 A Yes, I believe so.
11 be able to monitor, educate ourselves on more dynamic	11 Q Based on the work that you and your team
12 nature to support future operations.	12 have done and that we'll hear about more later today,
13 Q Let's see. I think we've talked a lot	13 do you think that the pilot project will negatively
14 about the Permian produced water reduction, so I'm	14 impact correlative rates?
15 going to skip some of those questions. But I did want	15 A No, I do not.
16 to ask you about Chevron's use of recycled water and	16 Q And based on your analysis and Chevron's
17 why recycling the produced water isn't the solution.	17 analysis, do you think that the project will result in
18 A So as I mentioned, the Basin roughly	18 waste?
19 produces about 30 million barrels a day roughly of	19 A I believe not.
20 produced water. You know, Chevron, within its	20 Q Do you think that the risk of waste is I
21 operations, recycles as much produced water as it can	21 know that other witnesses will talk about this a
22 through further operations.	22 little bit more. But is the risk of waste and the
23 However, there's just more produced water	23 protection of correlative rights even more evident
24 than we can recycle. And so the delta is is mainly	24 here because of the lack of DMG offset producers in
25 taken to disposal wells for for disposals. And in Page 50	25 these two areas? Page 52
	1 age 52
1 New Mexico today, there's roughly about a 3 million	1 A Can you state
2 barrel a day imbalance from produced water.	2 Q Sure. So if part of the concern is the
3 So based on the oil production in the	3 potential impact on DMG producers, has Chevron
4 injected water in Southeast New Mexico, there's	4 undertaken a review of the impact on DMG producers in
5 roughly about a 3-million-barrel delta, and most of	5 the area?
6 that water is moving across the state line into Texas	6 A Yes, we have.
7 to be disposed.	7 Q And is Chevron's conclusion that these two
8 Q One of the things you and I have talked	8 pilot projects or these two wells would not negatively
9 about in the past is the potential implications of the	9 impact those DMG producers within the area of the
10 water being transmitted or being transported into	10 A Yes.
11 Texas and how that can potentially impact New Mexico	11 Q Have Chevron considered whether its shallow
12 oil and gas operations.	12 disposal will impact drilling and completion at a
13 A Yes.	13 deeper strata?
14 Q Could you provide a little more detail on	14 A Yes, we have.
15 that? Or did you just do that?	15 Q And will there be a witness who will testify
16 A I believe I just did.	16 about that later?
17 Q And then so earlier a moment ago, Counsel	17 A Yes, there will be.
18 for Mewbourne mentioned the OCD Exhibit 11. And have	18 Q So before we move onto our next witness,
19 you reviewed OCD's Exhibit 11, which is	19 I'll open you up for questions from the other lawyers
20 A Yes, I have.	20 and the Commission. Do you have any final takeaways
21 Q And do you feel comfortable that Chevron's	21 that you want to say about the pilot project since
22 applications are consistent with the conditions of	22 you've been working on it for so long, and it's sort
23 approval in OCD's Exhibit 11?	23 of your baby?
24 A Yes, I am.	A Yes, I do. This is this is part of a
25 Q And has Chevron, in your opinion, undertaken	25 broader position from Chevron looking more optionality
25 Q And has Chevron, in your opinion, undertaken Page 51	25 broader position from Chevron looking more optionality Page 5

<sup>14 (</sup>Pages 50 - 53)

1 in produced water. The amount of water again that's	1 expanded upon down the road given the information is
2 produced on a daily basis in the Permian is unlike any	2 disseminated and reviewed in a proper manner.
3 other unconventional plate ever in the history of oil	3 Q Thank you. I believe that you mentioned
4 and gas. And it poses unique challenges that faces	4 that Chevron performed a review of potential impacts
5 everybody in this room.	5 on current production within this area; right?
6 So one of the components of Chevron's	6 A Yes.
7 approach on on environmentally safe produced water	7 Q Did you look at potential future production,
8 management is the expansion of optionality within not	8 or did Chevron focus on current, existing production
9 on the state of New Mexico but across the Permian.	9 within the area?
10 And one component of that is re-looking at shelves	10 A We looked at both. We looked at existing
11 within Southeast New Mexico.	11 legacy production what's in the area and also a
12 We feel that these locations provided an	12 geological review that could lead to future production
13 opportunity for not only Chevron, the industry, the	13 areas as well.
14 OCD and everybody involved to learn about potential	14 Q So is it my understanding then that that
15 consequences and concerns, understand those,	15 Chevron review of production in the area well, how
16 understand the opportunities that could be there that	16 would you describe a future potential production in
17 will allow for development of the resource within the	17 the area potentially impacted by this development?
18 state of New Mexico and across the Permian to support,	18 A So we looked at the different benches that
19 you know, the the of that.	19 could that potentially are productive. We looked
20 MS. BENNETT: Thank you. Those are all	20 at a geological review that'll be that'll be talked
21 the questions I have for you at this time. And I open	21 on more in future testimony on, you know, geological,
22 the floor for other questions from the Commission or	22 you know, ingredients, which could lead to future
23 other counsel.	23 development, obviously historical development, things
24 MR. FUGE: Mr. Tremaine, do you have	24 like that. But that will be discussed in the in
25 any cross?	25 future testimony.
Page 54	Page 56
1 MR. TREMAINE: I do have a couple	1 Q And just one other topic really quickly. It
2 questions. Thank you.	2 sounds like you've had an opportunity to review OCD
3 EXAMINATION	3 Exhibits 11 and 12; correct? Administrative approval,
4 BY MR. TREMAINE:	4 processing conditions, and the separator tests. You
5 Q So I believe during your testimony, you	5 may get to this later, but does Chevron have any
6 stated that this pilot project was considered kind of	6 specific concerns for items to address in those
7 a broader view of development of injection activity in	7 exhibits?
8 the DMG. Is that a fair assessment?	8 A Yes, we do. And I I believe we will
9 A Yes.	9 address those questions later in some other testimony,
10 Q If this pilot project is successful, what's	10 but we do have a few questions we would like to ask.
11 the scope of Chevron's anticipated injection	11 MR. TREMAINE: I'll reserve the
12 development within the DMG in this area?	12 questions then. Thank you.
13 A I think with that, our scope is is going	13 MR. FUGE: Ms. Hardy, do you have any
14 to be tactical. It's going to be "What does the data	14 questions for the witness?
15 tell us?" From from future projects, when we look	15 MS. HARDY: I don't at this time. I
16 at these, really, it's a case-by-case basis. We look	16 expect to have some questions for Mr. Comiskey on the
17 at these in review of all the technical information	17 seismicity testimony, but I have no questions right
18 and also too our our pace of development,	18 now.
19 locations, many different factors.	19 MR. FUGE: Looking at my Commissioners,
20 But we look at this as a key component to	20 Dr. Ampomah, do you have any questions for the
21 understanding what our the future of produced water	21 witness.
22 management may look like. But we are utterly	22 DR. AMPOMAH: Yeah, a quick one.
23 dependent on "What does the data tell us operationally	23 So can you clarify the use of the word
24 from the subsurface, from the facilities, which we'll	24 "pilot"?
25 speak to later, how they can maybe potentially be	25 MR. COMISKEY: Yes.
Page 55	
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<sup>15 (</sup>Pages 54 - 57)

1	DR. AMPOMAH: And the application.		opportunities, things like that. So that's that's
$\begin{vmatrix} 2 \\ 2 \end{vmatrix}$	MR. COMISKEY: So I think when we		something we'll find out.
	that's a great question. Thank you, Commissioner, on	3	DR. AMPOMAH: My last question will be
	that. Think the our view on a pilot project is		I just want to know if these two proposed wells are
	that, you know, we're acquiring a lot of data that's		the area where the more or less after the data as a
	not normally acquired in in DMG wells. I would		protected area.
	argue this is probably one of the most science DMG	7	MR. COMISKEY: These wells are within
	disposal permit in the Basin.	8	the area, yes.
9	So from that perspective, we look at	9	DR. AMPOMAH: Thank you, Mr. Chair. MR. FUGE: Mr. Bloom?
	these as as an opportunity to learn. We look at	10	
	these as as just like any other disposal well, as	11	MR. BLOOM: No questions at this time,
	an opportunity to dispose as well. But from the pilot		Mr. Chair.
	perspective and the way we voice this to not only to	13	MR. FUGE: I had a couple questions I
	the OCD or the State Land Office but to industry is we		wrote down, but I think you already covered them when
	want feedback. We want to be able to to		you talked about seismicity, so I'll reserve to there.
	incorporate that from a broad perspective and include	16	I did have two, though, other
	that in our operations.		questions. You indicated that one of the reasons why
18	And so that's kind of a a typical		you chose this location is for Chevron's interest in
	that's atypical from a traditional development plan,		the area. What proportion of the area around, meaning
	which is very, you know, thought out and executed.		surface and subsurface, does Chevron currently
	This is something that that I think we're going to		control?
	have a little more flexibility on. So that that's	22	MR. COMISKEY: Which area?
	kind of where the pilot is coming from.	23	MR. FUGE: Around the Severitas and
24	DR. AMPOMAH: So your testimony talked		Papa Squirrel wells.
25	about how Chevron talked to multiple counties in the Page 58	25	MR. COMISKEY: I don't know off the top Page 60
	1 age 36		1 age 00
1	area and they received approval. So with their	1	of my head what percentage. I know that we operate
2	concerns, some of the written social reason how you	2	production wells in the Avalon and the Wolfcamp below
3	were able to address those?	3	the Papa Squirrel location. And we operate production
4	MR. COMISKEY: Yes, there there were	4	wells and and the Bone Spring Wolfcamp below the
5	concerns. We did have a few protests on those wells,	5	Severitas location. So both those sections, Chevron
6	which we've they've been dropped and removed	6	operates and has has license to operate. And those
7	through the ongoing discussions. And I think the	7	are lease agreements to operating those.
8	biggest thing from our perspective is we want to be	8	So within the sections, a hundred
9	open. We we're collecting a lot of data.	9	percent. But I don't know within the within the
10	We recognize there's concerns.	10	area the exact percentage. I I think we have a few
11	Obviously, there's been historical testimony. It's	11	slides open a little further that will show a little
12	been presented as exhibits and something that Chevron	12	bit more detail.
13	was was involved in. We're not shying away from	13	MR. FUGE: Did I hear correctly that
14	those, so we recognize there's concerns.	14	Chevron is the owner of some DMG offset wells in the
15	But we also recognize this is an	15	area around Papa Squirrel and Severitas or?
16	industry issue. Produced water management is not just	16	MR. COMISKEY: We are and and we are
	a Chevron issue. This is an industry issue. So we	17	in the case of the Severitas.
	need to work together. And so we look at this as an	18	MR. FUGE: And then I think building
		19	off Commissioner Ampomah's questions about the pilot
	capital in these projects.		nature, maybe I'll provide a little context for my
21	We're going to take data, collect data,		question. When thinking about pilots and other
	provide it, and we hope through this and through the		pieces, are there any dates proposed in Chevron's
	ongoing through the New Mexico work group that was		application to either come back into the Commission or
	mentioned earlier, that we can collectively work		others to revisit what you're learning about? Or is
	together to understand any issues, understand		this a standard kind of 30-year term SWD permit with
	Page 59		Page 61

16 (Pages 58 - 61)

1 the feedback?	1 A That is correct.
2 MR. COMISKEY: No, it is not a standard	2 Q And operation of saltwater disposal wells?
3 30-year term permit. We have and I will speak to	3 A That is correct.
4 in in my later testimony on on response	4 Q And have you previously testified before the
5 framework that was developed with support of the	5 Oil Conservation Commission or the Oil Conservation
6 working group on on signpost on data dissemination.	6 Division?
7 We we hope to have ongoing engagement with the OCD	7 A No, I have not.
8 and industry on this as we collect and learn	8 Q Did you provide a resume with your
9 information. So we hope this will be very open-ended	9 materials?
10 and and very collaborative.	10 A Yes, I did.
11 MR. FUGE: I don't think there are any	11 Q And is that behind Tab E?
12 other further questions from the Commission, so you	12 A Yes.
13 may be excused. Thank you.	13 Q If you could, could you briefly summarize
14 MS. BENNETT: Thank you.	14 your educational background for the commissioners?
15 MR. FUGE: All right. Call your next	15 A Yeah. I have a Bachelor of Science degree
16 witness.	16 from Texas A&M in geology, and I have a Master of
17 MS. BENNETT: Thank you. I'd like to	17 Science degree from Southern Illinois University at
18 call Mr. Tom Merrifield.	18 Carbondale.
19 MR. FUGE: Can I ask the court reporter	19 Q And you mentioned that you worked at Chevron
20 to swear in Mr. Merrifield?	20 for 11 years. Where did you work before Chevron?
21 THE REPORTER: Will the witness please	21 A Various places. I worked in the water
22 raise their right hand?	22 resource, you know, sector for approximately 16 years.
23 //	23 I've also worked in the Permian Basin previously for
24 //	24 ARCO as well as Exxon. And I've worked I also did
25 // Base (2	25 work somewhat with the Hershey building program for
Page 62	Page 64
1 WHEREUPON,	1 about six years.
1 WHEREUPON, 2 TOM MERRIFIELD,	<ol> <li>about six years.</li> <li>Q One of the things you and I talked about a</li> </ol>
2 TOM MERRIFIELD, 3 called as a witness and having been first duly sworn	2 Q One of the things you and I talked about a 3 bit when we were talking about your professional
2 TOM MERRIFIELD,	2 Q One of the things you and I talked about a
<ul> <li>2 TOM MERRIFIELD,</li> <li>3 called as a witness and having been first duly sworn</li> <li>4 to tell the truth, the whole truth, and nothing but</li> <li>5 the truth, was examined and testified as follows:</li> </ul>	<ul> <li>Q One of the things you and I talked about a</li> <li>3 bit when we were talking about your professional</li> <li>4 experience was the number of UIC wells that you've</li> <li>5 been involved with in terms of design, permitting,</li> </ul>
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<ul> <li>2 TOM MERRIFIELD,</li> <li>3 called as a witness and having been first duly sworn</li> <li>4 to tell the truth, the whole truth, and nothing but</li> <li>5 the truth, was examined and testified as follows:</li> <li>6 MR. FUGE: Thank you.</li> <li>7 Proceed.</li> <li>8 MS. BENNETT: Thank you.</li> <li>9 EXAMINATION</li> <li>10 BY MS. BENNETT:</li> </ul>	<ul> <li>Q One of the things you and I talked about a</li> <li>bit when we were talking about your professional</li> <li>experience was the number of UIC wells that you've</li> <li>been involved with in terms of design, permitting,</li> <li>operation. If you had to guess, what is the number of</li> <li>UIC wells that you've been involved with?</li> <li>A Just for clarification, I worked for oil and</li> <li>gas at UIC wells. I've worked both water flood as</li> <li>well as well disposal wells. And somewhere in the</li> </ul>
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17 (Pages 62 - 65)

1 Q Are you familiar with the application that	1 A Yes, I did.
2 Chevron filed in these matters?	2 Q And in your opinion, does the C108 for the
3 A Yes.	3 Papa Squirrel well include all of the information and
4 Q Have you been working with Chevron on this	4 documentation required by the C108 and by the
5 particular project since 2022?	5 Commission?
6 A Yes.	6 A That was my understanding, yes.
7 Q And are you familiar with the wells, then,	7 Q Did you review OCD's, the Oil Conservation
8 that are the subject of the applications?	8 Division's pre-hearing statement in this matter?
9 A Absolutely.	9 A Yes.
10 MS. BENNETT: At this time I would like	10 Q And did you see in the OCD's pre-hearing
11 to tender Mr. Merrifield as an expert in UIC	11 statement where the Division noted that the C108s
12 terminating and operation matters and petroleum	12 comply with the current construction? Or the well
13 geology.	13 bore side, I should say, comply with current standards
14 MR. FUGE: The witness is so	14 for UIC Class 2 well?
15 recognized.	15 A Yes, I did see that.
16 MS. BENNETT: Thank you.	16 Q And did you see where both the wells were
17 BY MS. BENNETT:	17 designed for the area of review to be adequate?
18 Q So I'm going to start sharing my screen	18 A Yes, I did see that.
19 again, and we'll start with the applications that	19 Q So with that initial stamp of approval
20 Chevron submitted to matters. So Mr. Merrifield,	20 although I'm not trying to go too far with what OCD
21 before I turn to the applications, though, what is the	21 said in its pre-hearing statement. But I think that
22 purpose of your testimony today?	22 does narrow our inquiry a bit and discussion on C108
23 A Really to just kind of walk through the C108	23 So with your permission, I'd like to go through the
24 application first. Also to touch on the geology of	24 C108s rather quickly.
25 the injection intervals and how favorable they are	25 A Okay.
Page 66	Page 68
1 and also to address some of the their indicators of	1 Q So did Chevron submit a map that identifies
2 the likelihood of DMG reserves in in both of these	2 all wells within 2 miles of the Papa Squirrel well?
3 areas.	3 A Yes.
4 Q Great. So let's start with the discussion	4 Q And is that Attachment 1 to the C108?
5 of the C108s. Are the C108s included with the	5 A Yes.
6 applications that I filed on Chevron's behalf?	6 Q Did Chevron attach data within the AOR, so
7 A Yes.	7 the area of review for the wells, if there are any,
8 Q And turning to Tab A, which is at page 3 of	8 which penetrate the proposed injection zone?
9 267, does that look to you like the application that I	9 A Yes.
10 filed along with the C108 that you provided to me to	10 Q And was that Attachment 2?
11 include with the application?	11 A Yes.
12 A Yes, it does.	12 Q And in your materials, is there a plugged
13 Q And Tab A is the application in Case 23686	13 well within the AOR for Papa Squirrel?
14 for Papa Squirrel; is that right?	14 A Yes.
15 A Yes.	15 Q And did you submit the plugging information
16 Q And Tab B is the application in Case 23687,	16 from the well files?
17 which is for the Severitas well?	17 A Yes.
18 A Yes, it is.	18 Q Did you include information regarding the
19 Q Did you compile the materials? Well, let's	19 requirements for showing how much volume or the daily
20 focus on Papa Squirrel for a moment.	20 rate of injection and the proposed pressure?
21 A Sure.	21 A Yes. The operational part, yes.
21 A Sure. 22 Q Did you compile the materials that were	
	22 Q And I just want to take a quick look at 23 that That's Attachment 3: right?
<ul><li>23 submitted as the Papa Squirrel C108?</li><li>24 A Yes.</li></ul>	23 that. That's Attachment 3; right?
	24 A Yes. 25 O And so on Attachment 2 for Bana Souirrel
25 Q And did you submit that material to me? Page 67	25 Q And so on Attachment 3 for Papa Squirrel, Page 69
1 age 07	1 age 09

<sup>18 (</sup>Pages 66 - 69)

1 what maximum rate of injection or barrels of water per	1 there is no connectivity? Or you have not found any
2 day is Chevron requesting in the application?	2 connectivity?
3 A For Papa Squirrel, 20,000 barrels a day.	3 A Yes.
4 Q And what is the average daily rate?	4 Q Let's turn to the Severitas C108. And I'm
5 A 15,000 barrels per day.	5 not going to walk through that in any level of detail
6 Q And what is the max permit pressure that	6 except to ask you about the rates and pressure. But
7 Chevron is seeking for Papa Squirrel?	7 did you provide all of the same information for the
8 A 125 psi.	8 Severitas C108?
9 Q And how about the average pressure?	9 A Yes, I did.
10 A 750 psi.	10 Q And if we turn to page 66 of 267, which I'm
11 Q Thank you. Did you submit geologic data	11 showing on the screen, is that the operational data
12 with your C108s?	12 information that's required by the C108?
13 A Yes, I did.	13 A Yes, it is.
14 Q And is that Attachment 4?	14 Q And what is the maximum rate that Chevron is
15 A Yes, it was.	15 requesting for the Severitas 2 state well?
16 Q Did you provide information on the proposed	16 A 15,000 barrels per day.
17 stipulation program?	17 Q And what is the average daily rate?
18 A Yes, I did.	18 A 12,500 barrels per day.
19 Q And is that Attachment 5?	19 Q And Chevron is requesting lower psi, is that
20 A Yes, it was.	20 right, for this well?
21 Q Did you provide logging and test data on the	21 A Yes, it is.
22 well?	22 Q And what is the max pressure that Chevron's
23 A Yes, I did. But this well has not been	23 requesting?
24 through what I what I showed in that just in	24 A 468 psi.
25 that attachment was what we were planning to what	25 Q And the average pressure?
Page 70	Page 72
1 kind of data we were going to gather after an oil	1 A 400 psi.
2 spill.	2 Q Did you prepare an affirmative statement for
3 Q So because it is not an existing well, no	3 the Severitas well as well regarding the evidence of
4 wells have been run. But this Attachment 6 does show	4 open faults or other hydrologic connections to your
5 some of the logging that Chevron is proposing to do?	5 SDWs?
6 A Yes, it does.	6 A Yes, I did.
7 Q So I'm just going to skip Attachment 7.	7 Q And is that Attachment 8?
8 There were no wells within the area of review for Papa	8 A Yes, it is.
9 Squirrel; is that right?	9 Q If you could just read this last paragraph
10 A Yes.	10 here, starting with "Both the Papa Squirrel"?
11 Q Attachment 8 is what I call in shorthand the	11 A Okay. "Both the Papa Squirrel 781 and the
12 affirmative statement. And it's an affirmative	12 Severitas 2 State SWD 1 are are locations which we
13 statement signed by you; is that right? Is that your	13 find" excuse me.
14 signature?	14 Q Yeah, I know. It's so small.
15 A Yes.	15 A "Find no indication of open faults at the
16 Q And did you submit the statement saying that	16 surface or in the subsurface. No indication of
17 you, on behalf of Chevron, had examined the available	17 hydrologic connection between the proposed injection
18 geologic and engineering data, and you found no	18 zone, Bell Canyon and Cherry Canyon, and the
19 evidence of open faults or other hydrologic	19 underground source of drinking water. Both locations
20 connections to underground sources of drinking water?	20 have low potential for offset and reduce substance."
21 A Yes, I did.	21 Q Thank you. And is that still your
22 Q And that's based on your review of the	22 conclusion today for both wells?
23 materials?	23 A Yes, it is.
24 A That's correct.	24 Q Are you familiar with the stimulation
25 Q And is that still your conclusion today that	25 program that Chevron is proposing for these two wells?
Page 71	Page 73

19 (Pages 70 - 73)

1 Or is that a question better for someone later in the 1 of the hearing	
	ng. Did we talk about that?
	, we did.
	I what was your conclusion?
	we evaluated that a few weeks back.
	s not going to be any change in the
	t need to be notified if we move it to
7 to defer, we can. So have you looked at the OCD's 7 that locatio	
	w, the applications and the C108s discuss
	to the Brushy Canyon. But just to be
	ear, Chevron does not intent to inject
	ushy Canyon; is that right?
	are not planning to operationally inject
13 A Yes. 13 produced w	vater into the Brushy Canyon formation. In
14QAnd in your opinion is your proposed14fact, after v	ve've logged the route in the Brushy
15 stimulation program consistent with what OCD is 15 around defe	ects, we plan to plug off that Brushy
16 looking for in terms of a stimulation program? 16 Brushy Car	nyon and only inject into the Cherry Canyon
17 A Yes. And it's just a it's just an acid 17 and Bell Ca	anyon. And we are not drilling into the
18 job. That's that's the stimulation. 18 hollow part	of the Brushy either.
19QDo you recall what OCD was suggesting would19QSo I	et's kind of take that statement and
20 not be an appropriate stimulation method? 20 unlock it ju	st a little bit.
21 A It's my recollection I think what they were 21 A Sure	2.
22 concerned about mostly is is this one would 22 Q So v	what is a DFIT?
23 hydraulic fraction with and with profit without 23 A DFI	T is a diagnostic fracture injection
24 hydraulic stimulated fracture. This this proposal 24 test. So we	e actually do inject fluid into that
	It's usually fresh water or some very
Page 74	Page 76
1 stimulation. 1 compatible	formation fluid. But it's usually fresh
2 Q So having reviewed OCD's conditions of 2 water. And	l so they're very short-term injection
3 approval, it's your opinion that your stimulation 3 tests, very n	minor, but they are injection tested going
4 program is consistent with OCD's request? 4 to the form	ation.
5 A It's my understanding, yes. 5 Q And	l is this DFIT test part of Chevron's data
6 Q Thank you. One thing that you and I have 6 collection p	protocol?
7 spoken about is a potential need in the future to 7 A For	these wells, it is part of the our
8 microsite. To make some micro siting changes, I'll 8 protocol.	
9 call them, to the location of the Severitas well? 9 Q And	l my understanding though is that the sole
10 A Yes. 10 reason that	you had included the Brushy Canyon in your
11 Q And why would Chevron perhaps need to move 11 application	s at all is to authorize this DFIT test?
12 the service location of the Severitas well a few feet 12 A It	it's to authorize the DFIT test, but
13 here or there? 13 also to cond	duct open hole logging within this portion
14 A Currently, the location that's in the 14 of Brushy C	Canyon. And the open hole logs are going
15 application is in our lay down yard in the area. It 15 to be resisti	vity, gamma-ray, sonic, and neutron
	e'll also be running image logs as well.
16 would there's still a chance that that may work. 16 density. W	
	naybe I was too narrow saying it was just
17 We have to make sure that the the footprint can fit 17 Q So n	naybe I was too narrow saying it was just But really it is just for testing purposes,
17 We have to make sure that the the footprint can fit17 Q So I18 in there without going across roads and things of that18 for DFIT.	
17 We have to make sure that the the footprint can fit17 Q So I18 in there without going across roads and things of that18 for DFIT.19 nature.19 and then yet	But really it is just for testing purposes,
17 We have to make sure that the the footprint can fit17 Q So I18 in there without going across roads and things of that18 for DFIT.19 nature.19 and then yo20 There's another location that's about 20020 A That	But really it is just for testing purposes, bu'll be cementing it off?
17 We have to make sure that the the footprint can fit17 Q So the state of the st	But really it is just for testing purposes, bu'll be cementing it off? t's correct.
17 We have to make sure that the the footprint can fit17 Q So the second	But really it is just for testing purposes, ou'll be cementing it off? t's correct. I so it's a very limited purpose?
17 We have to make sure that the the footprint can fit17 Q So that18 in there without going across roads and things of that18 for DFIT.19 nature.19 and then yet20 There's another location that's about 20020 A That21 feet away that we we think we can move to. And we21 Q And22 will make that decision after hearing.22 A That23 Q But before coming here today, you and I23 Q And	But really it is just for testing purposes, bu'll be cementing it off? t's correct. I so it's a very limited purpose? t's correct.
17 We have to make sure that the the footprint can fit17 Q So the second	But really it is just for testing purposes, pu'll be cementing it off? t's correct. I so it's a very limited purpose? t's correct. I the targeted just to clarify, it is

<sup>20 (</sup>Pages 74 - 77)

1 injection.	1 talk about on her is the upper containment zone and
2 Q Thank you. And so with that, I did want to	2 the lower containment. So let's start with upper
3 turn into the well bore designs. Now, these were in	3 containment, which is noted right here. What can you
4 your C108s, but you also inserted them side by side in	4 tell us about the upper containment?
5 a slide for our convenience. And that is on Slide	5 A The Lamar limestone is considered the upper
6 Number 101. So if we could move to Slide 101, I	6 containment zone for the projection for the Severitas
7 wanted to talk through the casing designs a little	7 well. The lower containment zone of the well is the
8 bit, the well bore designs.	8 limestone, which is shown at the base.
9 A Okay.	9 Q And Chevron has other witnesses today that
10 Q And as we talked about earlier, the Division	10 will talk about some pressure tests and things that
11 has already said that the well bore designs are	11 were done on those two containment zones later today;
12 consistent with the construction standards these days	12 is that right?
13 for UIC Class 2 wells?	13 A That is correct.
14 A That is my understanding.	14 Q But one thing I did want to talk about with
15 Q But what I liked about your well bore	15 you because I find it to be quite interesting was you
16 designs is that they give us a little bit more	16 and I had talked about the presence of anhydrites and
17 information about where the closest aquifers are and	17 how those can act as a seal or sort of reinforce the
18 some of the formations that provide above and below	18 seal for containment zones. Are there anhydrites
19 the targets.	19 present here?
20 So I was wondering if you could walk us	20 A Yes, there are. Anhydrites are are a
21 through the Severitas State SWD Number 1 casing design	21 part of basically the whole component of what's shown
22 or well bore design first, and then we can move to	22 here on the diagram as the Castile formation.
23 Papa Squirrel. And I might have some questions for	23 Q And the Castile formation is this upper area
24 you as you're walking through it.	24 above the line?
25 A Okay. Both wells are a three-strand casing	25 A And correct. Well, it's right above the
Page 78	Page 80
1 design. And the Severitas well, we have a very we	1 line.
<ol> <li>design. And the Severitas well, we have a very we</li> <li>don't have much of an aquifer present in that</li> </ol>	<ol> <li>line.</li> <li>Q And when you and I spoke, what I found to be</li> </ol>
-	
2 don't have much of an aquifer present in that	2 Q And when you and I spoke, what I found to be
<ul><li>2 don't have much of an aquifer present in that</li><li>3 location. But we do have a very thin, less than 100</li></ul>	2 Q And when you and I spoke, what I found to be 3 interesting was that Castile and Lamar together
<ul> <li>2 don't have much of an aquifer present in that</li> <li>3 location. But we do have a very thin, less than 100</li> <li>4 foot aquifer in that location. And that extends</li> </ul>	<ul> <li>2 Q And when you and I spoke, what I found to be</li> <li>3 interesting was that Castile and Lamar together</li> <li>4 interact in a way because of the anhydrites to create</li> </ul>
<ul> <li>2 don't have much of an aquifer present in that</li> <li>3 location. But we do have a very thin, less than 100</li> <li>4 foot aquifer in that location. And that extends</li> <li>5 down to about 400 feet.</li> </ul>	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?
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<sup>21 (</sup>Pages 78 - 81)

1 A Yes. That distance is about 3700 feet.	1 the upper area?
2 And and in that case, it we do have rustler	2 A Yes.
3 present. And so it's really from the top of injection	3 Q And did you prepare the same analysis or a
4 at the top of the bell right below the Lamar to the	4 similar analysis for the Severitas well?
5 base of the rustler in the Papa Squirrel well.	5 A Yes. I think and you'll find that the
6 Q But there are multiple thousands of feet of	6 the slides are slightly the diagrams are slightly
7 vertical separation?	7 different, but they're they're made by other
8 A Correct.	8 geologists that were involved in this process, and
9 Q And earlier we were talking about the DFIT	9 they just took slightly different approaches, but they
10 test and cementing back. And do these show the	10 came to the same conclusion regarding the net
11 cementing back to prevent injection of produced water	11 thickness of porosity within the two areas.
12 into the Brushy?	12 Q And is that conclusion that that thickness
13 A Yes, they do. It to touch on the Papa	13 is favorable for injection?
14 Squirrel, there's an additional language that's left	14 A Yes, it is.
15 over from a diagram that went back and forth between	15 Q Let's start then on this slide, which is
16 myself and and wells, but really, the cement is	16 number 104 of 267. And let's start with an
17 the cement plug in the within the Brushy Canyon is	17 orientation of the slide for the commissioners and the
18 what we're planning for both wells.	18 other parties. What is this right here that I'm
19 Q Now I wanted to turn to a study that you	19 highlighting?
20 prepared to show the porosity of each of the two wells	20 A This is an inset that shows where that
21 and their favorability or the geology as an injection	21 portion of the map is located relative to the Delaware
22 interval. And here I'm going slightly out of order.	22 Basin that's shown where the tan lines are kind of
23 So at this time. I'd like to turn to Slide 103 of the	23 projected into the map the second map.
24 material. And again, that is the number of the top	24 Q And if you had to guess about I mean, if
25 righthand side.	25 you had to identify on this map where the Papa
Page 82	
1 A Okay.	1 Squirrel well is, is my hand more or less?
2 Q The substance starts on page 104. So the	2 A That is approximately where it's located,
3 slide I'm looking at now says, "Bell Canyon High	3 yes.
4 Porosity: Papa Squirrel." Are you there with me?	4 Q And so what does A to A prime mean on this
5 A Yes. Yes.	5 slide?
6 Q What is the purpose of the analysis that you	6 A This is a line of the projection, the
7 undertook in this slide?	
	7 cross-section that's shown on the left.
8 A The purpose of this analysis was really a	
8 A The purpose of this analysis was really a 9 prelude to identifying what where the optimal	7 cross-section that's shown on the left.
	<ul> <li>7 cross-section that's shown on the left.</li> <li>8 Q And does A correlate to the first</li> <li>9 cross-section that you have there?</li> </ul>
9 prelude to identifying what where the optimal	<ul> <li>7 cross-section that's shown on the left.</li> <li>8 Q And does A correlate to the first</li> <li>9 cross-section that you have there?</li> </ul>
<ul><li>9 prelude to identifying what where the optimal</li><li>10 locations are in both of these development areas. The</li></ul>	<ul> <li>7 cross-section that's shown on the left.</li> <li>8 Q And does A correlate to the first</li> <li>9 cross-section that you have there?</li> <li>10 A Yes, on the left side.</li> </ul>
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22 (Pages 82 - 85)

1pinkish 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.3QIs there anything else you wanted to m 4 about this slide before I move onto the next si 5 A No, I think that covers everything I w 6 to cover on the slide.7of sediments that are greater than 14 percent. 9QSo you filtered out anything below 14 10 percent or Chevron filtered out anything below 14 11 percent?7QSo turning to the next slide, this is the 8 geologic analysis that you undertook for the S 9 well to understand the porosity in that area; is 10 right?12AGreater than 14 percent. Greater than 14. 13QAnd this is page 106 of 267. And so of 13 orient the Commission again? What is the in 14 here on the righthand side of the slide?15But these dark blue areas indicate units 16 that are favorable for injection based on their 17 porosity levels?1A18AYeah. 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 proresit Page 861A1is sealty a law fort. And thet's why ung	nention lide? anted Severitas s that can you set map et at Harris, ends. the
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25 of of injection in the in the DMG, that porosity Page 86 25 blue is better net porosity?	
Page 86	nish
	<b>D</b> 00
1 is really a key fact. And that's why we come in and 1. A That is some if	Page 88
1 is really a key fact. And that's why we come in and 1 A That is correct.	
2 we looked to identify areas where we want to target 2 Q And the Severitas well is approximately	
3 placing the SWD wells. 3 halfway between the A and A prime on this?	
4 Q And just for the record, the Papa Squirrel 4 A Yeah. And the and the arrow point is	
5 well is about halfway down or a third of the way down 5 shown pretty correctly. So the point of the arrow i	S
6 the line from A to A prime? 6 really where the Severitas well is.	
7 A Right over here. 7 Q And do these logs have the same data as the	e
8 Q So let's turn to the next slide then, unless 8 prior logs that we looked at in terms of gamma?	
9 there was anything else on that slide you wanted to 9 A Yes, they do. And the difference is that	
10 touch on.       10 these were plotted in Petra. The other others were	re
11ANo, that's all.11 we used a different software package.	
12 Q So this next slide is page 105. And this 12 Q But they contained the same material.	
13 slide, again, are these the same two logs that we 13 A Same basic material. Just different	
14 reviewed on the last time? 14 programming.	
15 A They are the same two logs. Same two wells. 15 Q And what conclusions did you draw from t	his
16QAnd so in this leg you're just focusing16 analysis?	
17 further down in the geologic formation? 17 A Well, as as Cody Comiskey noted earlier	·,
18ARight. In the upper Cherry Cherry18you know, we we've looked at two areas where ye	we had
19 Canyon.19 slightly different variations in stratigraphy. One,	
20 Q And did you undertake this study again to 20 you know, the the stratigraphic thickness of the	
21 understand the net porosity in this area? 21 of the Delaware Mountain Group is thicker in the 2	Papa
22 A Yes, I did. 22 Squirrel area to the east.	
23 Q And what was your conclusion? 23 It's thinner to the west where the Severitas	
24 A This is still favorable. It's it's less 24 is. So we would naturally expect that the the	
	I
25 favorable, but it's still favorable. Page 87 25 reservoir character in this well would be less	

23 (Pages 86 - 89)

1 favorable than that in the Papa Squirrel just because	1 Q One of the primary takeaways I had from this
2 of stratigraphic thickness thickness variations.	2 slide was or questions I had was whether there are any
3 It's thinner over here. And we're actually seeing	3 DMG, Delaware Mountain Group wells within a half mile
4 less net porosity thickness in in this area.	4 of the Papa Squirrel?
5 But from a standpoint of what we're trying	5 A The answer is no.
6 to do within, you know, the scope of this these two	6 Q Where are the closest Delaware Mountain
7 pilot wells, it's important for us to kind of evaluate	7 Group producers from Papa Squirrel?
8 these areas where we may not have as great a	8 A They're they're about one and a half to
9 thickness, but at least, you know, crossing some sort	9 two miles away to the southeast.
10 of threshold coming from the well before us, and this	10 Q And will Mr. Taylor be discussing those
11 one does.	11 wells?
12 Q So if I'm understanding you, your choice of	12 A Yes, he will. Yes, he will.
13 wells is intentional, because you want to test the	13 Q Great. And then the next slide, which is
14 reaction of these different thicknesses?	14 slide 100 of 267, is this the same information but for
15 A That is correct, yes.	15 the Severitas well?
16 Q And Dr. Ampomah asked Mr. Comiskey a	16 A Yes. Again, these are these two tables
17 question about the pilot nature of these wells, and it	17 as well as the the map are both components that are
18 seems to me that at least one answer to that question	18 submitted with the C108 application.
19 is that you are trying to go get data from different	19 Q And one thing I wanted to ask you about,
20 reservoir thicknesses to enable Chevron to interpret	20 actually. I'm going to turn back to page 99. Chevron
21 that data?	21 operates wells within the Papa Squirrel AOR; accurate?
22 A That is correct, yes.	22 A That is correct.
23 Q And then move forward with other projects or	
24 not.	24 currently in production within the area of the Papa
25 A Exactly. And it should give us some insight	25 Squirrel well?
Page 90	Page 92
1 about what the opportunities are, you know, moving	1 A That is correct.
2 forward in the future. It's also going to give us	2 Q And is that true for the Severitas well
3 this data in a collaborative way where we can kind of	3 also, which is on page 100?
4 share in with both the OCD as well as other	4 A Yes, it is.
5 operators and and kind of help out with the	5 Q So Chevron, as part of the pilot nature of
6 decision-making process moving forward.	6 this project, you are able to test whether these wells
7 Q Great. Well, we're going to switch gears a	7 impact your "these wells," I mean SWDs impact
8 little bit and turn to a study that he did regarding	8 your existing wells?
9 DMG productivity in the area of the two wells. So I	9 A Correct. We we essentially don't have to
10 am going to switch now to page 99 of the materials.	10 worry about going out and asking another operator to
11 MS. BENNETT: Give everybody a chance	11 to monitor horizontal wells in these areas because
12 to catch up with me. You there?	12 we have some. And we can evaluate those impacts if
13 BY MS. BENNETT:	13 they exist directly.
14 Q So on page 99, can you describe to the	14 Q So you would have both the you manage the
15 commissioners what this exhibit is and your intentions	15 existing production wells, but you'll also be able to
16 behind this exhibit?	16 manage the proposed SWDs?
17 A Yeah, in in this exhibit, this is the	17 A That is correct.
18 the diagram on the right and the the table that's	18 Q And again, I think we might have talked
19 shown are really part of the C108 application. And	19 about this, but there's no DMG wells within the
20 and what I did was just to kind of combine both	20 half-mile radius of the Severitas well; is that right?
21 components that are included in the C108 application	21 A That that is correct.
22 into one slide. It just makes it	22 Q Now I want to turn to a slide you prepared
23 Q And what	
	23 about the drill stem tests, and that's page 107 of
24 MR. FUGE: Give it a second.	24 267. Give everybody a second to catch up there.
24    MR. FUGE: Give it a second.      25    BY MS. BENNETT:      Page 91	

<sup>24 (</sup>Pages 90 - 93)

1 A A drill stem test is a test that's run open	1 sort of a yeah, looking to see if there were
2 hole within a vertical well normally, and which there	2 existing wells, which there weren't any. And then
3 is a packer that is engaged, and a pressure suction on	3 looking to see if you could find any drill stem tests
4 the well that allows oil or any kind of fluids that	4 on the existing wells, which there weren't any within
5 are in the units where the packer isolates in in	5 two or three miles.
6 the well. And it's able to to evaluate both	6 A Right. Correct.
7 pressures as well as the fluid types that come into	7 Q And then you focused then even on the
8 the into the test testing device, the drill stem	8 geology of the area to see what the geology says about
9 test.	9 the presence of DMG and reservoirs in the area?
10 Q And so what does the drill stem test, what	10 A That's correct. So so really
11 kind of data does it provide you or provide Chevron	11 fundamentally both these slides, what we were trying
12 through you?	12 to do to establish was to take a stab at this question
13 A It essentially can indicate to us or any	13 of of, you know, the future reserves. What what
14 operator whether or what kind of potential there is	14 is you know, how can you come up with some sort of
15 for hydrocarbons within the zones that you're testing.	15 assessment on how or whether or not there are future
16 Q And these drill stem tests aren't tests that	16 reserves within the DMG in these areas. And and
17 you undertook though; right? They're existing tests?	17 these were two approaches that we came up with.
18 A These were publicly available drill stem	18 We felt that the drill stem test was the
19 tests. And the way we approach this data gathering	19 preferred way of assessing whether or not existing
20 was to assess, you know, the the large resource of	20 hydrocarbons are in the area. Because when a when
21 public data available in both areas and determine	21 the operator drills a well or looking for oil, you
22 which which drill stem test was conducted within a	22 know, a drill stem test is is a very cheap way to
23 radius of these wells within the the Delaware	23 determine whether or not it's worthwhile running
24 Mountain Group.	24 casing and producing from that zone.
25 Q And so let's just knock out Papa Squirrel	25 And then this second map was really designed
Page 94	Page 96
1 really quickly. You noted that there were no drill	1 to say, "Okay. If I'm an exploration geologist, what
2 stem tests taken in the DMG within two or three miles	2 would I do?" Well, in the previous slide where we had
3 of the Papa Squirrel?	3 stratigraphic units shown within the Bell Canyon and
4 A That's correct, yes.	4 the Cherry Canyon formation, we showed that the
5 Q And so there was no data for you to analyze	5 stratigraphic units seemed to have some sort of
6 there?	6 continuity across all those areas.
7 A There was no data to analyze. Correct.	7 So then the question is, okay. Given the
8 Q So how about for the Severitas? What did	8 fact that you don't have any obvious stratigraphic
9 you find for the Severitas?	9 pinch outs in these areas, then what else would you
10 A In the Severitas well there were there	10 look at? And the solution was, okay. I wanted to
11 were no DSTs within two miles of the Severitas well.	11 take a look at the structure map in both of these
12 We did have two DSTs within two to three miles of the	12 areas, and that's what I did.
13 Severitas well.	13 Because the structure map would define if
14 Q And were those two DSTs the two that you	14 there were no pinch outs of stratigraphy, then you
15 identified here?	15 would have to have some sort of tracking mechanism in
16 A That is correct, yes.	16 addition to that, and that would be structural
17 Q And in your review of the data, what did you	17 closure. And the bottom line in both of these series,
18 glean from the data in terms of DMG productivity in	18 I didn't see them.
19 and around Severitas 2 State SWD Number 1?	19 Q Thanks for that. You know you and I talked
20 A Well, the fact that they were two to three	20 a lot about this because structural closure and
21 miles away told me that that basically there's a	21 trapping is, you know, over my head. But what I
22 low risk of impact production in and around the	22 appreciated about it was that you went you were
23 Severitas well.	23 using actual information to test your theory about the
24 Q Let's turn now to the structure map that you	24 lack of DMG reserves in this area.
25 prepared. And the way I was looking at your was	25 A Yes, I got to be an exploration geologist,
Page 95	Page 97

<sup>25 (</sup>Pages 94 - 97)

1 and yeah so	
1 and yeah, so.	1 what we could tell, given all that, we don't have any
2 Q Yeah. And I really appreciate what you just	2 faults in both areas.
3 said about the drill stem test, because I don't think	3 Q And will one of Chevron's other witnesses
4 before today I actually understood that, that that is	4 today talk about the Lamar limestone and the amount of
5 a mechanism by which operators consider whether it's	5 pressure it would take to break that or the
6 worth it to continue to explore for it's a	6 sufficiency of the Lamar as a containment zone?
7 preliminary step in an exploration for reserves; is	7 A Yes, Bryce Taylor will discuss that further.
8 that right?	8 Q Great. So to summarize, in your opinion is
9 A It's a very cheap preliminary step to make	9 the Papa Squirrel well, does it have the potential to
10 that evaluation, yes.	10 in your opinion and just focusing on the slide and
11 Q And so if that that's incredible. Thank	11 your work with Chevron, does it have the potential in
12 you.	12 your opinion to negatively impact correlative rates?
13 On these, we've talked a lot about traffic	13 A Not in my opinion.
14 in the area. And you know, you ad I talked about an	14 Q And in your opinion, do you think that there
15 inverted bowl. And is that sort of where the	15 is a low likelihood of hydrocarbons in the DMG within
16 hydrocarbons would be trapped such that there could be	16 the AOR of each of these two wells?
17 future reserves in this area? Would that be an	17 A Not in my opinion.
18 indicator of that?	18 Q But it's your opinion that
19 A Yes, that's correct.	19 A It's my opinion that that is correct, yes.
20 Q And did you see anything that would indicate	20 Sorry.
21 the potential of unknown reserves in these two	21 Q That there is a low likelihood?
22 structure maps?	22 A That there is a low likelihood.
23 A No, I did not.	23 Q And that's based on the drill stem tests?
24 Q Did you see any fault in the lower	A The drill stem test coupled with the with
25 containment zone?	25 all the structural closure and the fact that there's
Page 98	Page 100
1 A No. No faults at the at the level of	1 continuity in the stratigraphic units across both
2 Bone Spring limestone. We evaluated seismic data in	2 areas.
3 in both areas and determined that there were no	3 Q And the continuity in the stratigraphic
4 nearby faults within a two-mile radius of of the	4 units, if there was a pinch out, that would be a place
5 Severitas and the Papa Squirrel well.	5 where hydrocarbons could collect?
6 Q How about any faults in an upper containment	6 A That's correct. And the other factor is
7 zone, which is the little Lamar limestone? Were you	7 that we have a number of wells that then drill
8 looking for faults there too?	8 through, you know, in these areas, and we haven't
9 A We did. And the challenge in Lamar kind of	9 today seen any evidence that there's from those
10 touched on the challenge with that, because if you	10 wells that there's potential for for hydrocarbons.
11 remember in the Castile formation where you have	11 Q Not to dwell on the stratigraphic uniformity
12 anhydrite, you also have salt in in these areas.	12 any longer, but I did just think of a really great
13 And there are some problems with depth conversion of	13 analogy for me, which is a stream, and the fish tend
14 the seismic data when you have these velocity changes	14 to gather, you know, in eddies or along the bank or
<ul><li>14 the seismic data when you have these velocity changes</li><li>15 that occur laterally within the section above the zone</li></ul>	15 rocks within a stream. And so if the hydrocarbons are
<ul><li>14 the seismic data when you have these velocity changes</li><li>15 that occur laterally within the section above the zone</li><li>16 that you're trying to map.</li></ul>	<ul><li>15 rocks within a stream. And so if the hydrocarbons are</li><li>16 fish, we're looking for some anomalies in the stream</li></ul>
<ul> <li>14 the seismic data when you have these velocity changes</li> <li>15 that occur laterally within the section above the zone</li> <li>16 that you're trying to map.</li> <li>17 The zone we're trying to map is determined</li> </ul>	<ul><li>15 rocks within a stream. And so if the hydrocarbons are</li><li>16 fish, we're looking for some anomalies in the stream</li><li>17 where they might gather and enjoy their day when we go</li></ul>
<ul> <li>14 the seismic data when you have these velocity changes</li> <li>15 that occur laterally within the section above the zone</li> <li>16 that you're trying to map.</li> <li>17 The zone we're trying to map is determined</li> <li>18 it's really the Lamar limestone. Do we see faults</li> </ul>	<ul><li>15 rocks within a stream. And so if the hydrocarbons are</li><li>16 fish, we're looking for some anomalies in the stream</li><li>17 where they might gather and enjoy their day when we go</li><li>18 fishing?</li></ul>
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## 26 (Pages 98 - 101)

1	MS. BENNETT: Thank you very much.		accurate assessments of frac gradients in these two
$\begin{vmatrix} 2 \\ 2 \end{vmatrix}$	And with that, I would move the		wells.
1	admission of Exhibits A and B, which are the	3	Q Thank you. And bear with me. Likewise, I'm
	applications and the included C108s. And I would also		not a geologist. So when you are done with the DFIT,
	move admission of the slides numbered 98 through 108.		when the lower zone is cemented off, how are you going
6	MR. FUGE: Any objections?		to be able to tell whether injected produced water in
7	They're admitted.		the higher zone migrated down to the Brushy to the
8	(Exhibit A, Exhibit B, and Exhibit 98		Brushy Canyon?
9	through Exhibit 108 were marked for	9	A We should have some indication with the
10	identification and admitted into		analysis of the data. So the data should tell us
11	evidence.)		something about frac gradients and whether they
12	MS. BENNETT: Thank you.		linearly increase with depth or if there is a
13	MR. FUGE: Mr. Tremaine, do you have		reversal. So there should be a theoretical indication
14	any questions for the witness.		before, you know, any migration fluid occurs, it
15	MR. TREMAINE: I do have some		but it will tell us about the possibility.
	questions. Thank you, Mr. Chair.	16	Q So you're going to see it before or as it
17	EXAMINATION		happens rather than after the fact?
	BY MR. TREMAINE:	18	A It's we're going to yes, correct.
19	Q Mr. Merrifield, I'm hoping to clarify a		It's it's really part of the data analysis. Now,
	response that you provided to Ms. Bennett. You used		mind you, the you know, after we collect the data,
	very specific language when you were talking about the		we're going to start injecting. Okay. There's going
1	produced water injection. I believe what you said was		to before any any potential migration were to
1	Chevron was not targeting the Brushy Canyon for		move into the Brushy, it would have to collect some
1	produced water injection. Is that correct?		sort of threshold pressure and volume that we've
25	A That is correct, yes. Page 102	25	injected into the Bell and Cherry before we see any Page 104
	rage 102		rage 104
1	Q Is it Chevron's expectation that produced		injection of migration downward into the Brushy. So I
2	water that is targeted to be injected into the Bell or	2	think there's going to be time where we would
2 3	water that is targeted to be injected into the Bell or the Cherry Canyon, will a communicator migrate down to	2 3	think there's going to be time where we would determine could determine from a theoretical
2 3 4	water that is targeted to be injected into the Bell or the Cherry Canyon, will a communicator migrate down to the Brushy Canyon?	2 3 4	think there's going to be time where we would determine could determine from a theoretical standpoint that's a possibility or know it's probably
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<sup>27 (</sup>Pages 102 - 105)

1 was a problem at any other operators?	1 MR. MERRIFIELD: Okay. This is a
2 A No.	2 this is one of the abandoned ones.
3 MR. TREMAINE: No further questions.	3 DR. AMPOMAH: Yeah, one of them.
4 MR. FUGE: Ms. Hardy?	4 MR. MERRIFIELD: I remember this.
5 MS. HARDY: I do have a couple of	5 Yeah.
6 questions.	6 DR. AMPOMAH: So looking at this, how
7 MR. FUGE: If you could just come up,	7 they proceed it, do you believe that it was plugged in
8 it will make it easier to hear.	8 a good way to prevent any potential complication with
9 MS. BENNETT: I can switch too if you	9 the oil breaching?
10 want.	10 MR. MERRIFIELD: So I don't recall the
11 MS. HARDY: That would be great. Thank	11 exact date. I'm looking at the way that they plugged
12 you.	12 this well. It's an it's an older plugging
13This will be quick. Sorry.	13 approach. And and the reason I know that is
14 EXAMINATION	14 because they use kind of these intermittent cement
15 BY MS. HARDY:	15 plug and then match
16 Q Mr. Merrifield, I just have a couple	16 And then it that is a standard
17 questions for you. With respect to your well bore	17 approach back in the kind of the 70s or the 80s and
18 diagram that we were looking at, which was page 101	18 sometimes even into the 90s depending on what state
19 using the file page number, you had discussed with	19 you're in. They they will still allow. Today,
20 Ms. Bennett the DFIT test and how they will impact or	20 that's not, you know, the best way to do it, but it
21 how they will be performed at Brushy Canyon.	21 was acceptable at that day and time.
22 A Yes.	22 Now, having said that, we were talking
23 Q Will the Brushy Canyon DFIT be performed	23 about mud slurry. That's usually a thick slurry
24 only in the open-hole section?	24 usually. So it's it is still So yes, I it
25 A It will not be performed in the open-hole	25 is an approved approach, but historically, I think,
Page 106	Page 108
1 section. And and maybe that was not clear. It	1 you know, that there's historical context.
2 it will DFITs, the diagnostic fracture injection	2 DR. AMPOMAH: So it's still workable?
3 test will be done through case toll. And that's	3 MR. MERRIFIELD: It's still what?
4 one of the advantages of doing that is that the	4 DR. AMPOMAH: Is it workable? Like you
5 chances of success are greatly enhanced when you have	5 believe there should be some sort of highlight on this
6 packers that are actually in contact with	6 particular well?
7 Q Then looking at your slide 108, which is the	7 MR. MERRIFIELD: All I'm saying is that
8 structure map, what is the contour interval on those	8 it's it's not the standard practice. But bentonite
9 maps?	9 is a very impermeable material. When it's mixed with
10 A I think it's 100. It could be 50 feet.	10 mud, basically the mud portion of that well as well as
11 It's 100 or 50 for sure.	11 the cement portion are considered impermeable barriers
12 Q 100 or 50?	12 within that well.
13 A Yes.	13 DR. AMPOMAH: So let's talk a little
14 Q Is it correct the down dip is to the right?	14 bit about
15 A It is correct.	15 MR. MERRIFIELD: Did that answer your
16 MS. HARDY: Those are my questions.	16 question?
17 MR. FUGE: Dr. Ampomah, do you have any	DR. AMPOMAH: Yeah. I'm sure OCD knows
18 questions for the witness?	18 more to make sure that there will be no problem with
DR. AMPOMAH: Yes, I do. So let's go	19 that. And I just wanted to know that. On page 10 of
20 over the C108.	20 the C108 1B application.
21 MR. MERRIFIELD: Okay.	21 MR. MERRIFIELD: Okay.
22 DR. AMPOMAH: So on page 23.	22 DR. AMPOMAH: So you have on saying
23 MR. MERRIFIELD: Okay.	23 Brushy Canyon is included as a potentially the
24 DR. AMPOMAH: You show the schematic of	24 Brushy is not intentionally targeted for injection.
25 the well.	25 Now, but you're also going to do a DFIT in this
Page 107	Page 109

28 (Pages 106 - 109)

	project; right?		coming back to fill it out? You know, so that is my
2	MR. MERRIFIELD: Correct. That's		concern.
	that's the key point.	3	MR. MERRIFIELD: Yeah. So the reason
4	DR. AMPOMAH: So I just want to know is		why we have to I think I understand where you're
	there no any other alternative? Other than more like		coming from is we actually have or are forced into
	bridging the Brushy Canyon, knowing very well that you		injecting into the formation.
1	are not going to do any injection. So is there any	7	So we actually have to cut a hole
1	other alternative to collect the data that you're		through casing and inject into the formation and
1	looking for without actually performing the DFIT in		monitor the pressure buildup and decline in order to
	this position?		gather this datapoint that's going to be used as a
11	MR. MERRIFIELD: The purpose of the		calibration point. There's no other way to do it from
	DFIT and is to really calibrate the interpretation		my standpoint. I don't I don't know of any other
	of the frac gradients that are determined from loss.		way to do it. You could do it open hole.
	And the only way that you can do that is by having	14	DR. AMPOMAH: Mini-frac, yeah.
	some type of injection test. A DFIT in my opinion is	15	MR. MERRIFIELD: But it but what I'm
	the best approach to get the most accurate and and		saying is the chance of success with the mini-frac of
	best chance at getting data than any other data that	17	getting the data is about 40 percent. Okay. And
	you can do.		and with this, it's about 95 percent.
19	But all the data that you can in	19	DR. AMPOMAH: So, like, 104 actually?
1	order to to calculate the frac gradients, you have	20	MR. MERRIFIELD: Yeah. Yeah.
	to you have to have some sort of injection test.	21	DR. AMPOMAH: So page 104 on the
1	And and Bryce will touch on this a little bit		application. I want to know how many wells you used
1	later, but he what he'll show is, you know, what		in analyzing the petrophysics to obtain results.
	the pressure buildup looks like and what it comes back	24	MR. MERRIFIELD: Okay. Yeah. And so
25	down to and and what part of the curve you actually Page 110	25	the the amount of wells, I don't have that number Page 112
	1420 110		1 4ge 112
	have to measure in order to assess, you know, what the		in hand. But the we had probably on the order of
2	frac closure stress or fracture is when you when	2	at least a hundred datapoints to create that map
2 3	frac closure stress or fracture is when you when you run that test.	2 3	at least a hundred datapoints to create that map that's on that's color-coded on the righthand side
2 3 4	frac closure stress or fracture is when you when you run that test. DR. AMPOMAH: So are you saying that	2 3 4	at least a hundred datapoints to create that map that's on that's color-coded on the righthand side right there. At least a hundred. Maybe 200. Maybe
2 3 4 5	frac closure stress or fracture is when you when you run that test. DR. AMPOMAH: So are you saying that let's say the DFIT that you're going to do in this	2 3 4 5	at least a hundred datapoints to create that map that's on that's color-coded on the righthand side right there. At least a hundred. Maybe 200. Maybe 500 to create do you want me to point at it?
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7       clarify that.         8       MR. MERRIFIELD: We - we did have that       8         8       MR. MERRIFIELD: We - we did have that       8         9       more of our initial evaluations of all the       9         10       because of - the coring I think ended up being a       11         11       because of - the coring I think ended up being a       11         13       would add as much value as the cost, and it was really       13         14       just o - when we evaluate all the different       14       DR. AMPOMAH: Because I was totally         15       surveillances that we were going to do, we just felt       16       MR. MERRIFIELD: No, valid question.         16       That sail.       10       DR. AMPOMAH: I do have further         18       DR. AMPOMAH: Seat how what.       18       questions. So how in your application you showed on a         19       priority. That's all.       10       correlations. But I don't see that on the side, so I         21       priority. That's all.       21       door - base, you know, but is stat to the well         23       bow Pinon water formation was, had it done just       23       door us sissmicity and showing that is - really has to         24       relying on no map relation, no -       24       MR. MERRIFIELD: The - the question	5 get the actual call because you want to build a	5 subsurface 2DD.
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	25 that to you, the well correlation that you have on	25 there are multiple options that you can run. You see
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	where under any given seismic faults, anything. So	1	MR. BLOOM: And do you do any extra
2	I'm just asking just a normal interpretation. Did you	2	sort of particular monitoring of those wells in your
3	go further to use attributes?	3	proposal?
4	MR. MERRIFIELD: We yeah. And the	4	MR. COMISKEY: I'll have to defer that
	person that did this actually looked at a couple of		to someone later, I think. Surveillance plan.
	different ways of looking at the data, but it it	6	MS. BENNETT: Mr. Comiskey will be
	boiled down to one fundamental criteria, how you		discussing the data and monitoring plan in detail.
	define fault using seismic data.	8	MR. BLOOM: Yeah, I was interested in
9	And that there it's a very	9	2
	traditional way of looking at it, and that is if you	10	And then I don't know if this would be
	really need to be able to define separation of		a question for you or perhaps someone else well. But
	stratigraphic units across a discontinuity that can be		regarding the location of the Severitas well, looks
	seen at the scale of the observation that you're	13	like that's in the SCADA. That's the state federal
	making.		unit.
15	'Cause it's that discontinuity between	15	MR. COMISKEY: Yes, it is.
	two horizons across some plan of discontinuity, which	16	MR. BLOOM: Yeah. I don't know if that
	is defined as a fault, where you actually see		unit's formations include the salt water disposal
	separation of layers. So he was really looking for		target formations. Do you know?
	that characteristic to define a fault.	19	MR. COMISKEY: So this is within the
20	MS. BENNETT: And I don't mean to		SCADA unit. This well is actually going to be located
	interrupt here, but Mr. Comiskey will also be able to		on State Land Office land. And it's it's from
	address some of the questions on seismicity if that's		from our assessment land assessment of this, we
23	useful for you later today as well.		we have the right to inject into the DMG, if that's
24	DR. AMPOMAH: Yeah, I was mostly		your question.
25	talking about the seismic interpretation, not	25	MR. BLOOM: That's where I was going.
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1	seismicity. I know that one. Yeah.	1	Yes. And similarly if you move that, I think there
2	Can you talk a little bit about the	2	was a mention of a micro-move of a couple hundred
3	stimulation? Do you plan to do stimulation in this	3	feet?
4	well?	4	MR. COMISKEY: Mm-hmm.
5	MR. MERRIFIELD: After we complete the	5	MR. BLOOM: You'd still be on State
6	well, after we drill the well and then we run casing	6	Trust Land?
7	and then we perforate the casing and then we set the	7	MR. COMISKEY: Yes. Yes.
	tubing in the packer in the well and we put a well	8	MR. BLOOM: You may want to check with
9	head on it, we will conduct an acid job.		the Land Office and see if that unit actually includes
10	And that really is to clean out, you	10	the DMG formation. And I believe have you filed
	know, the perforations, clean out anything near well	11	that application for the easement yet, salt water
12	bore so that when we actually go in and and inject	12	easement with the Land Office?
13	into the formation that we know that the the	13	MR. COMISKEY: I don't know if we have
	formation is as clean as possible and the near well	14	or not to be honest. Well, but I but I will tell
15	bore is as clean as possible to enhance injectivity.	15	you this. The person that is evaluating that is
16	So that's going to be, you know, the primary reason	16	actually over at the State Land Office right now
17	for doing an acid job. And by when we say	17	having a discussion with them about some some
18	stimulation, an acid job is a form of stimulation.	18	things.
19	DR. AMPOMAH: Thank you.	19	And I know that that the question
20	MR. FUGE: Mr. Bloom?	20	that you're asking is is something that and he
21	MR. BLOOM: Yeah, just a couple quick	21	he's aware of both locations. I've been having
22	questions about the location and some of the wells.	22	these these ongoing discussions with him about this
23	You mentioned I think with respect to the Severitas	23	and and he understands fully the need to have the
	well that there were three nearby Bone Springs wells?		-
25	MR. COMISKEY: Yes.		DMG on either location.
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31 (Pages 118 - 121)

1       MR. BLOOM: Yeah. Thank you. And you?       1       A Jason Parizek.         2 know, that might be a slite bit beyond the scope of 2       2       Who dy one work for Mr. Parizek?         3       A Chevron.       4       Q How long have you work for Mr. Parizek?         5       MR. COMISKEY: Exactly.       5       A Lot over tem yeams.         6       MS. BENNETT: Thank you.       6       Q and if you could for the Commission just         7       MR. BLOOM: Yeah. Thank you.       6       Q And if you could for the Commission just         9       MR. FUGE: And I've got no questions       10       A Yes. Stattand off working in San Jaquin         11       So you may be excused.       11       Valey, California, as an acid development geologist.         12       MR. MERRIFELD. Thank you.       13       of both horizontal and vertical well bores.         14       Mr. Chair, I did want to - and I       14       Following that I went out to a field office         15       should have been - well, I don't need to with       13       of both horizontal and vertical well bores.         16       MR. FUGE: Okay.       10       and estabhiling reservoir management and surveillance         16       MR. FUGE: Mak we and resurveit with seas will be       2       20 working the Permina Baán. I started of working in <td< th=""><th></th><th></th></td<>		
3       A. Chevron.         4       practicalities there so.       4         5       MR. COMISKEY: Exactly.       5         6       MS. BENNETT: Thank you.       7         7       MR. BLOOM: Yeah. Thank you for the       8         8       presentation. No further questions.       9         9       MR. FUGE: And I've got no questions       9         10       for the winness.       9         11       So you may be excussed.       11         12       MR. MERRIFIELD: Thank you.       12         13       MS. BENNETT: Thank you.       13         14       Mr. Chair, I did want to - and I       14         15       should have beer - well. J down the or and I       14         15       should have beer - well. J down the or and I       14         16       Mr. Comiskey. But with Mr. Merrifield, I would like I       15         17       reserve the right to call him for a rebuttal       17       and stabilishing reservoir management and surveillance         18       wincesi in cressmay       19       water injection projects. I was also responsible for         20       oreserve the right to call him for a rebuttal       12       and brainsing and planning side tracks of both veretial         21	1 MR. BLOOM: Yeah. Thank you. And you	1 A Jason Parizek.
4       0       How long have you worked for Chevron?         5       MR. COMISKEY: Exactly.       5       A Just over two years.         6       MS. BENNETT: Thank you.       7       Ware Disposibilities for any         9       MR. FUGE: And I've got no questions       9       jobs with Chevron during that period?         10       for the witness.       9       jobs with Chevron during that period?         11       So you may be excused.       11       Valley, California, as an acid development geologist.         12       MR. MERIFIELD: Thank you.       13       of both horizontal and vertical well bores.         14       Mr. Chair, I did want to - and I       14       Following that, I vent out to a field office         15       should have been - well, I don't need to with       16       for chaining reservoir management and surveillance         16       Mr. Comiskey. But with Mr. Merrifield. I would like       17       ordestails also responsibilities for any         19       MR. FUGE: Cokay.       18       programs for both a sour gas disposal projects. I was also responsible for         20       MS. BENNETT: Thank you.       20       overseeing and planning side tracks of both vertical         21       MR. FUGE: Make sure I'ver e-initiated       12       and brizontal wells.         22       108 If	2 know, that might be a little bit beyond the scope of	2 Q Who do you work for, Mr. Parizek?
5       MR. COMISKEY: Exactly.       5       A Just over ten years.         6       MS. BENNETT: Thank you.       6       Q And if you could for the Commission just [7] were shorthand background with regard to the service of		3 A Chevron.
6       MS. BENNETT: Thank you,       6       Q And if you could for the Commission just         7       MR. BLOOM: Yeah. Thank you for the       7 give a shorthand background with regard to the         8       presentation. No further questions.       9 jobs with Chevron during that period?         10       for the witness.       9 jobs with Chevron during that period?         11       So you may be excused.       11 Valley, California, as an acid development geologist.         12       MR. MERTFIELD: Thank you.       13 of both horizontal and vertical well bores.         14       Mr. Chair, I did want to - and I       14         15       should have been - well, I don't need to with       16 technical team. Duries in that role were setting up         17       to reserve the right to call him for a rebuttal       17 and establishing reservoir management and surveillance         18       WR. FUGE: Okay.       19 water injection projects. I was also responsible for         20       MS. BENNETT: Thank you.       20 overseeing and planning side tracks of both vertical         21       m. A. Type: A we adjourn for a relatively       21 and horizontal wells.         22       Time, Huffer.       12 and horizontal wells.         23       relatively long. I say we adjourn for a relatively       23 working the permiance bavement wells.         24 therecording. Good.	1	4 Q How long have you worked for Chevron?
7       MR. BLOOM: Yeah. Thank you for the presentation. No further questions.       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       for the witness.       10 A Yes. I started off working in San Joaquin 11 Valley, California, as an acid development geologist.         12       MR. MERRIFIELD: Thank you.       10 A Yes. I started off working in San Joaquin 11 Valley, California, as an acid development geologist.         13       MS. BEINNETT: Thank you.       13 of both horizontal and vertical well bores.         14       Mr. Churi, I did want to - and I       14 Following that, I went out to a field want to - 10 for creative the right to call him for a rebuttal       15 working with the production operations group on         16       Mr. Comiskey. But with Mr. Merrifield, I would like 17 to reserve the right to call him for a rebuttal       19 water injection projects. I was also responsible for 20 overseeing and planning side tracks of both vertical 21 and horizontal wells.         22       MR. FUGE: Ukay.       21 and horizontal wells.         23 relatively long. I say we adjourn for a relatively 24 brief-ish lunch break and resume at 12:45.       22 working the Pernian Basin. I started off working in 24 the recording.         24       MR. FUGE: Make sure I've re-initiated 1 the recording. Good.       1 some of our deep disposal wells, looking at different 2 the recording.         25       MS. BEINNETT: Thank you very much. And 6 Mr. DEBrine is going to handle the next t	-	5 A Just over ten years.
8       presentation. No further questions.       9       evolution of your duties and responsibilities for any         9       MR. PUGE: And I've got no questions.       9       jobs with Chevron during that period?         11       So you may be excused.       11       Values, California, as an acid development geologist.         12       MR. MERRIFIELD: Thank you.       13       of both horizontal and vertical well bores.         14       Mr. Chair, I did want to – and I       14       Following that, I went out to a field office         15       should have been - well, I don't need to with       16       for chowing with the production operations group on         16       Mr. Chair, I did want to – and I       14       Following that, I went out to a field office         19       MR. FUGE: Okay.       19       water injection projects. I was also responsible for         20       MS. BENNETT: Thank you.       20       oversering and planning side tracks of both vertical         21       MR. FUGE: I think in the interest of       21       and horizontal and vertical       23         21       MR. FUGE: Make sure I've re-initiated       23       sorking the Permian Basin. I started off working in         23       their keever and yo have you call       4       overse wome technology project such as gas         3       Tohink were ready to	•	
9       MR. FUGE: And I've got no questions       9 jobs with Chevron during that period?         10       for the witness.       10       A Yes. I started off working in Saloquin         11       So you may be excused.       11       Valley, California, as an acid development geologist.         12       MR. MERRIFIELD: Thank you.       13       d'hoth horizontal and vertical well bores.         14       Mr. Chair, I did want o - and I       14       Following that, I went out to a field office         15       should have been well, I don't need to with       15       working with the production operations group on         16       Mr. Comiskey. But with Mr. Merrifield, I would like       16 technical team. Duties in that role were setting up         17       to reserve the right to call him for a rebuttal       17 and establishing reservoir management and survellace         18       witness if necessary.       19       NR. FUGE: Okay.       19       vater injection projects. I was also responsible for         20       MS. BENNETT: Thank you.       20       oressering and planning ind tracks of both vertical         21       ink, FUGE: Okay.       21       and horizontal wells.       13 arc frac project hat we conducting in beasin and         23       relatively long. I say we adjourn for a relatively       23       working the Permina Basin. I staret of off working in a set set	-	
10       for the witness.       10       A Yes. I started off working in San Joaquin         11       So you may be excused.       11       Valley, California, as an acid development geologist.         13       MS. MERRIFIELD: Thank you.       13       of both horizontal and versiceing execution         13       MS. BENNETT: Thank you.       14       Following that, I went out to a field office         15       should have been well, I don'n reed to with       16       technical team. Duties in that role were setting up         17       to reserve the right to call him for a rebuttal       18       programs for both a sour gas disposal project and         19       MR. FUGE: Okay.       19       water injection projects. I was also responsible for         20       MS. BENNETT: Thank you.       20       overseeing and planning side tracks of both vertical         21       MR. FUGE: Okay.       19       water injection projects. I was also responsible for         22       ind horizontal wells.       22       2018 I moved out pto Milland, Texas         23       relatively long. I say we adjourn for a relatively       21       and horizontal wells.         24       brief sin hunch break and resume at 12:45.       24       the production office group as a technical team         25       (Off the record.)       Page 124       1	1	
11       So you may be excused.       11       Valley, California, as an acid development gologist.         12       MR. MERRIFIELD: Thank you.       12       My duites there were planning and oversceing execution         13       MS. BENNETT: Thank you.       13       of Soth horizontal and vertical well hores.         14       Mr. Chair, I did want to - and I       14       Following that, I went out to a field office         15       should have been - well, I don't need to with       15       working with the production operations group on         16       Mr. Chair, I did want to - and I       14       Following that, I went out to a field office         17       to reserve the right to call him for a rebuttal       15       working with the production operations group on         18       Witness if necessary.       19       MR. FUGE: Okay.       19       water injection projects. I was also responsible for         20       MS. BENNETT: Thank you.       20       overseeing and planing side tracks of both vertical         21       MR. FUGE: Okay.       21       and horizontal wells.       22       2018 I moved out up to Midland, Texas         23       relatively long. I say we adjourn for a relatively       23       working the Permian Basin. I started off working in         24       brief-ish lunch break and resume at 12:45.       24       br	U 1	
12       MR. MERRIFIELD: Thank you.       12 My duties there were planning and overseeing execution         13       MS. BENNETT: Thank you.       13 of both horizontal and vertical well bores.         14       Mr. Chair, I did want to - and I       13 of both horizontal and vertical well bores.         15       should have been - well, I don't need to with       14 of both norizontal and vertical well bores.         16       Mr. Comiskey. But with Mr. Merrifield, I would like       15 working with the production operations group on         16       Mr. Comiskey. But with Mr. Merrifield, I would like       16 technical team. Duties in thar ole were setting up         17       to reserve the right to call him for a rebuttal       17 and establishing reservoir management and surveillance         18       witness       17 and establishing reservoir management and surveillance         20       MR. FUGE: Okay.       19 water injection projects. I was also responsible for         21       md. FUGE: Make sure I've re-initiated       1 and horizontal wells.         24       brief-ish lunch break and resume at 12:45.       24 the production office group as a technical team         25       (Off the record.)       2 performance between the wells. I was responsible for         3       I think we're ready to have you call       1 some of our deep disposal wells, tooking at different         4 port next witness.       6 Th		10 A Yes. I started off working in San Joaquin
13       MS. BENNETT: Thank you.       13       of both horizontal and vertical well bores.         14       Mr. Chair, I did want to and I       14       Following that, I went out to a field office         15       should have been well, I don't need to with       15       working with the production operations group on         16       Mr. Comiskey. But with Mr. Merrifield, I would like       16       reserve the right to call him for a rebuttal         18       witness if neccessary.       19       MR. FUGE: I think in the interest of       19       water injection projects. I was also responsible for         20       MS. BENNETT: Thank you.       20       overseeing and planning side tracks of both vertical         21       MR. FUGE: I think in the interest of       21       and horizontal wells.       22       21       and horizontal wells.         22       time, and I think wate neary with exam       12.45.       22       2018 I moved out up to Midland, Texas         23       relatively long. I say we adjourn for a relatively       24       the production office group as a technical team         25       (Off the record.)       22       2018 I moved out up to Midland, Texas         24       the production office group as a technical team       25         25       project satt       wersaw some technology projects such as as		11 Valley, California, as an acid development geologist.
14       Mr. Chair, I did want to - and I       14       Following that, I went out to a field office         15       should have been well, I don't need to with       15         16       Mr. Comiskey. But with Mr. Merrifield, I would like       16         17       to reserve the right to call him for a rebuttal       17         18       witness if necessary.       18         20       MS. BENNETT: Thank you.       20         21       MR. FUGE: Okay.       20         23       relatively long. I say we adjourn for a relatively       24         24       brief-ish lunch break and resume at 12:45.       22         25       (Off the record.)       Page 122         26       (Off the record.)       Page 122         27       MR. FUGE: Make sure I've re-initiated       2       1 some of our deep disposal wells, looking at different         2       the recording. Good.       3 a re-frac project that we conducted in the basin and         3       your next witness.       6       Tracurently working as a development         4       your next witness.       6       Tracurently working as a development         5       MS. BENNETT: Thank you very much. And       6       Tracurently working as a development         6       Mr. FUGE: Cokay.		
15       should have been well, I don't need to with       15       with Comiskey, But with Mr, Merrifield, I would like         16       Mr, Comiskey, But with Mr, Merrifield, I would like       16       technical team. Duties in that role were setting up         17       to reserve the right to call him for a rebuttal       17       and stabilishing reservoir management and surveillance         18       witness; if necessary.       18       programs for both a sour gas disposal project and         19       MR, FUGE: I think in the interest of       20       overseeing and planning side tracks of both vertical         21       MR, FUGE: I think in the interest of       20       overseeing and planning side tracks of both vertical         22       time, and I think that the next witness will be       22       2018 I moved out up to Midland, Texas         23       relatively long. I say we adjourn for a relatively       23       working the Permian Basin. I starde off working in         24       brief-ish lunch break and resume at 12:45.       23       geologist. Duties on that team involved evaluating         25       (Off the record.)       29       Page 122       Page 122         14       MR. FUGE: Make sure I've re-initiated       1       some our deep disposal wells, looking at different         2       ther recording. Good.       3       a cr-frac project that we co	5	
16       Mr. Comiskey. But with Mr. Merrifield, I would like       16       technical team. Duties in that role were setting up         17       to reserve the right to call him for a rebuttal       17       and establishing reservoir management and surveillance         18       witness if necessary.       18       programs for both a sour gas disposal project and         19       MR. FUGE: Okay.       19       water injection projects. I was also responsible for         20       MS. BENNETT: Thank you.       20       overseeing and planning side tracks of both vertical         21       ine. and I think that he next witness will be       22       2018 I moved out up to Midland, Texas         23       relatively long. I say we adjourn for a relatively       24       the production office group as a technical team         24       brief-ish lunch break and resume at 12:45.       24       the groduction office group as a technical team         25       (Off the record.)       25       geologist. Duties on that tean involved evaluating         24       there ready to have you call       1       sour est witness.         3       I think we're ready to have you call       1       sour est witness.         4       your next witness.       7       MR. FUGE: Cokay.       5         8       MR. DEBRINE: Good aftermoon,       8 <td< td=""><td></td><td>-</td></td<>		-
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19       MR. FUGE: Okay.       19 water injection projects. I was also responsible for         20       MS. BENNETT: Thank you.       20 overseeing and planning side tracks of both vertical         21       MR. FUGE: I think in the interest of       21 and horizontal wells.         23 relatively long. I say we adjourn for a relatively       21 and horizontal wells.       22 ours an over dout up to Midland, Texas         23       relatively long. I say we adjourn for a relatively       23 working the Permian Basin. I started off working in         24       brief-ish lunch break and resume at 12:45.       23       2018 I moved out up to Midland, Texas         25       (Off the record.)       24       the production office group as a technical team         25       (Off the record.)       29 geologist. Duties on that team involved evaluating         4       the recording. Good.       3 a re-frae project that we conducted in the basin and         4       your next witness.       5       reinjection.         5       MS. BENNETT: Thank you very much. And       6       I'm currently working as a development         7       MR. FUGE: Can lask the outr reporter       3       a chorizontal wells.         10       Chevron would like to call its next       10       Q could you give a brief summary of your         11       witness. Jason Parizek.       12	_	
20       MS. BENNETT: Thank you.       20       overseeing and planning side tracks of both vertical         21       MR. FUGE: I think in the interest of       21       and horizontal wells.         22       20 overseeing and planning side tracks of both vertical         23       relatively long. I say we adjourn for a relatively       24         24       brief-ish lunch break and resume at 12:45.       23         25       (Off the record.)       Page 122         1       MR. FUGE: Make sure I've re-initiated       1         2       the recording. Good.       3         3       I think we're ready to have you call       3         4       your next witness.       4         5       MS. BENNETT: Thank you very much. And       6         6       Mr. DeBrine is going to handle the next two witnesses.       7         7       MR. FUGE: Ckay.       7         8       MR. DEBRINE: Good afternoon,       9         9       Mr. Chair.       10       Q Could you give a brief summary of your         11       witness, Jason Parizek.       11       educational background?         12       A I have a master or a bachelor's degree, a       13         13       to swear in Mr. Parizek please?       13       Bachelor's	-	
21       MR. FUGE: I think in the interest of       21       and horizontal wells.         22       time, and I think that the next witness will be       23       relatively long. I say we adjourn for a relatively         23       tref-ish lunch break and resume at 12:45.       2018 I moved out up to Midland, Texas         25       (Off the record.)       Page 122         1       MR. FUGE: Make sure I've re-initiated       1       some of our deep disposal wells, looking at different         2       the recording. Good.       3       a re-frac project that we conducted in the basin and         4       your next witness.       5       relignetic project such as gas         5       MS. BENNETT: Thank you very much. And       6       Th currently working as a development         7       MR. FUGE: Okay.       7       geologist in New Mexico. Have responsibilities in         8       MR. DEBRINE: Good afternoon,       9       of horizontal wells.         10       Chevron would like to call its next       10       Q       Could you give a brief summary of your         11       witness, Jason Parizek.       11       educational background?       12       A       I have a master or a bachelor's degree, a         13       to swear in Mr. FUGE: Cha J ask the court reporter       12       A       I have a custer ore	5	
22time, and I think that the next witness will be 23222018 I moved out up to Midland, Texas 2323relatively long. I say we adjourn for a relatively 2423working the Permian Basin. I started off working in 2424brief-ish lunch break and resume at 12:45. 25(Off the record.) Page 122241MR. FUGE: Make sure I've re-initiated 2 the recording. Good.1some of our deep disposal wells, looking at different 2 performance between the wells. I was responsible for 3 a I think we're ready to have you call 4 your next witness.1some 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 gas5MS. BENNETT: Thank you very much. And 4 mr. Burize in No. Berine is going to handle the next two witnesses. 76Tm 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.10Chevron would like to call its next 11uitness, Jason Parizek.10QCould you give a brief summary of your11witness, Jason Parizek.11Graduated summa cum laude. And a master's degree from 15 sand.15San Diego State University.14THE REPORTER: Please raise your right 15 hand.16Graduated summa cum laude. And a master's degree from 15 sand.1516WHEREUPON, 19 to tell the truth, was examined and testified as follows: 19 to tell the truth, was examined and nething but 10 thetruth, was examined and nethin	5	
23       relatively long. I say we adjourn for a relatively       23       working the Permian Basin. I started off working in         24       brief-ish lunch break and resume at 12:45.       24       the production office group as a technical team         25       (Off the record.)       Page 122       Page 122         1       MR. FUGE: Make sure I've re-initiated       1       some of our deep disposal wells, looking at different         2       the recording. Good.       3       a re-frac project that we conducted in the basin and         4       your next witness.       4       oversaw some technology projects such as gas         5       MS. BENNETT: Thank you very much. And       6       Tm currently working as a development         7       MR. FUGE: Okay.       7       geologist in New Mexico. Have responsibilities in         8       MR. DEBRINE: Good afternoon,       9       of horizontal wells.         9       Mr. Chair.       10       Q       Could you give a brief summary of your         11       witness, Jason Parizek.       11       educational background?         12       MR. FUGE: Can I ask the court reporter       12       A       I have a master or a bachelor's degree, a         13       to sovear in Mr. Parizek please?       13       Bachelor's in Science from San Diego State University.		
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25       (Off the record.)       25       geologist. Duties on that team involved evaluating       Page 122         1       MR. FUGE: Make sure I've re-initiated       1       some of our deep disposal wells, looking at different         2       the recording. Good.       3       a re-frac project that we conducted in the basin and         4       your next witness.       3       a re-frac project that we conducted in the basin and         4       your next witness.       5       recording. Good.         5       MS. BENNETT: Thank you very much. And       6       The currently working as a development         7       MR. FUGE: Okay.       7       geologist in New Mexico. Have responsibilities in         8       MR. DEBRINE: Good afternoon,       9       of horizontal wells.       1         9       Mr. Chair.       9       of horizontal wells.       10         10       Chevron would like to call its next       10       Q       Could you give a brief summary of your         11       witness, Jason Parizek.       11       educational background?       12       A       I have a master or a bachelor's degree, a         13       to swear in Mr. Parizek please?       13       Bachelor's in Science from San Diego State University.       14         6       WHEREUPON,       16 </td <td></td> <td></td>		
Page 122Page 1221MR, FUGE: Make sure I've re-initiated1 some of our deep disposal wells, looking at different2 the recording. Good.2 performance between the wells. I was responsible for3I think we're ready to have you call3 a re-frac project that we conducted in the basin and4 your next witness.4 oversaw some technology projects such as gas5MS, BENNETT: Thank you very much. And5 reinjection.6Mr. DeBrine is going to handle the next two witnesses.6 Trn currently working as a development7MR. FUGE: Okay.7 geologist in New Mexico. Have responsibilities in8MR. DEBRINE: Good afternoon,8 that role involved planning and overseeing execution9Mr. Chair.9 of horizontal wells.10Chevron would like to call its next10Q Could you give a brief summary of your11witness, Jason Parizek.11 educational background?12MR. FUGE: Can I ask the court reporter12 A I have a master or a bachelor's degree, a13 to swear in Mr. Parizek please?13 Bachelor's in Science from San Diego State University.14THE REPORTER: Please raise your right14 Graduated summa cum laude. And a master's degree from15 hand.15 geological sciences.1717JASON PARIZEK,17Q Have you previously specified before the New18called as a witness and having been first duly sworn18 Mexico Oil Conservation Commission or Division?19 to tell the truth, the whole truth, and nothing but19A I have testified before the Division in		24 the production office group as a technical team
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32 (Pages 122 - 125)

1	MR. FUGE: So tendered.		of a locator map. And within that, there are sections
	BY MR. DEBRINE:		that are highlighted in purple or red. And those
3	Q Are you familiar with the applications that		sections represent areas that were suggested to have
	Chevron filed in these two cases?		had DMG interactions with underlying Avalon producers.
5	A Yes.	5	And the way that they're identified, if you
6	Q Are you familiar with the two saltwater		look at the circles, you'll see a larger light-colored
1	disposal wells that are the subject of the present		circle and kind of a smaller dark circle. Well, the
	project?		smaller dark circle represents a cumulative watercut
9	A Yes.		over the life of the producing well and the larger
10	Q Before we start reviewing the exhibits you		light-colored circle would represent the last six
1	prepared as part of your study, if you could give the	11	months' watercut.
	Commission just a brief summary of what inquiry you	12	And when you would see an increase in the
13	undertook and the subject of your testimony today?		last six months' watercut over the lifetime watercut
14	A Yes, my testimony will be exploring in		of the well, that would indicate that that well is now
15	further detail some of the case studies that were	15	producing a higher watercut than it was historically,
16	identified in the map that was referenced I believe in	16	suggesting that something has changed reading that
17	the opening statements regarding one of the products	17	that production change.
18	of the 2016 work group that was taking place.	18	Q So is it fair to say that your study was to
19	What I'm going to show is that several	19	look into whether there were other potential causes to
	observations of looking at watercut changes can be	20	explain the increased watercuts that were reported in
21	explained in different ways by establishing some of	21	those case cuttings?
22	the understanding that we have developed with DMG and	22	A It was it was part of the work that I've
23	fracture driven interactions between various ventures	23	done. And I'll show in future exhibits that we've
24	within the Permian Basin.	24	learned a lot about our development areas that are
25	With those learned, we can now apply those	25	located proximal to the example I've shown. And we
	Page 126		Page 128
	that same level of assessment back to those case		would apply those learnings and revisit in some of
2	studies and potentially come up with different or more	2	these cases and and come up with different, and I
3	more robust interpretations for the root cause.		would argue in my opinion, stronger hypotheses as to
4	MR. DEBRINE: And to the benefit of the	4	what's going on with the watercut changes.
5	commissioners, the exhibits we're going to discuss	5	Q If you could turn to your next slide what
6	with Mr. Parizek start at page 109. If we can turn to	6	does this represent?
7	the first slide.	7	A The map shown on this exhibit represents a
8	BY MR. DEBRINE:	8	locator map for the case studies that I had evaluated
9	Q Could you just briefly explain what this		as part of this assessment. And it's a subset of
10	slide represents and the work that went into it?		them. Also shown on the they're represented by the
11	A Yes. This slide really the the core of	11	colored circles, and I'll describe those shortly.
12	the slide is I want to demonstrate that watercut alone	12	Also shown on this map in stars, yellow star
13	is not a definitive test for salt water disposal's		represents a location of the Papa Squirrel saltwater
14	interference of producing wells.	14	disposal well that's part of this case. And the blue
15	So just some of the background in going into	15	star on the left side of the map represents the
16	this. I mentioned the 2016 work group. That work	16	location of the Severitas 2 State SWD 1, also part of
17	group shared observations of both Delaware Mountain	17	this this case.
18	Group production wells and Avalon production wells	18	And the pink or purple polygons that are
19	that were seeing increased watercut over time.	19	scattered across this map represent locations or areas
20	And on the map on the right side, I've got	20	that Chevron operates.
21	a an example of what what those maps had looked	21	The colored circles shown on this map
22	like that was within that slide deck. And that slide	22	I've got a legend off to the upper right. But the
23	deck is I believe Exhibit 8 in the the OCD's	23	the green circles represent an area where we've
24	exhibits.	24	identified Wolfcamp completions affecting the Avalon
25	But on that on that map, you'll see kind	25	and resulting in similar observations that we had seen
	Page 127		Page 129

<sup>33 (</sup>Pages 126 - 129)

1 in the previous exhibit that I've shared regarding	1 showing here is both oil production rate and the gas
2 Exhibit 8 that the OCD has entered.	2 oil producing gas-oil-ratios for a sample of the
3 The blue circles represent areas where	3 Avalon producers on the northeast side of our Salado
4 Chevron is operating Avalon wells either directly	4 Draw development area.
5 under or adjacent to Delaware Mountain Group saltwater	5 Q And what colors are represented in that
6 disposal. And we are not seeing any impact from those	6 chart for each?
7 operations.	7 A The green circles represent the oil rate,
8 The red circle represents an area where	8 and the yellow circles represent the solution
9 there is identifiable geologic features that trend	9 gas-oil-ratio. What you'll observe on here as I
10 between Delaware Mountain Group injectors and Delaware	10 discuss is there's been relatively consistent or let
11 Mountain Group producers that may have a driver on why	11 me say stable declines through the oil rate and
12 some of the the potential communication was seen in	12 increases in gas-oil-ratio. What we observed at at
13 those areas.	13 that time was increases in production.
14 And then lastly, the orange circles	14 If you'll look at where the vertical dash
15 represent areas where there are geologic features that	15 black line is on that plot, and this is prior to us
16 trend between Avalon producers and Delaware Mountain	16 really understanding what was going on. We started to
17 Group saltwater disposal wells that again could it	17 see significant increases in oil production and
18 may indicate why some of those observations were made.	18 significant decreases in gas-oil-ratio.
19 Q Let's turn to the potential exhibits	19These Avalon wells are approximately 3,000
20 prepared for inspection and study. The first one is	20 feet TBD shallower than our Wolfcamp pads. And at the
21 just identified in the next slide, "Wolfcamp	21 time of the study, we didn't have a precedent for
22 Completions Affect Avalon Production." Just the title	22 for Wolfcamp completions interacting with Avalon
23 and the actual first exhibit representative of these	23 wells.
24 studies on page 112, "Wolfcamp Completions Result in	24 So some of these, we took an investigation
25 Avalon Production Interaction."	25 to understand what was going on. We looked at
Page 130	Page 132
1 If you could explain for the Commission what	1 facilities bottlenecking. We looked at a wide
2 you did in your study and what's represented by this	2 spectrum of drivers, but the only one that really
<ul><li>2 you did in your study and what's represented by this</li><li>3 exhibit?</li></ul>	<ul><li>2 spectrum of drivers, but the only one that really</li><li>3 correlated to what we've observed here were our</li></ul>
3 exhibit?	3 correlated to what we've observed here were our
<ul><li>3 exhibit?</li><li>4 A Yes. Chevron operates in the vicinity of</li></ul>	<ul><li>3 correlated to what we've observed here were our</li><li>4 underlying Wolfcamp A fracs. And the and the frac</li></ul>
<ul> <li>3 exhibit?</li> <li>4 A Yes. Chevron operates in the vicinity of</li> <li>5 the Papa Squirrel saltwater disposal well we're</li> </ul>	<ul> <li>3 correlated to what we've observed here were our</li> <li>4 underlying Wolfcamp A fracs. And the and the frac</li> <li>5 date is shown by that vertical dashed black line. So</li> <li>6 that was our first our first indication that we had</li> </ul>
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<sup>34 (</sup>Pages 130 - 133)

	increase in the water production.		and the Y axis represents in blue, water rate; in red,
2			gas rate; and in green, the oil rate. And you
1	first event down until the point where there's a		looking at these I'll kind of walk through one of
	vertical red solid line and then a second vertical		them.
	dash line. What this window represents is the start	5	Looking at the one on the left, you'll see a
1	to the end of the Wolfcamp A completion that was being		very subtle increase around the the first callout
	conducted below the this Avalon well.		that says "Avalon Frac," the left of the two. There's
8			a small increase in the water change. And this
1	had strong hypothesis that these Wolfcamp completions		represents the pad of Avalon wells that were completed
	were interacting with Avalon. So we took a		two well spaces over from the the well that's shown
11	-		here or two pad spaces over.
	third pad where we showed it in two Avalon wells. We	12	The second Avalon frac callout represents an
	ran down whole memory pressure gauges.		offset Avalon pad that was fracked. You'll see a more
14	L L		significant increase in water production, a drop in
15			the producing in the gas production, and then an
1	water samples from an offset Wolfcamp pad as a		increase in oil production after the the well
1	baseline, and we took our water samples from our		recovers from that frac-driven interaction.
1	completions. And what we observed when that	18	But we'll also refer to those as fracture
1	underlying Wolfcamp A well or the pad was completed,		stimulation interference, FSI or FDI. We're using
	2,000-psi increase in one of our Avalon wells.		those. I'm using those terms analogously.
21	We saw the water chemistry change from the	21	Q And you may have covered it, but which ones
	time that from the time prior to the completion to		are you referring to when you're talking about water?
1	during the completion and then reverted back to this		I mean which color on the graphs?
1	baseline after the completion. So we we then had,	24	A The blue. So the water the water rate
25	again, more data now that supports this hypothesis Page 134	25	itself, the water production rate is blue. But when I Page 136
	1 420 134		1 420 130
1	that our Wolfcamp wells were interacting with Avalon.		refer to the water cut, what I'm observing is that the
2	Q Could you turn to your next exhibit on page		oil rate drops down to roughly the zero line as the
1	113? It's talking about "Wolfcamp Completions Have		water rate increases from the base line. So that
1	Extended Periods of Water Influx in Nearby Avalon		would have indicated that the water cut's increasing
1	Wells." And what did you do for this study in order	5	at that point.
	to reach these analysis and conclusions?	6	So I've stepped through the two examples
7	5 6		from Avalon fracs. Now I want to show that the
1	corner just a locator map showing the the		Wolfcamp fracs are the next two vertical lines on this
	development, the Salado Draw development area just in		plot. And both of those the first Wolfcamp frac
1	the vicinity of where we were observing these		figurative interaction that we observe, we'll see an
	Wolfcamp A interactions with our Avalon wells.		increase again in in the the water production
12			rate in blue and the oil production rate in green.
1	of those blue rectangles represents an individual pad		And again, that well recovers back to a baseline
1	of Wolfcamp A wells where we have seen an interaction		within about six months, just estimating based on
1	with the overlying Avalon wells. And the only reasons		the the graph.
1	that that 13 and 24 aren't highlighted is that they	16	And then lastly, if you move over to roughly
	were completed after I conducted his study. So I have		where it says Year 6, you'll see that that next
1	not evaluated any whether those those pads have		Wolfcamp A completion that took place resulted in an
	interacted with Avalon.		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		23	And that's really the key that I want to
	bottom right locator map.		demonstrate with these plots here is if you look over
25	1 2	25	to the middle plot where that Wolfcamp A frac is shown
	Page 135		Page 137

<sup>35 (</sup>Pages 134 - 137)

1 around Year 5, you see that production upset or that2 change in water production rate extends almost a year3 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 for6 the the limit of the data that's shown on this7 plot.8 So the key to the key to what I'm showing9 here is that the fracture-driven interactions or frac10 interactions between completions and offset wells are11 generally short term in duration, that these Wolfcamp12 interactions that we've observed and kind of13 established are hurting in our area can lead to14 long-term changes in the the water production rate15 for the the Avalon wells.16 Q If you could turn to your next slide on17 page 114. And what does this slide represents a reevaluation of one19 of the case studies that that we had taken a look20 at. And I want to draw attention to the locator map21 on the left side. What's shown here in yellow22 highlight on that locator map is the western extent of23 our Salado Draw development area. And in the middle24 of Section 21, and I've I've got a blue well stick
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24 of Section 21, and I've I've got a blue well stick 24 A This is looking at looking at the locator
25 located. And that is the Avalon producer that we're 25 map on the left. We're looking at the same general
Page 138 Pag
1 going to be looking at here in this example. 1 area, but I've moved the subject well one well spacing
2 Q So this was multiple other case studies and 2 to the to the east of the the previous example.
3 now Exhibit 8? 3 Located in Section it's located roughly in the
4 A This is that's correct. 4 center of Section 21.
5 Also shown on the map in Section 16 north of 5 Also in Section 21, there are two light blue
6 Section 21 is a blue triangle in the southeast corner. 6 well sticks on the left side representing two Wolfcamp
7 This represents the location of a Delaware Mountain 7 A wells. There are four well sticks kind of in the
8 Group saltwater disposal well. And and that same 8 center of this section representing another set of
9 on the eastern side of Section 16, I've got two 9 Wolfcamp A wells and set of purple or I guess purple
10 well sticks that are difficult to discern.10 well sticks on the east side, again representing
11But the callouts on the top represent those11 Wolfcamp A wells.
12 being the locations of one-third Bone Spring well with 12 So I've taken the completion dates for those
13 the completion date shown to be between May and June 13 wells and overlaid those onto a production plot from
14 of 2015. And a stack of three Wolfcamp wells with the 14 that particular well. And those are shown with the
15 completions to be between July and August of 2015. 15 vertical dash lines on the production plot on the
16Looking at the the production on the16 right side of this exhibit.
17 right side of of the X axis, we're looking at time. 17 I want to note that this one is looking at
18 And on the Y axis, we're looking at monthly volumes on 18 daily rate versus rather than monthly monthly
19 the logarithmic scale. Shown in blue on this plot is 19 rate that we have seen on the last slide. So the
20 the water production rate. Green is oil rate. Red is 20 first pad of the first two Wolfcamp A completions
21 the gas rate for the producer that I have called out 21 that took place don't show a a significant step
22 on Section 21. 22 change. You could argue that the if you look at
23 Also shown on this plot is the injection 23 the vertical blue dash line that there's a small
24 rate in monthly volumes again up for the saltwater 24 increase in water production.
24 rate in monthly volumes again up for the saltwater24 increase in water production.25 disposal well that's shown in the southeast corner of Page 13925 But what I really want to call out on this Page 139

#### 36 (Pages 138 - 141)

1	example is that the two pad, the Wolfcamp A wells that		two others, the Delaware Mountain Group saltwater
2	are directly underlying that Avalon producer are	2	disposal wells. One of them was one of the SDS 11
3	plotted with a red dash line and a purple dash line.	3	Fed 1 was injecting into only the the Bell Canyon.
4	And this well sees a significant change in oil, gas,	4	Lotos 11 Fed 2 was injecting into the Bell Canyon and
5	and water rate coincident with that with those	5	Cherry Canyon.
6	completion dates.	6	But the really the key that I want to
7	And this is similar to the example that I	7	demonstrate here is despite the potential
8	had shown in my previous exhibit. One on page 112,	8	communication between the the two saltwater
9	where we saw increased oil production following an	9	disposal wells over to those Delaware Mountain Group
10	underlying Wolfcamp A completion.	10	producers, Chevron operates Avalon wells that are
11	Q So your bottom line including with respect	11	underlying or between those two locations shown by the
12	to the analysis of the Wolfcamp and Bone Spring	12	the DMG wells and the saltwater disposal wells.
13	completions on oil and gas?	13	And we had not seen any indication of water and influx
14	A So the the key takeaway for my for	14	or abnormal production from those underlying Avalon
15	this section is that the observations that we've seen	15	wells.
16	in Exhibit 8 can have alternative alternative	16	Q Where are the Avalon wells shown on the map?
17	explanations. Chevron has consistently seen	17	A They're shown by the tan or pink color
18	Wolfcamp A completions interacting with our Avalon	18	that's in the tan polygon representing the development
19	wells in this particular section of Lea County.	19	area.
20	And again, the just looking at water cut	20	Q If you could turn to the next slide on
21	alone in proximity to saltwater disposal wells, it	21	page 118 and explain what your study looked at here
22	is it is not conclusive in determining root cause.	22	and the conclusions that you reached.
23	With the additional data we have, we really need to do	23	A This this study demonstrates again what
24	more thorough examinations of to rule out which the	24	I'm going to highlight on the locator map shown on the
25	leading hypothesis is.	25	bottom right of the of the slide with a blue
	Page 142		Page 144
1	Q Let's turn to the next aspect of your study,	1	what we're looking at here is our again, our
	Q Let's turn to the next aspect of your study, which begins on page 116, looking at whether Avalon		what we're looking at here is our again, our Chevron Salado Draw development area, the wells that
2		2	
2 3	which begins on page 116, looking at whether Avalon	2 3	Chevron Salado Draw development area, the wells that
2 3 4 5	which begins on page 116, looking at whether Avalon wells were affected by DMG disposal. And the first substantive slide is on page 117. If you could explain to the Commission what we're looking at here	2 3 4 5	Chevron Salado Draw development area, the wells that are showing up on the map in Sections 15, 14, 13, 18, 19, 24, 23. These are Avalon producers within that area.
2 3 4 5	which begins on page 116, looking at whether Avalon wells were affected by DMG disposal. And the first substantive slide is on page 117. If you could	2 3 4 5	Chevron Salado Draw development area, the wells that are showing up on the map in Sections 15, 14, 13, 18, 19, 24, 23.
2 3 4 5	which begins on page 116, looking at whether Avalon wells were affected by DMG disposal. And the first substantive slide is on page 117. If you could explain to the Commission what we're looking at here	2 3 4 5 6	Chevron Salado Draw development area, the wells that are showing up on the map in Sections 15, 14, 13, 18, 19, 24, 23. These are Avalon producers within that area.
2 3 4 5 6 7	which begins on page 116, looking at whether Avalon wells were affected by DMG disposal. And the first substantive slide is on page 117. If you could explain to the Commission what we're looking at here and what conclusions were reached.	2 3 4 5 6 7	Chevron Salado Draw development area, the wells that are showing up on the map in Sections 15, 14, 13, 18, 19, 24, 23. These are Avalon producers within that area. The northeast corner of our development area is a
2 3 4 5 6 7 8 9	<ul> <li>which begins on page 116, looking at whether Avalon</li> <li>wells were affected by DMG disposal. And the first</li> <li>substantive slide is on page 117. If you could</li> <li>explain to the Commission what we're looking at here</li> <li>and what conclusions were reached.</li> <li>A Yes. This example is in a location that's</li> <li>similar to I believe Exhibit 7 that the the OCD has</li> <li>submitted. And this is an a an area where in 2014</li> </ul>	2 3 4 5 6 7 8 9	Chevron Salado Draw development area, the wells that are showing up on the map in Sections 15, 14, 13, 18, 19, 24, 23. These are Avalon producers within that area. The northeast corner of our development area is a saltwater disposal well that was completed in the Bell Canyon and the Cherry Canyon. Q And just to clarify, Chevron's Avalon
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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	which begins on page 116, looking at whether Avalon wells were affected by DMG disposal. And the first substantive slide is on page 117. If you could explain to the Commission what we're looking at here and what conclusions were reached. A Yes. This example is in a location that's similar to I believe Exhibit 7 that the the OCD has submitted. And this is an a an area where in 2014 and into 2015, the Bran SWD 1 and the Heavy Metal 12 1 were two open-hole saltwater disposal wells. And the operator of the the green well sticks that were shown on this map where it says "DMG producers," I noted an increase in water production and reached out to the operator of those those two saltwater disposal wells, showed them the the observations that they had, and they came to an agreement that that they were going to shut those wells in due to suspected communication. Q If you could just identify the location of those two wells that you managed to modify on the map? A Those two wells are indicated by a blue circle with a cross in the middle of it.	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	Chevron Salado Draw development area, the wells that are showing up on the map in Sections 15, 14, 13, 18, 19, 24, 23. These are Avalon producers within that area. The northeast corner of our development area is a saltwater disposal well that was completed in the Bell Canyon and the Cherry Canyon. Q And just to clarify, Chevron's Avalon producers here are in a different area than what we looked at in the prior exhibit? A Correct. This is this is south of that prior exhibit. Also on this map is a is a SHMax orientation. This this is the maximum horizontal stress direction. And it was derived from image image logs looking at four-hole breakouts as well as micro-seismic that was conducted in Sections 18 and 19 on this on this map. But what I'm going to demonstrate here is that that saltwater disposal well was active from the time that we drilled those wells all the way to February of 2019. And we were on strike to that SHMAX

<sup>37 (</sup>Pages 142 - 145)

	1
1 that time aside from the known completions that we had	1 lineaments in our different development areas. And
2 in the Avalon wells that are called out on the	2 not being aware of this particular case study, I took
3 production plot that's shown on the left side here.	3 the work that that geophysicist had done, and I
4 Q You said it runs; correct?	4 integrated it into this example.
5 A Yes. What I mean by that is if you take the	5 And on that map shown in green represent a
6 SHMAx orientation from the and lay overlay it on	6 potential lineament that was that was mapped out
7 the saltwater disposal well, that orientation	7 from seismic. And the location of that lineament
8 direction points directly into our Avalon wells.	8 trends between the the heavy metal well, the Bran
9 Q So the conclusion you've reached is	9 well. And the projection of that extends through
10 demonstrated by the slide as well?	10 where you see that PLT inflow point on that 401H
11 A In part. The other the other point that	11 producer.
12 I want to make regarding this this area is that	12 Q So you're talking about the green diagonal
13 these wells produced roughly a 50 percent water cut	13 line that runs from the southwest to the northeast?
14 over their over their well life up until we started	14 A That that's correct. And the
15 to see interactions with the Wolfcamp completions. We	15 significance of that with regard to the SHMax
16 were able to draw down.	16 orientation that's shown with the double red arrow on
17 We conducted a a pressure study in	17 the the bottom of the slide here is that a you
18 Sections 18 and 19. We were able to draw down	18 know, any kind of fracture, lineament, fault, anything
19 bottomhole pressures to where we cut conducted	19 that's oriented parallel to the SHMax direction is
20 those pressure surveys. We were seeing 500 psi to 800	20 going to be under an an opening mode or it's going
21 psi on those surveys. And over the course of that	21 to be in an orientation.
22 that time when that well was actively injecting, we	22 I would enhance or enable potential fluid
23 didn't see any indication of a water pressure change.	23 migration through it versus an an orientation such
24 Q Let's take a look at the next aspect of your	24 as shown on the bottom of this slide. I guess there's
25 study when you looked at possible causes of faulting	25 two there's two little cartoons on the bottom of
Page 146	Page 148
1 or the lineaments that begins on page 119 and then for	1 the slide.
2 subsequent slides on page 120. If you could explain	2 The one on the left would represent an
3 to the Commission the work you did here and what the	3 orientation of the lineament relative to the the
4 slide demonstrates.	4 SHMax and SHMin. That would give the opening mode.
5 A So now now we I've stepped back up to	5 The one on the right shows that that lineament is now
6 the previous example that I've shown where our Avalon	6 perpendicular to SHMax, so it would be under an
7 wells do not interact with overlying and offset	7 orientation that would be preferentially closed or
8 saltwater disposal in the Delaware Mountain Group.	8 restricted fluid movement.
9 But we're we're focused now on the Delaware	9 But having lineaments, faults, any kind of
10 Mountain Group producers in relation to the Delaware	10 feature like that in the vicinity of the injection
11 Mountain Group injectors that are that are shown on	11 would be unfavorable. And this is a potential
12 this map on the right with the DMG producers being in	12 explanation as to why that that area has reserved
13 green, DMG injectors being in blue.	13 the effects that were that were noted in here.
14 Q This is again looking at those wells	14 Q So is it fair to say that your conclusion as
15 depicted on Exhibit 11 or 7, I mean?	15 to the lineament is a possible pathway for the
16 A That is correct.	16 migration of fluids were observed?
17 On the the well that has a callout	17 A That's correct.
18 labeled PLU 401H, I've got a pink dot that indicates	18 Q If you could turn to your next slide on
19 where on a pressure I'm sorry production logging	19 page 121, this looks like a little bit deeper analysis
20 tool. Basically a production log that was run on that	20 of the same issue.
21 well. They observed 1,520 barrels of water coming in	21 A That's correct.
22 at one perforation cluster. That point on this well	22 So what I want to first call out is the
23 represents that inflow point.	23 locator map that's shown on the left side of this
24 We had a, as Tom mentioned, our geophysicist	24 slide here. The blue box on that locator map
25 mere and look for not satisfied for the stantist	
25 map out and look for potential faults, potential Page 147	25 represents generally the general area that we're Page 149

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1 looking at with this particular example. Looking at	1 A Yes. This this study went to evaluate
2 the the larger map in the center of the exhibit,	2 the the strength or the ability of the Bone Spring
3 there are several different colored lines here. And I	3 Lime to prevent fracture growth from Avalon producers
4 want to describe what those are.	4 up through it. So one of the hypotheses that we
5 First are the green there's a green well	5 identified early on is that these Avalon wells are
6 location, a green well stick on the southern part or	6 potentially seeing water production production
7 the the lower half of this map. That represents a	7 higher than than expected because they were
8 well that was included in the case study. I believe	8 breaching through the Bone Spring Lime.
9 that was Exhibit 8 as a well that had watered out or	9 So I've got a a map on the lower left
10 seen an increase in water production.	10 side here, a map showing the Bone Spring Lime gross
11 As part of the review of that case study, I	11 interval thickness. And this area covers the New
12 did not observe any offset Wolfcamp A or Avalon or	12 Mexico portion of the Delaware Basin. Also on the
13 Bone Spring completions that occurred around the time	13 slide is the Delaware Mountain Group risk area
14 of that well. Seeing increased water production, so	14 outline, but it's truncated at the Texas-New Mexico
15 we were able to exclude that as a potential driver.	15 border, and that's shown in black.
16 But the on the right side of the map	16 There's a yellow star near the near the
17 there are two triangles that represent the locations	17 Texas-New Mexico border that represents the Madera
18 of two Delaware Mountain Group producer injectors that	18 Malcolm R ET 1 well. And the significance of this
19 were completed in the Cherry Canyon and in the Brushy	19 well is that in evaluating the Bone Spring Lime
20 Canyon. Those were thought to be the potential driver	20 throughout this area, the although the gross
21 to the the events that were observed and the vents	21 thickness was roughly 30 feet thick, the net carbonate
22 being the increased water production in the in the	22 thickness within this well was was only
23 Avalon well that's shown on the the map here.	23 representative of two beds that were approximately
24 I again integrated the work of our	24 8 feet thick. So this was a pessimistic case showing
25 geophysics team. The blue lines on the map	25 the thin or low side case for what the Bone Spring
Page 150	Page 152
1 represent these are deep Woodford or deeper faults.	1 Lime thickness would be at the area.
2 And you'll notice that there's one that trends	2 Lastly, on the on the map shown on the
3 southwest/northeast across this map. And the the	3 left side, I've got the the starred locations in
4 red lines indicate the red lines indicate a	4 orange of the Papa Squirrel, the Severitas wells. And
5 potential Delaware Mountain Group lineaments that the	5 in white are callouts showing the the thickness of
6 geophysicist had identified in that seismic volume.	6 the Bone Spring Lime at 42 feet at the Papa Squirrel
7 And what I want to note here is two things.	7 and 87 feet thick at at the Severitas location.
8 The first is that the DMG lineaments are roughly	8 Q And what does it show on the right?
9 parallel to the deep faults that we that are	9 A On the right is the showing the log on
10 interpreted in the area. And both of those are	10 the Madera Malcolm, the well that I had mentioned
11 parallel or sub-parallel to the SHMax orientation	11 previously. And we're looking at in a in terms
12 here.	12 of the tracks, the first track is the gamma ray. Then
13 So again, this is a potential geologic	13 you'll see the depth track with depth indicated in
14 control on why two saltwater disposal wells could	14 both TBD and TBD sub C.
15 potentially interact with the producing well that's	15 The the next log frac is the resistivity,
16 over four miles away. So you know, looking at it from	16 and there is ferocity along with the PE,
17 an interpretation standpoint, this would be an	17 photoelectric. And then lastly is just a lithology, -
18 unfavorable location group to to put it in	18 - lithology on the the right track.
19 saltwater disposal wells.	19 Q If you could turn to your next slide on
20 Q Did you also take a step in regard to the	20 page 124 where you dug deeper with regard to the Bone
21 lower containment for detecting influx?	21 Spring Lime being breached?
22 A Yes.	22 A Yes.
23 Q And that begins on page 122, with a	
20 2 mili una begnis on page 122, with a	23 Q And what are you showing here?
24 supplement slide on page 123 where you analyze the	
	23 Q And what are you showing here?
24 supplement slide on page 123 where you analyze the	<ul> <li>23 Q And what are you showing here?</li> <li>24 A What's showing here was a a modeling</li> </ul>

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1 our baseline Avalon completions could potentially	1 Exhibit 8 from the OCD map in the previous study.
2 breach through the Bone Spring Lime at this location.	2 We have two cases of complete development
3 So what was done is we took the base case completion	3 areas where we're able to produce our Avalon wells in
4 with slurry volume per cluster basis and started out	4 proximity to Delaware Mountain Group injection without
5 with 69,000 gallons per cluster.	5 seeing indications of communication.
6 We also studied sensitivities of 79,000	6 When the SHMax orientation of features such
7 gallons per cluster and 91,000 gallons per cluster.	7 as lineaments or faults is parallel to the when the
8 And in doing that, we were looking at the potential	8 strikes of the lineaments or fault are parallel to
9 that you weren't seeing the great cluster efficiency,	9 SHMax, those locations are that orientation's
10 meaning that not all the clusters were receiving	10 potentially enabling to fluid migration through them
11 fluid.	11 as opposed to when they're orthogonal to SHMax or
12 And in all three of those scenarios, we did	12 perpendicular to it where the the lineament will be
13 not observe the Bone Spring Lime. Or let me, well,	13 under enclosing mode.
14 rephrase. We did not observe the the Avalon	14 Q And Chevron analyzed the areas around the
15 completions propagating up through the Bone Spring	15 two wells that are the subject of the pilot project to
16 Lime. But we also undertook a study to understand	16 determine if they're lineaments?
17 what it would take.	17 A They have investigated it, and they have not
18 So we we increased the the volumes	18 any evidence within 2 miles of the locations.
19 for of it volume per cluster basis. And it took	19 Q And finally, what does the
20 over 109,000 gallons per cluster in order to start to	20 A In conclusion, the the Bone Spring Lime
21 breach the 8-foot-thick Bone Spring Lime. But I want	21 is is not being breached during Avalon completions.
22 to emphasize that over our development area and over	22 And the saltwater disposal wells are operating in a
23 the the locations of our saltwater disposal wells	23 manner not to frac the reservoir. Whereas our Avalon
24 that the Bone Spring Lime is significantly thicker	24 completion is the intent of those was to break down
25 than this.	25 the reservoir. So we were trying to stimulate frac of
Page 154	Page 156
1 And then one final note. You know, this is	1 the the reservoir below them, and we were not
2 a model, so we want to calibrate it to field data.	2 breaching through the Bone Spring Lime.
3 And as I mentioned previously, we were able to draw	3 Q In your opinion, will the Chevron wells that
4 down our Avalon wells to less than a thousand psi	4 were subject to the pilot project negatively impact
5 bottomhole pressure, which suggests to us that we are	5 DMG existing or future projects in the area?
6 not seeing influx of water from the overlying Delaware	6 A No.
7 Mountain Group, meaning that those completions did not	7 Q In your opinion will the Chevron wells
8 breach through the the Bone Spring Lime.	8 negatively impact Avalon's wellspring production into
9 Q Can you turn to the next slide, which is	9 the area?
10 just a summary of your conclusions? If you can go	10 A No.
11 through them and express your opinions based on your	11 Q In your opinion will the wells actively
12 study?	12 impact relevant rights of producers of Avalon or Bone
13 A Yes. To summarize, you know, looking at	13 Spring or DMG?
14 looking back at the case studies that were shared, I	14 A No.
15 it's shown that water cut can have multiple drivers	15 Q Were the exhibits we discussed today
16 in unconventional wells. And really, we need data and	16 prepared by your or under your direction?
17 we need to do more exhaustive analyses on these case	17 A Yes.
18 studies to identify what the root cause is just	18 MR. DEBRINE: We would move the
19 because water cut alone in proximity to saltwater	19 admission of Exhibits I believe it's 109 through 123.
20 disposal is not a conclusion of interference.	20 MR. FUGE: Any objections?
20 disposal is not a conclusion of interference. 21 We've seen consistently within our	21 MR. TREMAINE: Yes, Mr. Chair. Thank
22 development area in South Lea County that we've had	22 you.
23 Wolfcamp completions interacting with Avalon wells.	23 MR. FUGE: Any objections?
24 And often the response that we see those Avalon wells	24 Exhibits have been admitted.
25 is the observation is similar to what was noted in	25 //
25 is the observation is similar to what was noted in Page 155	25 // Page 157

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1 (Exhibits 109 through Exhibit 123 were	1 A Yeah.
2 marked for identification and admitted	2 Q Is there still what is happening with the
3 into evidence.)	3 sixth case study?
4 MR. FUGE: Mr. Tremaine?	4 A Yeah. The sixth case is the orange circle
5 MR. TREMAINE: Making sure I understand	5 that's shown on the near the state line on this
6 the formulation of the questions.	6 map. And it's it represents the area where Chevron
7 EXAMINATION	7 drilled eight Avalon wells, and since the beginning of
8 BY MR. TREMAINE:	8 those wells, they've seen high watercut and high
9 Q We're going back to slide 120. This is a	9 pressure.
10 clarifying question. What is the distance between the	10 Across the state line difficult to
11 injection wells that you're referring to and the	11 explain. I guess across the state line and one
12 producing wells that were affected on the slide?	12 section to the west, so approximately 1 mile to the
13 A Approximately two and a half miles.	13 southwest of that location, there is a saltwater
14 Q And I want to make sure I'm understanding	14 disposal well that's completed in the in the
15 the summary of your presentation here. Is it	15 Delaware Mountain Group.
16 Chevron's conclusion that the Wolfcamp wells are	16 We identified between that saltwater
17 communicating with Avalon producing wells?	17 disposal well and our Avalon wells some potential
18 A They are. That is our conclusion, yes.	18 localized faulting. And it's our it's our leading
19 Q And can you speak to whether that	19 hypothesis that those wells are being influenced by
20 communication is negatively affecting or damaging	20 saltwater disposal in that in that area. But
21 production in those Avalon wells?	21 that's the last case. I did not have an exhibit on it
22 A We have seen cases where it has where it	22 and did not discuss it.
23 has taken longer to recover in those wells. I can't	23 Q And what's the current production status for
24 speak to the the economic value of that.	24 the Avalon wells included in this case study?
25 Q And is my understanding also true that you	25 A I don't know the current status of the
Page 158	Page 160
1 cannot eliminate the Mesquite well SWD wells as the	1 wells.
2 source of the interference for the wells?	2 Q You can what is the approximate vertical
3 A No, I'm not. I'm not suggesting that	3 separation between the Wolfcamp and the Avalon shale?
4 they're not.	4 A 3,000 feet.
5 Q In the area where the observed influence for	5 Q And what do you think is the mechanism or
6 the Wolfcamp completion was observed in the Avalon,	6 the pathway that is allowing Wolfcamp fracs to
7 were there any similar observations in the Bone Spring	7 communicate with Avalon?
8 horizontal wells and the Avalon and Wolfcamp?	8 A I don't know. But but the hypothesis is
9 A I have not investigated that in that area.	9 either existing potential existing open networks or
10 MR. TREMAINE: No further questions.	10 the stimulation networks. But we we do not think
11 MR. FUGE: Ms. Hardy, any questions?	11 that we are propagating the Wolfcamp fractures up all
12 MS. HARDY: I do have some questions.	12 the way to the Avalon.
13 Thank you.	13 Q Is the frac being comprised or vertically
14 EXAMINATION	14 through the pole rod section or is the communication
15 BY MS. HARDY:	15 occurring through natural fractures or faults?
16 Q Good afternoon. I've got a few questions	16 A I think that's what I answered in the last
17 for you, and I'm going to be jumping around a little	17 question.
18 bit here. If you can look at page 110 of the	18 Q Those are that it's growing vertically
19 application file.	19 through the?
20 A Yes.	20 A Oh, we don't we don't believe that it's
21 Q So it looks like this exhibit addresses or	21 growing vertically 3,000 feet.
22 references six case studies; is that right?	22 Q You don't know. Have you checked the oil
23 A Yes.	23 gravity to determine whether it's changed?
<ul><li>23 A Yes.</li><li>24 Q And then the writeup within the subsequent</li></ul>	
	23 gravity to determine whether it's changed?

41 (Pages 158 - 161)

1 at Slide 113? And there are three production rate	1 A That that's the best bit of data we have,
2 versus time lapse on this page; correct?	2 so we're looking at the fracs that are roughly a
3 A Yes.	3 half-mile away, but we're also looking at the
4 Q And are these composite graphs for all of	4 saltwater disposal well to that same distance and
5 the Avalon well drilled in a path?	5 spacing where the Wolfcamp wells were, again,
6 A These are not. These these represent a	6 intentionally trying to break break down the rock,
7 sample of wells primarily taken from the the east	7 whereas the saltwater disposal well was was not.
8 side of the of the Salado Draw development area, so	8 It was supposed to be injected under a frac gradient.
9 Sections 18 and 19.	9 So that's the conclusion that we lead to is that the
10 Q And what are the dates for the data that's	10 Wolfcamp completions that are a a superior
11 shown on these graphs?	11 hypothesis.
12 A The dates indicate I don't have the	12 Q And the Wolfcamp completions are several
13 the dates listed on here but these represent from the	13 thousand feet deeper; correct?
14 start of the well shown on the left side of the data	14 A That's correct.
15 all the way through just the years I've shown on here.	15 Q What typical half fracked length does
16 Q So you don't have an idea or you don't know	<ul><li>16 Chevron target?</li><li>17 A I don't know.</li></ul>
17 what the timeframes were?	
18 A Roughly 216 would would be the start of	18 Q Do you have any examples in this
19 the plots, the times on here.	<ul><li>19 presentation where Chevron has performed targeted</li><li>20 surveillance and Wolfcamp frac water traveled over a</li></ul>
20 Q And were any of these sections at least	-
21 including the original production areas caused by DMG	<ul><li>21 half-mile?</li><li>22 A Not in this presentation, no.</li></ul>
22 injections?	I /
23 A Can you rephrase the question?	23 Q And has Chevron done that analysis other
24 Q Yeah. Were any of these sections included	24 than in this presentation?
25 in the original production areas that were influenced Page 162	25 A Can you rephrase the question? Page 164
1 by DMG injection?	1 Q Sure.
2 A Not sure I understand the question.	2 A Or restate that.
3 Q Let me ask this. Did the other Avalon pad	3 Q Sure. Has Chevron performed targeted
4 show similar production performance or are there some	4 surveillance of the Wolfcamp frac that has shown the
5 that are showing water influx?	5 Wolfcamp frac water has traveled over a half-mile?
6 A Yes. The the paths that are shown on the	6 A We have vertically. So we have seen
7 the map on Exhibit 113 showed stable production.	7 indications it's not conclusive, but we have seen
8 The the two sections that I've noted in that case	8 indications where a Wolfcamp to Avalon water mixing
9 study in sections 29 and 32 that are cropped off on	9 relationship is a valid solution to the observations
10 this map are the wells that have showed increased	10 that we have.
11 influx from these early production wells.	11 Q That's vertical?
12 Q So back on page 112, the exhibit indicates	12 A That's vertical.
13 that Chevron observed significant production changes	13 Q But not horizontal?
14 in Avalon wells overlying Wolfcamp A fracs; right?	14 A Not that I'm aware of. No.
15 A Overlying and your directly overlying and	15 Q Do you have the 3D seismic in this area?
16 in proximity to the pad. So it did not have to be	16 A We do.
17 directly underlying the the Avalon wells impactor	17 Q And have you been able to determine the
18 did not need to be directly overlying the Wolfcamp	18 location or trend of these fractions or faults that
19 fracs. So even if there were a couple well spacings	19 are allowing this fracture stimulation's appearance?
20 offset, we still would see the the influence of	20 A Not in not in the vicinity of this area,
21 them.	21 no.
22 Q And then on page 114, are you attributing	22 Q If you'll look at page 118 please. And this
23 the watering out of the Section 21 Avalon well to	23 is a production rate versus time graph; correct?
24 fracs that were completed approximately a half-mile	24 A Yes.
25 away?	$(1 \in A) = A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A = 1 + A $
Page 163	25 Q And is this plot a single Avalon well? Page 165

<sup>42 (</sup>Pages 162 - 165)

1 A This is, yes.	1 of those those features could reach through the
2 Q And where is the well located?	2 Bone Spring Lime providing a conduit. We don't have
3 A Roughly in the center of Section 18.	3 data that to support those hypotheses.
4 Q And the data on the graph ends in late 2021;	4 Q Were the two DMG SWDs shown on this exhibit
5 is that correct?	5 good disposal wells?
6 A That's correct.	6 A I don't know the the rates that went into
7 Q Has there been any change in the production	7 those wells.
8 performance of this well since then?	8 Q Does Chevron believe there could be a
9 A There has, yes.	9 correlation between the presence of faults and
10 Q And what has that shown?	10 injectivity?
11 A That's shown a Wolfcamp completion that	11 A I wouldn't be able to answer that. I don't
12 was there was two paths of Wolfcamp wells that were	12 have the background in that. It's not my area of
13 completed on the west half of Sections 18 and 19. And	13 expertise.
14 this well has seen a response to that frac gradient	14 Q Let's look at page 124. And you indicated
15 interaction in both wells. And I believe that this	15 earlier in your testimony that your frac predictions
16 well is actually one of the examples shown on another	16 were based on the models; is that correct?
17 exhibit that has all this data.	17 A In part, yes. They were the modeling was
18 Q And on the lower right side, the Mesa B SWD	18 a test. Yes.
19 is highlighted; correct?	19 Q And can you confirm that you won't be able
20 A Yes.	20 to predict the shape of the actual fracs until the
21 Q And is that a DMG SWD?	21 models are calibrated?
22 A It is.	22 A The the frac model, the, like, details of
23 Q And do you have any information about the	23 the frac models, Cody Comiskey will be able to answer
24 history of that well?	24 some of those.
25 A Other than what's located on the or	25 Q Did Chevron run micro-seismic in this area?
Page 166	Page 168
1 indicated on the slides, that's the the history	1 A Yes.
2 that I have on it.	2 Q Did that analysis agree with your simulation
	3 results?
<ul><li>3 Q If you can please look at page 124.</li><li>4 Actually, sorry, 121. What is the name of the well</li></ul>	4 A It did.
	5 MS. HARDY: Those are all of my
5 that is labeled 24/8/2011? Sort of the lower part of	-
6 the	6 questions. Thank you.
7 A I I do not recall. And that that date	7 MR. FUGE: Dr. Ampomah?
8 represents the completion date for that well.	8 DR. AMPOMAH: Thank you, Chair. I do
9 Q And do you know what zone that well is	9 have some few questions.
10 completed in?	10 So beyond the tunnel fracture model
11 A I believe it's Avalon.	11 that you did, has there been any actual done to
12 Q What's the significance of these DMG	12 test some of these hypotheses?
13 lineaments that are shown on this exhibit?	13 MR. PARIZEK: We not to my
14 A That it could that the orientation of	14 knowledge.
15 those lineaments is parallel to the SHMax orientation	15 DR. AMPOMAH: And is there any plans?
16 and that they trend between the disposal wells and	16 MR. PARIZEK: To there may be. And
17 the the producer that's shown on the map.	17 perhaps one of the other witnesses can discuss that.
18 Q Do they provide a vertical connection	18 I'm not aware of what the entirety is of what 25 folks
19 between different layers?	19 did, but I don't know the answer to that.
20 A We don't know.	20 DR. AMPOMAH: Someone needs how do I
21 Q On which path does Chevron believe the water	21 put this? Based on the testimony it's more like some
22 moved between the SWDs and the producer?	22 of them are still inconclusive.
23 A One hypothesis is since these lineaments are	23 MR. PARIZEK: In I think that's a
24 parallel to the deep basement faults that are shown	1.2.4 supply and next of the basis of supplied in
21 paraner to the deep busement radies that are shown	24 great question and part of the basis of our pilot is
25 here is that potential movement or even minor movement Page 167	<ul><li>24 great question and part of the basis of our pilot is</li><li>25 to collect the data in order to really rule out and</li><li>Page 169</li></ul>

43 (Pages 166 - 169)

1 understand what the root causes are so we're not in a	1 per day.
2 situation where we have multiple working hypotheses	2 DR. AMPOMAH: So is it a general
3 but no way to test them.	3 representation of the typical rates in this area?
4 DR. AMPOMAH: So what about the trace	4 MR. PARIZEK: In New Mexico, that's the
5 test?	5 example. Across the state line, approximately half a
6 MR. PARIZEK: That's that's a key	6 mile south of the state line, there is a well that has
7 part of surveillance. However, it's difficult to	7 injected I want to say to the best of my knowledge
8 convince an operator of a saltwater disposal well to	8 over 10,000 barrels a day, potentially higher.
9 run a tracer in their well when it may prove that that	9 DR. AMPOMAH: So you talk about a
10 well connects to one of your producers. So having an	10 geological feature like the lineament or send out
11 operator operate the saltwater disposal and the	11 potential communication, so have those been marked,
12 producer, it helps to test those types of scenarios.	12 you know, in this area, especially where you are,
13DR. AMPOMAH: And I know that's	13 because of the pilot?
14 something that you want to do as part of the pilot	14 MR. PARIZEK: It has. The geophysicist
15 program.	15 has gone in investigation for DMG lineaments kind of
16 MR. PARIZEK: Yes. And we discussed by	16 mapping the way that they had done in the other
17 another witness, but that is part of our results, yes,	17 examples that I have shown. And they have not
18 is that.	18 identified any within 2 miles.
19DR. AMPOMAH: So the Avalon and the	19 DR. AMPOMAH: And I just want to
20 Wolfcamp, these are open and producing results; right?	20 confirm. So you showed the thin thickness of the Bone
21 MR. PARIZEK: That's correct.	21 Spring Lime. So I just want to confirm that in your
22 DR. AMPOMAH: So where is the water	22 area it's much thicker than in that 8?
23 coming from?	23 MR. PARIZEK: That's correct. So that
24 MR. PARIZEK: We we don't have a	24 that map shown shown on Exhibit 123 or page 123,
25 conclusive answer to that, where that water is coming	25 that well is located both outside of development area,
Page 170	Page 172
1 from. We've seen well, what we have seen with the	1 the Salado Draw, and across the Texas state line. So
2 the surveillance that we have done is that we in	2 it's outside of where we're going to be operating or
3 the east half of the field, we have seen a valid	3 potentially operating these two wells. At the
4 mixing relationship between Wolfcamp water and Avalon	4 locations of the wells noted it's 42 feet thick at
5 water, meaning that multiple constituents show an	5 Papa Squirrel and 87 feet thick at Severitas.
6 increase in in enrichment. And in the west half of	6 DR. AMPOMAH: Are there any extra
7 the field, we've seen a valid mixing relationship	7 fractures in this area that you're aware of?
8 between frac water and Avalon water, suggesting that	8 MR. PARIZEK: That
9 we were seeing migrated frac fluid up.	9 DR. AMPOMAH: Multiple fractures?
10 But again, we don't have water samples	10 MR. PARIZEK: In the in the Bone
11 for all of the different benches, so we don't know	11 Spring Lime?
12 whether that's potentially coming from another bench	12 DR. AMPOMAH: In the Bone Spring. Also
13 that we don't have to sample for. But we again,	13 the Brushy Canyon, and also the actual injection zones
14 valid mixing relationships in those cases.	14 that you target?
15 DR. AMPOMAH: So let me ask you this on	15 MR. PARIZEK: Not that I'm aware of.
16 your experience in this area. Why does it take	16 DR. AMPOMAH: So you don't believe
17 induction rates for in this area?	17 could there be a possibility that there could be an
18 MR. PARIZEK: The only example that I	18 existent fracture is causing some of the
19 have knowledge of is the one that I shared on	19 communications?
20 DR. AMPOMAH: [Unintelligible response]	20 MR. PARIZEK: The the image logs
21 MR. PARIZEK: Yes. I believe it	21 that have been acquired over the area generally show
22 that is	22 and I'm speaking just in general in the Permian
23 DR. AMPOMAH: 118?	23 that the vast majority of fractures are are healed
24 MR. PARIZEK: 118. That the typical	24 or sealed.
25 rate for that well is between 2,000 and 4,000 barrels	25 DR. AMPOMAH: So there's no need to get
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44 (Pages 170 - 173)

1 a	1 EXAMINATION
2 MR. PARIZEK: The I think it would	2 BY MS. HARDY:
3 be I don't I don't know the answer to that.	3 Q Can you confirm that for a Wolfcamp frac
4 DR. AMPOMAH: Thank you.	4 that you'd give with an Avalon producer, there would
5 MR. PARIZEK: Thank you.	5 have to be a breach in the Bone Spring Lime?
6 MR. FUGE: Mr. Bloom?	6 A There would not.
7 MR. BLOOM: No questions. Ms. Hardy	7 Q There would not have to be a breach?
8 and Dr. Ampomah asked my questions there. Thank you.	8 A So Avalon lies below the Bone Spring Lime as
9 MR. FUGE: I just had one, and it goes	9 does the Wolfcamp, so it would not require a breach.
10 back to your testimony. 2016, if I was understanding	10 Q And I think you said this earlier, but can
11 it correctly, you referred to re-looking at some of	11 you confirm that you're not able to identify the
12 the case studies there that the operator group came up	12 fracture pathways that allowed the communication
13 with. And at the time they'd attributed to SWD. But	13 that's a result of the 3D seismic analysis?
14 in looking at it more closely, you know, it at least	14 A That's correct.
15 equally attributed in your testimony of kind of the	15 Q Based on Chevron's experience with
16 Wolfcamp A completion.	16 stimulation appearance between Wolfcamp fracs and
17 Why wasn't some of that analysis	17 Avalon producers, have you seen an immediate response
18 done in 2016? Was the data not available? I'm just	18 in the producer while stimulation operations are
19 curious of the change in sort of the conclusions and	19 occurring?
20 the source.	20 A We have with pressure. We did see pressure
21 MR. PARIZEK: I I wasn't part of the	21 response increase during the Wolfcamp completion.
22 work group in 2016. But I will I would suspect	22 Q Does Chevron shut in its Avalon producers
23 that seeing Wolfcamp fractured interactions with	23 while fracturing the live Wolfcamp horizontal wells?
24 Avalon was probably something that they weren't	24 A We do not.
25 considering at that time. And having experienced that	25 Q Does Chevron surface commingle its Avalon
Page 174	Page 176
1 in our area, that's what prompted us to to revisit	1 Wolfcamp wells?
2 that.	2 A I don't know.
3 And in fact, when I started out here in	3 Q What if your graphs shows water production
4 the Permian Basin, that was you know, that study	4 versus gas-oil-ratio? That should be on slide 112.
5 was kind of a foundation that that I use in	5 And is that a plot of the production from a pad or
6 evaluating Solada Draw area in general. And when we	6 from an individual well?
7 started to see the the production changes in our	7 A The which plot?
8 Avalon wells around the time that we were completing	8 Q The water production versus gas-oil-ratio?
9 the Wolfcamp fracs, we did test water and we were	9 A That's an individual well.
10 seeing different water chemistry that we had observed	10 Q Would Chevron consider this a tight curve
11 in the wells that we suspected to be watered out by	11 for Wolfcamp frac to Avalon producer interference?
12 the DMG.	12 A Can you rephrase?
13 So that suggested to us that that SWD	13 Q Sure. I'll ask it again. Would Chevron
14 to Avalon model wasn't an explanation for what we were	14 consider this plot a tight curve for Wolfcamp frac to
15 observing and caused us to to investigate other	15 Avalon producer interference?
16 other causes being built at Wolfcamp A.	16 A We we have not seen this type of response
17 MR. FUGE: No further questions.	17 everywhere. Some of them were positive
18 MS. HARDY: Mr. Chair?	18 fracture-driven interactions. This represents a
19 MR. FUGE: Yes, I'm sorry.	19 negative fracture-driven interaction. So there is not
20 MS. HARDY: I apologize. Would it be	20 a a single response to those interactions. So no.
21 possible for me to ask a couple more questions	21 Q And is the entire production history of that
22 following Dr. Ampomah's questions?	22 well, that shelf on the
23 MR. FUGE: Yeah, that's fine.	23 A I don't recall.
24 MS. HARDY: Thank you. I'll be quick.	24 MS. HARDY: That's all my questions.
25 //	25 Thank you.
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45 (Pages 174 - 177)

1 MR. FUGE: I think the witness is	1 production engineer for about two and a half years.
2 excused.	2 Following that, I transferred out here to the Permian
3 MR. DEBRINE: Yeah, no further	3 Basin as a reservoir engineer.
4 questions. We'll reserve the opportunity to call on	4 I get into our asset development groups who
5 him for rebuttal.	5 do drilling or do horizontal wells. My primary area
6 MR. FUGE: Okay.	6 of focus was in the Midland Basin where I was at
7 MR. DEBRINE: Chevron calls its next	7 had the opportunity to bring online approximately 200
8 witness Bryce Taylor.	8 unconventional wells across my tenure there. That
9 MR. FUGE: May I ask the court reporter	9 lasted about four and a half years.
10 to swear in the witness?	10 And then at the beginning of 2022, I moved
11 THE REPORTER: Please raise your right	11 into my current role, which is our water strategies
12 hand.	12 senior petroleum engineering advisor for the entire
13 WHEREUPON,	13 Permian. And this role is primarily focused on
14 BRYCE TAYLOR,	14 long-term water produced water handling strategy.
15 called as a witness and having been first duly sworn	15 It's focused on their program and really the
16 to tell the truth, the whole truth, and nothing but	16 subsurface reservoir engineering related tasks and
17 the truth, was examined and testified as follows:	17 analyses as they relate to our produced produced
18 MR. FUGE: Thank you.	18 water.
19 You may begin.	19 Q You said your responsibility includes the
20 EXAMINATION	20 entire Permian, which obviously is part of New Mexico?
21 BY MR. DEBRINE:	21 A That is correct.
22 Q Could you please state your name for the	22 Q Have you ever testified before the Oil
23 record?	23 Conservation Commission or Division?
A Yes, my name is Bryce Taylor.	24 A I have not.
25 Q Who do you work for, Mr. Taylor? Page 178	25 Q Are you familiar with the applications that Page 180
I age 176	1 age 180
1 A I work for Chevron.	1 Chevron has filed in these two cases?
1       A       I work for Chevron.         2       Q       How long have you worked for Chevron?	<ol> <li>Chevron has filed in these two cases?</li> <li>A I am.</li> </ol>
	<ul><li>2 A I am.</li><li>3 Q Are you familiar with the two wells that are</li></ul>
2 Q How long have you worked for Chevron?	<ul> <li>2 A I am.</li> <li>3 Q Are you familiar with the two wells that are</li> <li>4 the subject of Chevron's pilot project underlying</li> </ul>
<ul> <li>2 Q How long have you worked for Chevron?</li> <li>3 A I've worked for Chevron for approximately 11</li> </ul>	<ul><li>2 A I am.</li><li>3 Q Are you familiar with the two wells that are</li></ul>
<ul> <li>2 Q How long have you worked for Chevron?</li> <li>3 A I've worked for Chevron for approximately 11</li> <li>4 years.</li> </ul>	<ul> <li>2 A I am.</li> <li>3 Q Are you familiar with the two wells that are</li> <li>4 the subject of Chevron's pilot project underlying</li> </ul>
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1       Larrel insertione.       1       harrel iper day over that month.         2       Lake have an assessment of some modeling a work, how we identify analogs for the SWD wells, and a replying those analogs to these - these two wells in 5 Guestion, the Papa Squired and Severitas to mole all severitas to mole Severitas.       1       The decline portion of the analysis covers 3         3       an area or a timeframe of approximately five to ten 4       years, as you can see indicated there by the straight 5         6       which will include what their ratius of impact will see withing the theorem the portochron points on the right to       6         9       reservoir pressures could react over time as we inject 10       0         10       warre into these SVDS.       10         11       And finally, II give a brief overview of 12       11         12       our - our surface operations of our SWDs and the 13       12       calculate its remaining potentia.         13       Soconistiones and the parits, the exhibits we'e 15       5       calculate its remaining tote and the contention of 10         15       Soconistiones and the parits, the exhibits we'e 15       30.37 precent per year. Extrapolating that decline 10         15       Soconistiones and the parits, the exhibits we'e 15       30.40 precent per year. Extrapolating that decline 10         15       Soconistiones and the parits, the exhibits we'e 15       10       10 <td< th=""><th></th><th></th></td<>		
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Page 183 Page 185	<ul> <li>17 dates back to, you know, 1960s, 1970s. This is the</li> <li>18 entire production history of the well, so this</li> <li>19 includes its primary production and secondary recovery</li> <li>20 portions of its life.</li> <li>21 The analysis the decline analysis that I</li> <li>22 conducted took into account approximately and each</li> <li>23 dot here sorry, on the chart. Green dot represents</li> </ul>	<ul> <li>17 Q And I believe that begins on page 147?</li> <li>18 A Yes, it does.</li> <li>19 Q If you could just explain to the</li> <li>20 commissioners what you did and what you found out</li> <li>21 about this exhibit.</li> <li>22 A Yes. So this is a very similar methodology.</li> <li>23 The only difference being this is rolling up and</li> </ul>
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<sup>47 (</sup>Pages 182 - 185)

11data we - we get. So you can see there there's a - 2 a couple of plots. The - the central plot there on 3 order have been a - the well' count of about 20 outles 3 which continued through 2022. Decliming out those 20 4 wells also resulted in a 33.82 percent annual decline 5 ruta against avery high caling. Had the three 6 individual wells examined. 7 The cutoff rutal choos for this analysis 8 was 30 barres is a month for the entire field. 10 This is projecting with that cutoff rutal for a field. 11 to potentially in the next year with only 1300 barrels 12 of all remaining. 13 Tot 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, he 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. 18 of produced for a long life and are depleted. 19 optential impacts to the EIMar Fields? 12 on the remaining reserves to the EIMar Fields? 12 on drumer DMG productions driue your analysis with respect to the impact of the wells on either existing 3 DMG production or thrue DMG production? 4 a Yess. 19 Q And what conclusions did you reach? 6 A Reached that there - could you restate the 7 question?14 the first stop atter well drilling "right below a new coasing shoe 10 up ressure. We econtinue to pump there. Well actually 2 reserve of the ceptor firmation. First and the projector? 2 A My conclusion is that there would be - not 23 be an impact with respect to the wells on either existing 3 DMG production or thure DMG production? 4 a Yess. 14 as the Division's concerned that express with regard 15 Q. Lefts now trunt to your analysis with regard to their concerns with 9 respect to the effect of the pilot wells on existing 10 and future DMG productions tha				
3       which continued through 2022. Declining out those 20       3       the - on the slide is a representation of typical         4       wells also resulted in a 33.82 percent annual decline       5       So the first portion labeled by PIT there         6       individual wells examined.       5       So the first portion labeled by PIT there         6       individual wells examined.       7       The curoff rate Chose for this analysis         9       wersy small amount of - a very small rate for a field.       7       The curoff rate Chose for this analysis         9       very small amount of - a very small rate for a field.       10       Q       And you're referring to the first graph on         11       to potentially in the next year with only 1300 barrels       10       Q       And you're referring to the first graph on         13       tri dato like to apologize on the exhibit.       14       the formation over a period of finice. As that fuid is         14       the any advise with respect to the impact of the wells       11       the bin me is the pump pressure.         19       Q And so what conclusions did you ravel/       10       the sum pressure is monination         20       your analysis with respect to the graph, which is - stands for leak-off test. So       11       the bine is the pump pressure.         19       S to thif regard to their concerns with				
4wells also resulted in a 33.82 percent annual decline4behavior as we conduct these tests.5rate against a very high ceiling. Had the three5So the first portion labeled by FIT there6individual vells examined.5So the first portion labeled by FIT there7The cutoff rate I choose for this analysis7typically done to evaluate the strength and integrity8was 30 barels a month for the entire field. That's a9of the new formation. And it's the first graph on11to poetainly in the next year with only 1300 barels10QAnd you're referring to the first graph on13to poetainly in the next year with only 1300 barels12AThat's correct. After the formation and13Ta labo like to apologize on the exhibit.13access, the small amounts of fluid will be pumped into14We have a box there. We have kind of a blank there16there, the blac line - sorry and the green there17in 977. So these were old wells. You know, we kind16there, the blac line - sorry and the green there17in 977. So these were old wells. You know, we kind18of produced for a long life and are depleted.20you conclusion is that there would be on tot20integrity test. The so21A My conclusions did you draw from20integrity test. The weotime to pump oil and build21or other advest the there would be on the resting.330an impact due to the fact that the built it2424should be depleted.21 <td>1</td> <td></td> <td></td> <td></td>	1			
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	23	like, for those who are not familiar with the with	23	the pressure data and time in order to find some
25 the typical behavior of loak off tests, what kind of 25 englysis today, as this is just a summary of the of	24	an extended leak-out test just to walk us through it,	24	trends. Not going to go into detail on that specific
	25	the typical behavior of leak-off tests, what kind of	25	analysis today, as this is just a summary of the of
Page 187 Page 189		Page 187	1	Page 189

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1 the test.	1 the red outlined boxes and the table there out of that
2 But you will be able to find a point, which	2 second one up from the bottom on the leftmost is,
3 is indicative of the fracture closure pressure. And	3 like, 1.22. That was the minimum stress gradient or
4 that's how we get that datapoint. And as to your	4 the fracture closure pressure identified in Cycle 1
5 question, we conducted a test on in October of 2022	5 was 1.22 psi.
6 on a well in Texas. It'd be 174WA. That is in our	6 But Cycle 2, we would expect it to be weaker
7 Delaware Ranch Field, which is if you think where the	7 since we've already fractured the rock in the first
8 Severitas location is, it's approximately 25 to 30	8 cycle. It dropped down to 1.15. And then the
9 miles southwest that over in Texas.	9 Cycle 3, a little bit hard to interpret, but it was
10 The reason why we decided on a location is	10 between 1.1 and 1.14. So we figured that's our
11 that the DMG gets a lot shallower as you go to the	11 that fracture parting pressure or that fracture
12 west. The the overburden thins, and due to how	12 closure stress.
13 much shallower the Lamar is at this point, less of an	13 The other point that is interesting is that
14 overburden, this was considered a good spot test in a	14 we look at the at the other red box there, the
15 conservative nature what the strength of that, that	15 leak-out pressure and pounds per gallon. And actually
16 Lamar is.	16 all it is, it's not actually in the table in psi per
17 We expected it to be much stronger as it	17 foot.
18 gets deeper, and the overburden grows to the east as	18 But on the the third bullet down on that
19 is where our Severitas and Papa Squirrel wells were	19 right side, I I calculated when that ppg would be
20 located. So I mean, this kind of represents a more	20 and psi per clip, to identify that leak-off point,
21 conservative estimate of the strength of that of	21 which again is that point at which the the
22 the Lamar. You can see there that graph graph in	22 formation first starts to become compromised and
23 the top right of the chart or the slide, this is the	23 starts taking fluid. And that wasn't until 1.5 to
24 behavior of the actual XLOT test that we noted as	24 1.53 psi per foot.
25 well. And you can see we saw the leak-off point, but Page 190	25 Q You're referring to the second bullet on the Page 192
1 we never actually reached formation breakdown	1 right?
2 pressure.	2 A I believe it's third bullet on the on the
3 The the formation was so strong that our	
	3 right. Yep.
4 pump capacity was reached in the pump tricks before we	4 So if we take that yeah. So again, just
<ul><li>4 pump capacity was reached in the pump tricks before we</li><li>5 were able to actually see the the formation</li></ul>	4 So if we take that yeah. So again, just 5 another another datapoint to share how strong this
<ul> <li>4 pump capacity was reached in the pump tricks before we</li> <li>5 were able to actually see the the formation</li> <li>6 breakdown. That's a very good good information</li> </ul>	<ul> <li>4 So if we take that yeah. So again, just</li> <li>5 another another datapoint to share how strong this</li> <li>6 formation is. Now, if we look at actual injection</li> </ul>
<ul> <li>4 pump capacity was reached in the pump tricks before we</li> <li>5 were able to actually see the the formation</li> <li>6 breakdown. That's a very good good information</li> <li>7 that we have a very, very strong pump at Castile. The</li> </ul>	<ul> <li>4 So if we take that yeah. So again, just</li> <li>5 another another datapoint to share how strong this</li> <li>6 formation is. Now, if we look at actual injection</li> <li>7 operation in in the state of New Mexico and as</li> </ul>
<ul> <li>4 pump capacity was reached in the pump tricks before we</li> <li>5 were able to actually see the the formation</li> <li>6 breakdown. That's a very good good information</li> <li>7 that we have a very, very strong pump at Castile. The</li> <li>8 surface pressure at that point was 2200 psi.</li> </ul>	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
<ul> <li>4 pump capacity was reached in the pump tricks before we</li> <li>5 were able to actually see the the formation</li> <li>6 breakdown. That's a very good good information</li> <li>7 that we have a very, very strong pump at Castile. The</li> <li>8 surface pressure at that point was 2200 psi.</li> <li>9 As you will recall from our request for</li> </ul>	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
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<sup>49 (</sup>Pages 190 - 193)

1 stress gradient, it's at the yeah, that 1.1 to 1.2	1 slide. So what rate transient analysis is, is it lets
2 range, that parting pressure, again much higher. So	2 us take the rate data and pressure data from either
3 that I'll just direct you to the kind of the	3 producer or injector in this case an injector
4 summary box there on the bottom of the slide. This	4 and transform that data through derivatives, pressure
5 gives us a safety factor of 1.57 to 1.74 depending on	5 differences, different ways to look at time.
6 if you're looking at the that 1.1 psi per foot for	6 And we can plot out those those
7 minimum stress gradient or one of the higher numbers.	7 transforms. And then we know that there's several
8 So all this to say that seal is very confident and we	8 analytical solutions, the models of reservoirs that
9 don't see any chance of really breaking it down during	9 will match the characteristics we see in that data.
10 normal injection operations.	10 And so what we're able to do is kind of pick and
11 Q And again, it's much thicker in the areas of	11 choose these different reservoir models, match it to
12 the two wells of the pilot project than the wells	12 the data, and and then finetune different
13 where you conducted the leak-off test?	13 parameters such as our permeability, porosity,
14 A The Lamar itself, I'm not sure. I do know	14 thickness, the injection radius, or what how big
15 that the relatively it's going to be the same. But	15 your big your reservoir is.
16 it's similar in thickness. The the question is the	16 You can find it there's other parameters
17 overburden, since we're much deeper, there's just more	17 we can we can tune. But we can do all of that and
18 rock between the the Lamar and the surface.	18 essentially match the data to one of those reservoir
19 And as Tom Merrifield pointed out in his	19 models. And that gives us a a good approximation
20 testimony earlier, we did see our subject matter	20 of what the reservoir looks like that the well is
21 experts when they were analyzing this data did see	21 injecting into.
22 additional a lot of this additional strength. And	22 Q And the parameters you described, are those
23 part of the Lamar was due to that Castile and the	23 all shown on page 153?
24 overburdened formations that were right there. So do	A Yeah, these are some of the parameters, the
25 expect it to be stronger to where we have our our	25 ones we we thought were most useful for the
Page 194	Page 196
1 two wells pumped.	1 subsequent steps of modeling. So again, with with
2 Q We can turn now to the injection modeling	2 the rate transient analysis, the you know, we
3 that you did with respect to the two wells?	3 mentioned earlier that, you know, permeability in the
4 A Yes.	4 hearing was a was a question. How can we
5 Q It begins on page 151. And let's turn to	5 understand permeability?
6 page 152, which is the locator data.	6 So one way to major that is is through
7 A Yes. So in this next section, I'm going to	7 this rate transient analysis, which you get
8 talk a little bit about rate transient analysis, what	8 permeability goes directly into how much our wells
9 that is, and how we used it for our to figure out	9 will improve from a rate standpoint. The other really
10 our analogs to then be able to stimulate the the	10 important thing when it comes to SWDs is how far do
11 performance of the Severitas and Papa Squirrel.	11 they inject.
12 Though just to orient everyone, you can see	12 Most of these injectors can be described by
13 on the map the Severitas well in green with the	13 a relatively simple model. It is a essentially, a
14 green star and Papa Squirrel with the blue star. And	14 radial flow model with the steady state radial flow
15 then there's these markers across the state line down	15 model. An easy way to think about that is I have got
16 to Texas. Those represent wells that were were	16 a cylinder with my well right at the center of the
17 used as our analogs, so those are all DMG SWD wells.	17 cylinder, and that cylinder represents my reservoir so
18The reason why we were able to use these	18 the it represents the storage tank.
19 wells is because they publicly reported data on these	19 And so at the edges of the cylinder and the
20 wells on daily rates and daily pressures, which for	20 model, we have what is called a new flow boundary.
21 RTA analysis is what we would like to see.	21 Just a point where the really, the end of the
22 Q And just for laymen's terms, what is rate	22 influence of the the specific injector. We'll see
23 transient analysis?	23 pressure influence beyond that or the the long-term
24 A Rate transient analysis. So I will actually	24 fluid influence beyond that, you know, flow boundary.
25 get to get into it's a good segue to the next	25 So we're trying to determine the how the
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1	R2SWD wells will impact the surrounding reservoir, how	1	barrels of water over the life of the well. The
2	far out will the injection go. This was a way to	2	and that cumulative storage, as we'll see in a second,
3	understand statistically what SWDs typically do. And	3	it's really dependent on depth. And that's mostly
4	you can see there in the table kind of the summary of	4	because the depth is directly tied to the maximum
5	those calculated values where kind of the median	5	allowable surface injection pressure.
6	the calculated value for injection radius was 8,979	6	So this well in particular, again, at that
7	feet. Permeability was the in that median value	7	location, you know, just under 29 million barrels, I
8	was about 13 millidarcy.	8	have here in the chart at the top right the outputs of
9	And then the other thing to to point out	9	the great profiles for this well with the the three
10	is the cumulative injection number. So the other	10	different scenarios reflecting different
11	thing rate transient analysis lets us do is forecast	11	permeabilities.
12	the well out beyond his production history. So once	12	So we set the model with the parameters of
13	we've got or injection history in this case. So	13	the injection into the Bell and the Cherry with that
14	once we have a good match on the for our model.	14	8,979-foot boundary radius, which correlates to about
15	We're able to match that those actual rate and	15	1.7 miles. And with the corresponding porosity values
16	pressure datas with the with the model.	16	that we we got from our geologic assessments of the
17	We can then use that use the program to -	17	area and then we applied the different permeability
18	- the computer program we're using to do this. It's	18	here to understand what are low, mid, and high cases.
19	called Kappa, and it's got multiple different software	19	And you could see those by the blue line,
20	suites. So let let's us do the rate transient	20	orange line, and gray line for this location. And so
21	analysis and other things. Anyway the the software	21	we have a, you know, expected range of anywhere
22	will then allow us to forecast out the just what	22	between just under 4,000 barrels of water per day to
23	the performance at this well or these injectors will	23	just over 12,000 barrels of water per day for this
24	be like over a number of years.	24	well.
25	And so we can essentially forecast that out	25	Q Did you also look at the effect of the
	Page 198		Page 200
1	to the end of life by setting the maximum allowed	1	injection reservoir over time?
2	surface injection pressure, which is our constraint,	2	A Yes, we did.
3	and then letting the model run and the driver behind	3	Q If you could turn to page 155.
4	the decline that we see in the injectors is the	4	A So this assessment is to show how that
5	reservoir pressure within that no-flow boundary	5	reservoir pressure within that no-flow boundary radius
6	increasing.	6	will increase over time. So as you can see there, on
7	Eventually, that reservoir pressure will	7	the plot and the Y axis, we have pressure that is
8	increase such that it equalizes with the bottomhole	8	represents the reservoir pressure taken at the top of
9	injection pressure with the well, and at that point	9	the Bell Canyon, which would be the top of our
10	more fluid can go into the reservoir. And so that	10	injection interval, and then the X axis is the depth
11	that tells us what the total storage is of the DMG		of the investigation. So like depending on spatially
	injector.		how far away I am from that injector what what I
13			would expect the reservoir pressure to be.
14	you did for the two wells pilot project.	14	And you can see that travels out to just
15		15	below that 9,000 foot mark. So we end up using that
16	Q The first one begins on page 154 for the		same kind of median injection radius there. Each line
17	Severitas well.		represents a different amount of cumulative injection.
18	A Yes.		And this model was based on darcy radial flow,
19			radial flow.
	this shows and the data and the conclusions you	20	Q And so the bottom line conclusion that you
	reached?		reached?
22		22	A Yes. So you can see there in the gray box
23			after years there even the colors are corresponding to
	And the headline for this for this well is the		that low, mid, and high permeability cases that we
	cumulative storage at this location is 28.8 million		looked at on the previous charts. Just speaking to
	Page 199		Page 201
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<sup>51 (</sup>Pages 198 - 201)

1       the mid-case, which was that 13 millidarcy. You can       1       look ino?         2       schw long it wold take for this will to pressure       2       A Yeah, so I – this is to share with the         2       as a this time goes by.       3       Commission and others present, just our – how we         4       And so to get to that, that orange line       5       childing and others present. Just our – how we         5       there, which represents 2000 billion barrels injected       6       to yaus. So typically, how we – and Davis reflects         7       that we per a shallow SWDs today our over Texas.       7       that we per are shallow SWDs today our over Texas.         9       that, even a 300-psi increase would be realized in the       7       So typically, how we – and Davis reflects         1       to that's due to how – how large the injection       10       So typically, we have the cental duality         11       to that's due to how – how large the injection       11       or So typically, we have the cental duality         12       ast fifther with per singers       11       or So typically, we have the cental duality         12       ast fifther with searce in New       9       Mexica and the – the ones we saw ourer in Texas.         13       Q. Left that we optical ast ont texp stain       11       or Su that's in well of the water to send				
3 up as a - as this time goes by.       3 commission and others present, just our - how we         4 And so to get to that, that orange line       4 typically operate our SWDs. This is related to our         5 there, which represents 200 billion barrels injection       5 facilities and operations teams, and 1m relaying that         6 and roughly 300 psi increase from starting conditions       7 duat we operate shallow SWDs today out over Texas as         8 So we're looking at over a decade before       8 well as the deep SWDs that we still have here in New         9 that, even a 300-psi increase would be realized in the       9 Mexico and the - the ones we saw over in Texas.         10 reservoir. But that is - that's not very fast. A       10 So typically, we have the entral facility         11 of oth affs due to how how large the injection       12 of SWD facilities which process the water and, well,         12 adults as at that 1.7 mile approximate radius.       13 of clear it op at skim well of the water to sent 04         14 Squirrel well, which begins on page 156.       15 A Yes. So for the Papa Squirrel well,       14 facture strafter presente, which         18 examilative strafter.       16 mentioned carlier, this well is much decyer. Youg et mere       16 mentioned the injection rates for the low and may is the et all wells. Each wells         12 using the thicknesses of the Bell and Cherny and the       20 or the rase that we would like to sent to each         23 we simulated the injection rates for the low rates are constantly monitored </td <td>1</td> <td>the mid-case, which was that 13 millidarcy. You can</td> <td>1</td> <td>look into?</td>	1	the mid-case, which was that 13 millidarcy. You can	1	look into?
4And 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 mould 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 18 cumulative stores. 19 We've -we've kept the same - same size 10 reservoir. But you know, 8,797-foot boundary radius 20 corresponding porosities at this location. And then 21 using the chicknesses 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 casea gain, represented by the bube, cornage, and gray 25 curves there on that run plot there at the tory right. 3 Wou can see the	2	see how long it would take for this swell to pressure	2	A Yeah, so I this is to share with the
5       fact, which represents 200 billion barrels injected       5       factifies and operations teams, and Tm claying that         6       and roughl 300 psi increase from starting conditions       6       to you. So typically, how we and Davis reflects         7       would take 13 years.       7       Well as the deep SWDs that we still have here in New         9       that, even a 300-psi increase would be realized in the       9       Mexico and the the ones we saw over in Texas.         10       reservoir. But that is that's not very fast. A       10       So typically, we have the central facility         11       tof that's due to how how large the injection       11       or SUD facilities which process the water and, well,         12       aligher surface pressure, and in turn you get more       13       and clean it up at skim well off of the water to send         14       Squirrel well, which begins on page 156.       14       back for processing.       16         13       a clean it up at skim well off of the water to send       18       carry it to a network of SWD wells. Each well is         14       squirrel well, which the same - same size       16       prumerys, positice displacement pumps, 17         14       saminal ethe in corrison starts of the ball and Cherry and the       2       corresponding porosities at this location. And the -       2       or the class that we wou	3	up as a as this time goes by.	3	Commission and others present, just our how we
6and roughly 300 psi increase from starting conditions6to you. So typically, how we - and Davis reflects7would take 13 years.7that we operate shallow SWDs today out over Texas as8So we're looking at over a decade before8Well as the decy SWDs that we suill have here in New9that, even a 300-psi increase would be realized in the9Mexico and thethe ones we saw over in Texas.10reservoir. But that is that's not very fast. A10So typically, we have the central facility11toof that's due to how how large the injection11or SWD facilities which process the water and well,12adius as at that 1.7 mile approximate radius.10SWD facilities which process the water is sent of13QLet's turn to your analysis of the Papa11or SWD facilities which process the water is sent of14Squirrel well, which begins on page 156.14back for processing.15A Yes. So for the Papa Squirrel well, 115And then eventually the water is sent of H16mentioned carlier, this well is much decper. You got10or PLC at the well of SID outputs20reservoir, but you know, 8,979-foot boundary radius21or the carls that we would like to send to each21exemulative storage.20or PLC at the well site, they have two chokes which21cases again, represented by the blue, orange, and gry24cases again, represented of the field, errorage, and gry24cases again, represented of to 6 millidarey, 131injection pressur				
7would take 13 years.7that we operate shallow SWDs today out over Texas as8So we're looking at over a decade before9Mexico and thethe ones we saw over in Texas.10reservoir. But that is that's not very fast. A10So typically, we have the central facility11lot of that's due to how how large the injection11or SWD facilities which process the water and, well,12radius as at that 1.7 mile approximate radius.10So typically, we have the central facility13Q Let's turn to your analysis of the Papa13and clean it up at skim well off of the water to send14Squirrel well, which begins on page 156.14back for processing.15A Yes. So for the Papa Squirrel well, I15And then eventually the water is sent to H16mentioned earlier, this well is much deeper. You get15And then eventually the water is sent to H17a wing the thicknesses of the Bell and Cherry and the20or PLC at the well sit, they have two chokes which21corresponding porosities at this location. And then22or the ates that we would like to send to each23we simulated the injection rates for the low and high24The flow rates are constantly monitored24a xe simulated the injection rates for the predicted rates for11injection pressure set point at about 25 point for whatever set point18bindicary, 03 0 millidarcy, 1311injection pressure set point at about 25 point for whatever set point at about 25 point for whatever set point at about 25 point for whatever	5	there, which represents 200 billion barrels injected	5	facilities and operations teams, and I'm relaying that
8So we're looking at over a decade before99well as the deep SWDs that we still have here in New99the cons we saw over in Texas.10restroving Text that is - what's not very first. A1110Stypically, we have the central facility1111of that's due to how - how large the injection1111SWD facilities which process the water and, well,12radius as at that 1.7 mile approximate radius.12talk about it. It's - they also have filtered well13QLet's turn to your analysis of the Papa13and clean it up at skim well off of the water to send14Squirrel well, which begins on page 156.15A Yes. So for the Papa Squirrel well, 11616mentioned earlier, this well is much deeper. You gut1616pumps, positive displacement pumps17higher surface pressure, and in turn you get more16pumps, positive displacement pumps18cumulative storage.10controlled by locally by a production log controller20corresponding porostities at this location. And then23individual well.21using the tricknesses of the Bell and Chary and thigh23individual well.23weismulated the injection rates for the low and high23individual well.24case again, represented by the bhel, orange, and gru23individual well.23weismulated the injection rates for the low and high23individual well.3weismulated the injection rates for the low and sy south atheore st	6	and roughly 300 psi increase from starting conditions	6	to you. So typically, how we and Davis reflects
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.9 Mexico and the the ones we saw over in Texas.10 To SUB facilities with process the water and, well, 12 radius as at that 1.7 mile approximate radius.10 or SUB facilities with process the water and, well, 11 or SUB facilities with process the water and, well, 12 talk about it. It's they also have filtered well13 Q Let's turn to your analysis of the Papa 14 Squirrel well, with begins on page 156.14 back for processing.15 A Yes. So for the Papa Squirrel well, 115 And then eventually the water is sent to H16 mentioned carlier, this well is much deeper. You get 17 a higher surface pressure, and it turn you get more 18 cumulative storage.15 And then eventually the water is sent to H19 We've - we've kept the same - same size 10 reservoir, but you know, 89.79-ford 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 24 The flow rates are constantly monitored 25 curves there on that run plot there at the top right. Page 2021 Should have data correspond to 6 millidarcy, 13 2 millidarcy, or 30 millidarcy.1 injection pressure set point at about 25 psi before 2 the premit maximum allowable or whatever set point 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 preday. And yes, the storage here again is just 6 preday. And yes, the storage here again is just 10 A Yes, that - yes, it - this we	7	would take 13 years.	7	that we operate shallow SWDs today out over Texas as
10reservoir. But that is that's not very fast. A10So typically, we have the central facility11lot of that's due to how how large the injection11or SWD facilities which process the water and, well,12radius as at that 1.7 mile approximate radius.12radius as at that 1.7 mile approximate radius.13QLet's turn to your analysis of the Papa13and clean it up at skim well off of the water to send14Squirrel well, which begins on page 156.14back for processing.15AYes.So typically we have the central facility16mentioned earlier, this well is much deeper. You get15A dhe vertaully the water is sent to H16mentioned earlier, this well is much deeper. You get16pumps or horizontal pumps, positive displacement pumps17ahigher surface pressure, and in turn you get more10or PLC at the well site, they have two chokes which20reservoir, but you know, 8,979-foot boundary radius20or PLC at the well site, they have two chokes which21using the thicknesses of the Bell and Cherry and the21can be ait to determine the max pressures and the22curves there on that run plot there at the top right.23individual well.24case again, represented by the blue, orange, and gray24The flow rates are constantly monitored25curves the the predicted rates for3we -we choose. You know, we worig ong up. We wont3You can see the the predicted rates for3we we we at an dower set </td <td>8</td> <td>So we're looking at over a decade before</td> <td>8</td> <td>well as the deep SWDs that we still have here in New</td>	8	So we're looking at over a decade before	8	well as the deep SWDs that we still have here in New
11       lot of that's due to how how large the injection       11       or SWD facilities which process the water and, well,         12       radius as at that 1.7 mile approximate radius.       11       or SWD facilities which process the water to send         13       Q       Let's turn to your analysis of the Papa       13       and clean it up at skim well off of the water to send         14       Squirrel well, which begins on page 156.       14       back for processing.         15       A Yes. So for the Papa Squirrel well, 1       16       pumps or horizontal pumps, positive displacement	9	that, even a 300-psi increase would be realized in the	9	Mexico and the the ones we saw over in Texas.
12       radius as at that 1.7 mile approximate radius.       12       talk about it. It's they also have filtered well         13       Q       Let's turn to your analysis of the Papa       13       and clean it up at skim well off of the water to send         14       Squirrel well, which begins on page 156.       14       hack for processing.       14       hack for processing.         15       A Yes. So for the Papa Squirrel well, I       16       mentioned earlier, this well is much deeper. You get         16       mentioned earlier, this well is much deeper. You get       16       And then eventually the water is sent to H         16       mentioned earlier, this well is much deeper. You get       16       ontrolled by locally by a production log controller         20       reservoir, but you know, 8/979-foot boundary radius       20       or PLC at the well site, they have two chokes which         21       using the thicknesses of the Bell and Cherry and the       22       or the cast back well site, they have two chokes which         22       corresponding porosities at this location. And then       initiatidace, or 30 millidarey.       21       a be sit to determine the max pressures and the         22       corresponding porosities at this location. And then       initiatidace, or 30 millidarey.       32       initiatidace, or 30 millidarey.       32         2       the permin maximu	10	reservoir. But that is that's not very fast. A	10	So typically, we have the central facility
13QLet's turn to your analysis of the Papa13and clean it up at skim well off of the water to send14Squirrel well, which begins on page 156.14back for processing.17a higher surface pressure, and in turn you get meri15A M then eventually the water is sent to H16mentioned earlier, this well is much deeper. You get15A M then eventually the water is sent to H18curnalitive storage.15and then eventually the water is sent to H19We've - we've kept the same - same size19corresponding porosities at this location. And then21using the thicknesses of the Bell and Cherry and the 22 corresponding porosities at this location. And then2122corresponding porosities at this location. And then23individual well.23eases again, represented by the blue, orange, and gray24The flow rates are constantly monitored25curves there on that run plot there at the tor pright. Page 20223oraite by flow meters. We typically set - pu toar2millidarcy, r301injection pressure set point at about 25 psib floor2millidarcy, r30 millidarcy.1injection pressure set point at about 25 psib floor3You can see the - the predicted rates for 4 this well yay between as low as 9,000 barrels of 5 water per day to just about 20,000 barrels of water14for the reservoir on time?1injection pressure set point at about 25 psib flow10A Yes, that - yes, it - this well for a 11is main time period, in this case to injec	11	lot of that's due to how how large the injection	11	or SWD facilities which process the water and, well,
14       Squirrel well, which begins on page 156.       14       back for processing.         15       A Yes. So for the Papa Squirrel well, I       16         16       mentioned earlier, this well is much deeper. You get       15       And then eventually the water is sent to H         16       mentioned earlier, this well is much deeper. You get       16       pumps or horizontal pumps, positive displacement pumps         17       where it is pushing high pressure flow lines, which       16       pumps or horizontal pumps, positive displacement pumps         18       carry it to a network of SWD wells. Each well is       19       corresponding porosities at this location. And then         20       oreservoir, but you know, 8,979-foot boundary radius       20       or herates that we would like to send to each         21       us simulated the injection rates for the low and high       21       canse sagain, represented by the blue, orange, and gray         24       a key the storage here again is just       1       injection pressure set point at about 25 psid before         2       millidarcy, or 30 millidarcy.       3       1       injection pressure set point at about 25 psid before         2       med ray to just about 20.000 barrels of       4       set is above the permit, but we have it at a lower set         3       You can see the same slow increase of       9       point	12	radius as at that 1.7 mile approximate radius.	12	talk about it. It's they also have filtered well
15A Yes. So for the Papa Squirrel well, I15And then eventually the water is sent to H16mentioned earlier, this well is much deeper. You get16pumps or horizontal pumps, positive displacement pumps17a higher surface pressure, and in turn you get more17where it is pushing high pressure flow lines, which18carry it to a network of SWD wells. Each well is19controlled by locally by a production log controller20reservoir, but you know, 8,979-foot boundary radius20or PLC at the well site, they have two chokes which21using the thicknesses of the Bell and Cherry and the21can be sit to determine the max pressures and the -22corresponding porosities at this location. And then23is to determine the max pressures and the -23cases again, represented by the blue, orange, and gray24The flow rates are constantly monitored25curves there on that run plot there at the top right.25onise by flow meters. We typically set - put our Page 20226rule and yeas, the storage here again is just1injection pressure set point at alower set3water per day to just about 20,000 barrels of 9 pressure of the reservoir on time?1110AYes, that - yes, it - this well for a111similar time period, in this case to inject 40 million10is end tow sate proint, yeah, a call10AYes, that - yes, it - this well for a1111singlard yea, fis, yis at little bit higher than15in eral time for all of our operat	13	Q Let's turn to your analysis of the Papa	13	and clean it up at skim well off of the water to send
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17a higher surface pressure, and in turn you get more 1817where it is pushing high pressure flow lines, which 1818cumulative storage.17where it is pushing high pressure flow lines, which 1819We've we've kept the same same size 20reservoir, but you know, 8,979-foot boundary radius 2118carry it to a network of SWD wells. Each well is 1920reservoir, but you know, 8,979-foot boundary radius 22orresponding porosities at this location. And then 2220or PLC at the well site, they have two chokes which 2121using the thicknesses of the Bell and Cherry and the 2221cases again, represented by the blue, orange, and gray 2323individual well.24cases again, represented by the blue, orange, and gray 2524The flow rates are constantly monitored 252325curves there on that run plot there at the top right. Page 2027Meeters. We typically set put our Page 20425millidarcy, or 30 millidarcy. 31injection pressure set point at about 25 psid before 212multidarcy, or 30 millidarcy. 31injection pressure set point at about 25 psid before 213You can see the the predicted rates for 4this well yay to just about 20,000 barrels of 914this well yay to just about 20,000 barrels of 91set it about 25 psid before 26per day. And yes, the storage here again is just 77We have automated processes and alarns so 88QAnd if y	15	A Yes. So for the Papa Squirrel well, I	15	And then eventually the water is sent to H
18 cumulative storage.       18 carry it to a network of SWD wells. Each well is         19       We've we've kept the same same size       20         20       reservoir, but you know, 8,979-foot boundary ratius       20         21       using the thicknesses of the Bell and Cherry and the       22       corresponding porosities at this location. And then         22       corresponding porosities at this location. And then       23       individual well.         24       cases again, represented by the blue, orange, and gray       25       curves there on that run plot there at the top right.         25       curves there on that run plot there at the top right.       Page 204         1       Should have data correspond to 6 millidarcy, 13       1       injection pressure set point at about 25 psid before         2       1 should have data correspond to 6 millidarcy.       3       we we choose. You know, we won't go up. We won't         3       we case the the predicted rates for       4       set it above the premit, but we have it at a lower set         5       water per day. And yes, the storage here again is just       7       We have automated processes and alarms so         8       Q And if you see the same slow increase of       9       more than 30 seconds above the set point, yeah, a call         10       A Yes, that - yes, it - this well for a       11	16	mentioned earlier, this well is much deeper. You get	16	pumps or horizontal pumps, positive displacement pumps
19       We've we've kept the same same size       19       controlled by locally by a production log controller         20       reservoir, but you know, 8,979-foot boundary radius       20       or PLC at the well site, they have two chokes which         21       using the thicknesses of the Bell and Cherry and the       20       or PLC at the well site, they have two chokes which         23       corresponding porosities at this location. And then       20       or PLC at the well site, they have two chokes which         23       cases again, represented by the blue, orange, and gray       22       or the rates that we would like to send to each         24       cases again, represented by the blue, orange, and gray       23       individual well.         25       curves there on that run plot there at the top right.       Page 204       The flow rates are constantly monitored         25       millidarcy, or 30 millidarcy.       3       You can see the the predicted rates for       4       4       4 set it above the permit, but we have it a lower set       5         3       You can see the same slow increase of       9       pressure of the reservoir on time?       9       1       inejectual pressure reason that would have a similar         6       per day. And yes, the storage here again is just       7       We have automated processes and alarms so       8       that if the pressure increases	17	a higher surface pressure, and in turn you get more	17	where it is pushing high pressure flow lines, which
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	24	A Yes.	24	the data that you collect?
Page 203 Page 205	25		25	
		Page 203		Page 205

<sup>52 (</sup>Pages 202 - 205)

1			
	an example for the types of data that we look at in	1	A Yes.
2	real time. The shortlist data real time by our SCADA	2	Q If you could just walk through this with the
3	units that and all of it's pulled into our	3	Commission?
4	integrated operations center.	4	A Yes, I will.
5	And so it data such as flow rate,	5	So first and foremost, our our proposed
6	injection pressure, downhole pressures, control valve	6	SWD wells are in the best interests of conservation,
7	pressures, casing pressure, temperatures, et cetera,	7	prevention of waste, and will not impair our
8	are a lot more monitoring that I'm not sure here that	8	correlative rights. The nearest DMG producers and
9	we have at the actual facilities and the tanks favor	9	fields whose injectors are depleted, that Lamar
10	themselves. But I just wanted to give everyone a	10	limestone is a very confident seal of the DMG which to
11	sense of the the type of real time data collection	11	provide their containment looking for production
12	that we we have in place already, we plan to	12	numbers that are associated with the SWD operations do
13	implement on this new SWDs.	13	not come anywhere close to that fracture closures,
14	THE REPORTER: And by SCADA, what is	\$ 14	leak-off pressures, or breakdown pressures of Lamar.
15	that acronym?	15	Our DMG SWD analogs show that SWDs at the
16	MR. TAYLOR: Sorry. I do not know. I	16	DMG tend to influence the reservoir after about 1.7
17	cannot remember off the top of my head.		miles, and reservoir pressure in that radius is
18	MR. DEBRINE: I don't remember either.		expected to increase slowly during the the
19	BY MR. DEBRINE:		operation of our wells.
20	Q If you could turn to the next line, the page	20	And and here you can see the great
21	161 where it says, "Discusses the handling of solids	21	summarized with Severitas and Papa Squirrel.
22	to improve the quality of the alarms."	22	Severitas anywhere between 4 and 12,000 barrels of
23	A Yes. So that makes sure that everything	23	water per day and 29 million barrels in total storage,
24	in order to improve the longevity of our SWDs we	24	while Papa Squirrel, a deeper, better location
25	recognize that the water we send down them has to be	25	anywhere between about 9,000 to 20,000 barrels of
	Page 206		Page 208
1	as clean as possible. That would mean they don't want	1	water per day and 73 million barrels of storage.
2	to frac and solids are are particles that are so	2	Chevron does our standard operations for
3	big it will plug up the either the perforations or	3	SWDs feature active monitoring and control logic to
4	once it gets out into the reservoir, the pour space.	4	ensure safe operations, with real-time and
5	And so to do that, we have a couple	5	real-time data collection. And finally, our our
6	filtration devices, which will collect one or two	6	
	initiation devices, which will conect one of two	0	SWD facilities are fitted with filtration systems to
7	particles. I think the current design is a hundred		SWD facilities are fitted with filtration systems to improve injected water quality, utility, and life of
	,	7	-
8	particles. I think the current design is a hundred	7 8	improve injected water quality, utility, and life of
8 9	particles. I think the current design is a hundred mesh filters. It's always being looked at to be	7 8	improve injected water quality, utility, and life of these SWDs with all solids removed to appropriate solid waste facilities.
8 9 10	particles. I think the current design is a hundred mesh filters. It's always being looked at to be optimized. It's the the toilets are flushed to the	7 8 9 10	improve injected water quality, utility, and life of these SWDs with all solids removed to appropriate solid waste facilities.
8 9 10	particles. I think the current design is a hundred mesh filters. It's always being looked at to be optimized. It's the the toilets are flushed to the point of tank where the solids settle out. On the	7 8 9 10	<ul><li>improve injected water quality, utility, and life of these SWDs with all solids removed to appropriate solid waste facilities.</li><li>Q Were the exhibits we discussed on page 142 to 162 prepared by you or under your supervision?</li></ul>
8 9 10 11 12	particles. I think the current design is a hundred mesh filters. It's always being looked at to be optimized. It's the the toilets are flushed to the point of tank where the solids settle out. On the comb bottom foots, it's constantly monitored.	7 8 9 10 11	<ul><li>improve injected water quality, utility, and life of these SWDs with all solids removed to appropriate solid waste facilities.</li><li>Q Were the exhibits we discussed on page 142 to 162 prepared by you or under your supervision?</li><li>A Yes.</li></ul>
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8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	particles. I think the current design is a hundred mesh filters. It's always being looked at to be optimized. It's the the toilets are flushed to the point of tank where the solids settle out. On the comb bottom foots, it's constantly monitored. And then once it now solid that solids that accumulate reach a certain level. I work will be sent to operators. And then they can operate a truck to come pull the solids off the off that tank. Which the solids are then removed to solid waste facilities much like we could remove drill cuttings or other other items left over from oil and gas operations. And then all of the water in that flush tank after it's rattled back to the charge cost of the inject went through the cycle again. Q And if I'm on page 162, is that a summary of	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	improve injected water quality, utility, and life of these SWDs with all solids removed to appropriate solid waste facilities. Q Were the exhibits we discussed on page 142 to 162 prepared by you or under your supervision? A Yes. MR. DEBRINE: Moving to the admission of Exhibits 142 to 162. MR. FUGE: Any objection? They're admitted. (Exhibit 142 through Exhibit 162 were marked for identification and admitted into evidence.) MR. DEBRINE: And we'll pass the witness for question. MR. FUGE: Mr. Tremaine, do you have cross?

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1 EXAMINATION	1 reason behind why 30 minutes was the number agreed
2 BY MR. TREMAINE:	2 upon, if there would be a you know, a longer or
3 Q Looking at the slide 143, map slide of	3 shorter duration that would be more optimal. It's
4 producer producing wells in the El Mar Oil Field?	4 just our current current control logic.
5 A Yes.	5 Q Are you aware, according to the current
6 Q Can you provide any more detail as to which	6 proposal, how much volume could be pumped during that
7 part or zone out the DMG those wells are completed in?	7 period?
8 A I do not recall. That topic I can defer	8 A Could be calculated. It would depend on the
9 that to to Tom Merrifield.	9 the time, the at what stage of the well's life
10 Q That's what we need.	10 we're in where that could happen. They did they do
11 MR. FUGE: We can do it now.	11 like to their rates looked I declined them
12 Mr. Merrifield. Ask that question now and bring it	12 I'd say more rapidly than we would like, so I I
13 back.	13 don't have that number off the top of my head, but it
14 MR. TREMAINE: Since he's already sworn	14 could calculated from the the plots shown in the
15 in, I think we'd be comfortable having him just answer	15 exhibits.
16 the question.	16 MR. TREMAINE: Thank you. No further
17 MR. BLOOM: No objection.	17 questions. Thank you.
18 MR. FUGE: Yeah, no objection.	18 MR. FUGE: Ms. Hardy, do you have any
19 MR. TREMAINE: Thank you.	19 questions for this witness?
20 BY MR. TREMAINE:	20 MS. HARDY: I have a couple of
21 Q And just a clarification here. It sounds	21 questions.
22 like from your exhibits and your testimony that there	22 EXAMINATION
23 is that proposed wells, you conceive a 1.7-mile	23 BY MS. HARDY:
24 injection radius?	24 Q Hello. I just have a few questions for you.
25 A Yes.	25 If you can look at page 152. That's the
Page 210	Page 212
1 Q So the total area of impact would be	1 "Location of Wells with Sufficient Data for Rate
2 approximately 3.4 miles across?	2 Transient Analysis"; right?
3 A Yes.	3 A Yes.
4 Q Remind us what the radius was that Chevron	4 Q Can you confirm that Chevron's drilled DMG
5 enjoys for its area of	5 SWD wells on its Texas acreage?
6 A So I know I know before our we used	6 A Yes, we have.
7 that half-mile radius as dictated in the the rules	7 Q And did Chevron perform similar testing as
8 for notifications and then the internally, one of	8 that proposed in Mexico pilot in those wells?
9 the reasons why you kept seeing 2 miles kind of up	9 A As far as rate transient analysis is
10 there as we were looking for offset producers was	10 concerned?
11 partially because of this obtain analysis just to	11 Q Right. Who's out there testing and
12 give us a little bit extra of a buffer and just say	12 monitoring this?
13 that they do not recall the exact radius for the	13 A So yes. The one of the reasons why we
14 for the AOR.	14 didn't include our our own data in these areas is
15 Q Thank you. And then I want to one more	15 that, you know, number one, due to the timing of this
16 question. I want to look at slide 159. Can you	16 analysis also our wells are relatively new and only
17 explain the reason for the 30-minute delay for that	17 been put online in the last few months. And you we
18 shutoff?	18 typically like to see several months of of
19 A That's yeah, that's just something to	19 continuous data before we can properly analyze a well
20 call out. Standard practice, I guess. I'm intimately	20 with rate transient analysis.
21 familiar with the exact reason why my part of the	21 The really the shortest amount of time
22 reason, though, is to give the operator time to	22 I've seen is approximately four months or six months
23 physically travel to the well site, which are which	23 to read is a lot better. It also depends on how high
24 are kind of the somebody has to drive out there.	24 quality your data is. Downhole pressure will just
25 I again, I'm not I don't know the	25 make the process that much easier when you have
Page 211	Page 213

54 (Pages 210 - 213)

1 downhole pressure gauges and are Severitas and Papa	1 against a a close pipe essentially. And and
2 Squirrel well.	2 since you actually do have flow that will go out into
3 We do have Chevron wells, but then just you	3 the reservoir that will actually be the maximum
4 had had some other operational issues that have	4 pressure that's slightly lower than that, but it's a
5 prevented them from operating that consistently that	5 good rule of thumb for yeah, I have a whole lot of
6 first available to conduct that type of analysis. So	6 some safety factors just to just to see how close
7 these wells that we we used for our analog study	7 we're coming to to fracture pressures.
8 again have the the sufficient history and the data	8 Q And if the bottomhole gradient was .7 psi,
9 and the the daily orthographs to conduct your	9 is it correct that then you'd be fracturing the DMG?
10 transit analysis.	10 A Yes, but according to the rules that, yeah,
11 The shorter enrollment you have for your	11 we agreed with from the OCD, once we found that
12 datapoints, the better for this analysis. Daily is	12 that fracture gradient, I think there's a, like, 90
13 we would like to go more than daily. So there are a	13 percent safety factor that's applied to that. And so
14 lot of wells out there that report monthly data.	14 our max surface pressure would be in you know, that
15 However, it takes four to five months to even see the	15 safety factor's set the load for that fracture.
16 initial cycle of monthly data. You'd only have four	16 MS. HARDY: Those are all of my
17 to five datapoints. You wouldn't be able to interpret	17 questions. Thank you.
18	18 MR. FUGE: Dr. Ampomah?
19 Q And so in Texas DMG SWDs, do you know what	19 DR. AMPOMAH: Let's start with slide
20 intervals are being tested?	20 147. So you've presented about why you believe that
21 A Yes. All of these are either they're all	21 Chevron believes that the DMG group is not ready for
22 DMG shallow wells that we looked at. Don't recall if	22 that.
23 it's some of these might have Brushy Canyon	23 MR. TAYLOR: Yeah.
24 targeted at or just just Bell and Cherry. These	24 DR. AMPOMAH: So what is the typical
25 wells in particular fall within some of the Texas	25 residual saturation for these areas that you analyzed?
Page 214	Page 216
1 seismic review areas, which is why they're required to	1 MR. TAYLOR: I do not know. But that
2 report daily rate submissions.	2 is not not something that we had the current log
3 Q And do you know what the bottomhole fracture	3 especially if you want your current log data to be
4 gradient in those wells has been?	4 able to analyze it.
5 A So there's a range. Part of the reason why	5 DR. AMPOMAH: Yeah. So you're saying
6 we conduct separate tests is to determine that	6 that we're meeting in place right now is a 1.3?
7 individual wells and say for our own wells we've seen	7 MR. TAYLOR: Yes.
8 anywhere from, you know, .62, .65 psi per foot up to	8 DR. AMPOMAH: So if I want to believe
9 .72 psi per foot. So that really does does vary.	
	9 that we cannot produce any amount of I want to
10 I mean, those numbers sound like they're close, but	<ul><li>9 that we cannot produce any amount of 1 want to</li><li>10 know the vertical saturation right there. So you</li></ul>
10 I mean, those numbers sound like they're close, but	10 know the vertical saturation right there. So you
<ul><li>10 I mean, those numbers sound like they're close, but</li><li>11 when the you're talking about the injection rates</li></ul>	<ul><li>10 know the vertical saturation right there. So you</li><li>11 talked about this going through primary, secondary.</li></ul>
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	targeting, you know, tens of feet. We want to target,	1	MR. FUGE: You can just walk up, just
	you know, thousands of feet for injection.		get a little closer to the mic.
3	We also noticed that the rates that	3	MR. COMISKEY: So if I believe I
	they see it and the maximum rates on their permits and	4	understood the question correctly, it was what is
	then at least on the Texas side and some of the	5	DR. AMPOMAH: Based on the Anderson
	pressure that we've seen in New Mexico or or very	6	theory.
7	low so you're looking at, you know, typical injection	7	MR. COMISKEY: Yeah. So and this is a
8	rates, about a thousand barrels a day.		normal faulting environment. So what this means with
9	The SWDs have their purposes to put		the vertical stress is greater than the horizontal
10	away a lot more water, to enable the oil productions	10	stretch beginning in the minimal stress. So it's a
	in the fields, and to much steadier intervals at much	11	it's a normal faulting environment.
12	higher rates for an SWD to be successful. So yeah,	12	That's mostly dominated in the in
13	really, the wells I presented for the from the RGA		the Delaware Basin. It just needs to move into the
14	standpoint, were the best analogs we can find in the	14	Midland Basin to get a little bit more of a of a
15	vicinity of modern day DMG SWD wells.	15	strike slip type in my slide my testimony it will
16	DR. AMPOMAH: So now Chevron owns these	16	force that that theory as well.
17	wells that were analyzed?	17	DR. AMPOMAH: Yeah. So if it's a
18	MR. TAYLOR: No.		normal routine, you do have SV all the same as your
19	DR. AMPOMAH: And then the companies	19	minimum stress. So now I don't understand.
20	that own these wells didn't already did you support	20	MR. COMISKEY: So we've seen in in
21	the analysis that you did?	21	this area that minimum horizontal stress is somewhere
22	MR. TAYLOR: I am not aware of any	22	around .65 and .75 psi, which puts the magic number
23	feedback from those companies. But we we based	23	horizontal stress around .9 and the vertical stress
24	this of, like, data.	24	around 1. And then formal breakouts also looked
25	DR. AMPOMAH: Let's go to slide number	25	at focal mechanism aversion for a moment just for
	Page 218		Page 220
1	or page number 150. So I do have quite a number of	1	short breaks that tied that into the roughly
2	questions on this page. So the first one is what is a	2	values. And they quarterly head back to as well.
3	stress gradient here?	3	DR. AMPOMAH: So let's say would that
4	MR. TAYLOR: Can you clarify?	4	be more like related to a normal reservoir? Because I
5	DR. AMPOMAH: Yeah. Where is the	5	didn't know what that meant. Lamar is more like a
6	stress gradient in this area?	6	right. So I just want to understand how the minimum
7	MR. TAYLOR: You mean in terms of the	7	stress point is about 1.2 psi before, and then the
8	SHMax?	8	too.
9	DR. AMPOMAH: Yeah. But depending on	9	MR. TAYLOR: Yeah. I think part of
10	whether the SHMax lays on the SV, then there	10	that might just come from mislabeling minimum stress
11	MR. TAYLOR: So the the stress	11	here. This is not to communicate that the minimum
12	orientation is to put and I don't have my slides,	12	stress is that work well. I guess it it's really
13	but in the other exhibits we've seen today, including	13	the minimum fracture closure pressure that we got from
14	the ones that Jason shared, that's that's a stress	14	the XLOT.
15	orientation of the southwest for these.	15	DR. AMPOMAH: So I don't take that as a
16	DR. AMPOMAH: No, I mean, I just want a	16	minimum result of stress?
17	clear answer to what is the force of G in this area?	17	MR. COMISKEY: Correct. Correct.
18	MR. TAYLOR: I I'm not the right	18	That's that's the closure stress gradient, not
19	person to answer that question then.	19	not the actual instance you stress test for.
20	DR. AMPOMAH: Can someone respond to	20	DR. AMPOMAH: So do we need to do it to
21	that?	21	make any adjustments to this? Because it's confusing
22	MS. BENNETT: Mr. Comiskey can. Do you		to me actually.
23	want him to give input now?	23	MR. TAYLOR: That you're requesting,
24	DR. AMPOMAH: Yeah. It's very	24	I guess, an update to the exhibit here?
25	important to all my other questions.	25	DR. AMPOMAH: Yeah. Because, like,
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### 56 (Pages 218 - 221)

11 let's asy 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 asy 4 1.32 psi compared to SV of 1.2 psi. That would be- 7 = update that lately of SV of 1.2 psi. That would be- 811I 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 56MR. TAYLOR: Understood that. Date the 9 that - update the label?6DR. 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 9 soo nside 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 samelysis?6DR. AMPOMAH: Yeah, so out just want to clarify that the blue locations are 15 where you have the wells that you use for the 18 locations of the analog wells.11If more the 20,000 r 1012MR. TAYLOR: So Think that notable 13 analysis of the C108s cores as 50,000 barrels131414141414141414141414141414141414141414141414141414141414141414141414141414141414141414141414141414141414141414 <th></th> <th></th> <th></th> <th></th>				
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17MR. TAYLOR: Yes. Those are the 18 locations of the analog wells.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 hard all of these are in Texas?20And all of these are in Texas?20 barrels per day, which agreed exactly with our our 18 assessment there on the C108. Or as noted on the 22 barrels per day with our average at about 12,500 21 barrels a day.21MR. TAYLOR: Correct.21 barrels a day.22DR. AMPOMAH: So my first question is 33 what is the distance between the closest one to the Page 22222 You can see here from this plot on page 223 154 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 Page 2221question. There's not a scale on this map, so I 2 can't.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.7MR. TAYLOR: Severitas? 6 DR. AMPOMAH: Yeah. I don't want to 9 daily rate and a 50,000 daily rate. These are 10 analogous, each well analysis to propose 20,000 13 hore. So the C108 analysis was done prior to have 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 subsitied in the C108 very in jndex would 18 be for the reservoir, where you applied that to the 19 the well bore and dept conditions in both the 20 severitas and Papa Squirrel to then calculate what thi 21	15	where you have the wells that you use for the	15	that high case peak of these Veritas wells, 20,000
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Page 223 Page 225	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	can't. DR. AMPOMAH: I do live very close to the MR. TAYLOR: Severitas? DR. AMPOMAH: Yeah. I don't want to be that close. But near Papa Squirrel. And I do see also that he brings the analysis to propose 20,000 daily rate and a 50,000 daily rate. These are analogous, each well analysis; right? MR. TAYLOR: Yeah. So coming back to what was submitted in the C108 versus the analogs here. So the C108 analysis was done prior to having this dataset completed. So we actually used it, no one else's software and then a a much smaller subset of of the analog SWDs to figure out what a the productivity index or injectivity index would be for the reservoir, where you applied that to the the well bore and depth conditions in both the Severitas and Papa Squirrel to then calculate what the rate would be. And that was what was submitted into the C108. You notice that that agreed quite well with	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	DR. AMPOMAH: Yeah, so that is my concern. Because let's say we agree to 20,000 barrels per day. Now, before I move on, let me ask. So these were there to analyze what is the maximum injection rate for either the maximum? I cannot recall. MR. TAYLOR: So what I recall, I think between 20 and 30,000 barrels of water per day. DR. AMPOMAH: So I asked this question earlier to your colleague. And then he told me he told the Commission that in New Mexico, it is very small. But the maximum he has seen in Texas has been about 10,000. Yeah, that was part of the testimony. MR. TAYLOR: Yeah, I I know there are some wells that have injected 10,000 barrels a day. Our Chevron wells and one of the ones that we had actually has a similar maximum rate on it as as what we would see in that I think in the Severitas well. And it's a shallow one in Texas. It's been averaging about 12,000 barrels a day. So it it really depends on where you are in the and there's a lot of wells there more towards the the east closer to the Papa Squirrel
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1 permits that have been granted.	1 for what would explain the data that we're seeing.
2 But important to keep in mind Texas has	2 That and that's just to avoid a creative yet super
3 a much higher maximum surface pressure that actually	3 convoluted model that might match the data but not
4 results in the injection of bone fracture gradient.	4 really reflect reality.
5 DR. AMPOMAH: Yeah, not in New Mexico.	5 And in a lot of cases, most every
6 MR. TAYLOR: Right.	6 every case for RTA that we've looked at, they that
7 DR. AMPOMAH: So I just want to clarify	7 simple model that explains the dataset is a
8 that the people said, you know, two to 4,000	8 homogeneous radial flow meshed with a cylindrical
9 barrels a day. And at the maximum that they see based	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
J	21 calculate.
5	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.
Page 226	Page 228
1 lot of publicly available data we can look up and	1 So what what could be the cause of that?
2 pull. But there's dozens and dozens of wells that are	2 Sometimes natural fractures that
3 injecting about 20,000, 30,000 barrels a day in Texas.	3 that you asked about in a previous question that could
4 So the the DMG is capable of taking	4 be present taking some some additional fluid out
5 a lot of water. However, as this you were pointing	5 here on these Texas wells. Specifically, it could be
6 out a lot of that then Texas is above the fracture	6 due to induced fracturing from the high rates of
7 parting pressure, and so we're we are expecting	7 pressures that are present in the Texas. So those are
8 much lower rates here in New Mexico due to the the	8 not that's kind of all reflected in this composite
9 guidelines set by the OCD.	9 permeability calculation that we get out of the data.
10 DR. AMPOMAH: Let me ask. What about	10Some of the other assumptions that
11 your assumptions that you utilize in their key	11 we're using yeah, we're not really. Sometimes
12 analysis?	12 we'll model these with well bore storage most of the
13 MR. TAYLOR: Can you be more specific	13 time. It doesn't really make much of a difference in
14 about the which assumptions?	14 the final answer, so we tend to leave that off. We
15 DR. AMPOMAH: So the first one that I	15 well, in these cases, some of them have time dependent
16 saw is that there is a general system. So even that	16 skin. That's when operations happen.
17 one, how does that translate to, let's say, a highly	17 They and they'll do acid jobs
18 heterogenous system that you are used to dealing with.	18 throughout the life of the well and see the skin
19 You know, and if you are using that, you search more	19 factors change. On all of our numerical simulations
20 like you explain more just why that conversation	20 that we're showing here on the exhibits today, we're
20 like you explain more just why that conversation	
	21 sending zero skins to represent the brand new well,
21 ran that higher rate. You know, how is that shaping	<ul><li>21 sending zero skins to represent the brand new well,</li><li>22 cleaned up a better casing</li></ul>
<ul><li>21 ran that higher rate. You know, how is that shaping</li><li>22 up in terms of if they had continuous and then</li></ul>	
<ul> <li>21 ran that higher rate. You know, how is that shaping</li> <li>22 up in terms of if they had continuous and then</li> <li>23 MR. TAYLOR: Yeah. Thank you for that</li> </ul>	22 cleaned up a better casing
<ul> <li>21 ran that higher rate. You know, how is that shaping</li> <li>22 up in terms of if they had continuous and then</li> <li>23 MR. TAYLOR: Yeah. Thank you for that</li> <li>24 question. So the the approach that we're that I</li> </ul>	<ul><li>22 cleaned up a better casing</li><li>23 DR. AMPOMAH: So nothing really that</li></ul>

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1 MR. TAYLOR: Yes, yes.	1 pressure ingredients that you utilized in this one for
2 DR. AMPOMAH: So now what? If you look	2 either of the wells?
3 at the testimony now presented in your analysis in the	3 MR. TAYLOR: So this model did not take
4 area that you are proposing, you have the radial	4 into account fracture pressure. This is the very
5 .32 millidarcy?	5 simple radial flow homogeneous model.
6 MR. TAYLOR: Yeah.	6 DR. AMPOMAH: So in my mind, I'm trying
7 DR. AMPOMAH: So I am expecting around	7 to correlate the significance of the arms to the rate
8 lower end. Should a range reflect that?	8 that you want So it sounds to me like this is a
9 MR. TAYLOR: Yeah. And I and I do	9 very simplistic model. And looking at how simple-
10 understand that that concern. I think that these	10 looking it is, you know, maximum injection rate, it's
11 models are very easy to to rerun with permeability	11 not really up to answering our question.
12 assumptions. It's the we wanted to honor the	12 MR. TAYLOR: This I can agree that I
13 analog data since we don't have, you know, really any	13 can thank the the rates that we requested were on
14 analogs in New Mexico under that pressure, where you	14 the high side and then we wanted to socialize those
15 know, we have to use the Texas wells, which do have	15 those high in potential numbers based on what we're
16 some different operational conditions.	16 seeing in Texas and how this is possible in the DMG.
17 You know, part of the reason why we	17 And just so that we're not we didn't
18 want this pilot, they're requesting this pilot program	18 want to come in and request 5,000 barrels a day and
19 is to actually get that data in New Mexico operating	19 then have well, the potential for 20,000 barrels a
20 under the OCD guidelines to understand more about how	20 day. We thought it would be better to err on the
21 the rock is reacting to the to an injection. What	21 conservative side of requesting for more, higher rate
22 are we really seeing in terms of permeability?	22 at these given pressures and then learn through this
23 You know, the the few core samples	23 pilot what is actually possible in in New Mexico.
24 that we do have, are those reflective of the entire	24 There's just there's a lot of
25 reservoir or not. And so there there's a lot of	25 uncertainty on the rates. Much more confident in
Page 230	Page 232
1 unanswered questions that we have right now. A lot of	1 the the pressure assumptions and the total storage
2 uncertain data we are hoping to resolve in this pilot	2 in real life as well. But the rate is really a big
3 project.	3 question. That just comes down to that that
4 DR. AMPOMAH: So in the modeling that	4 uncertainty and permeability to have all these tracks
5 you did for the two wells, do you know whether the	5 going forward.
6 formation really took most of the water?	6 What does the permeability really look
7 MR. TAYLOR: So since these models are	7 like on a macro level as the well accesses the
8 ultimately homogeneous and ultimately simple, it	8 reservoir? And we won't understand that until we have
9 really just comes down to it's mostly collated with	9 some injectors in the ground and we can do a similar
10 their thickness. We think upper, which is a Y, and	10 analysis on them.
11 injection rate is correlated to to thickness.	11 DR. AMPOMAH: So I'm going to ask you
12 So the thicker one would take more	12 based on the analysis that you've done, in your
13 more water in the models, so in this case it would be	13 experience, you know, how is the high volume injection
14 the the Cherry. The porosities do do impact	14 in the shallower areas that you are proposing, how
15 that a little bit. But being as how close these are	15 will the impact you're going to build a pressure
16 with these models, it's they give a thicker	16 pit. So how is that going to impact future injection
17 interval tends to hold more water.	17
18 DR. AMPOMAH: Just so I understand, so	18 MR. TAYLOR: I I think this is why
19 before the true potential injection zones, you	19 it's important to space wells properly. I do agree
20 assigned the same porosity?	20 with the proposal that the OCD put forth that the
21 MR. TAYLOR: No. As you'll see on	21 wells be at least a mile apart. You know, Chevron, we
22 slides 154 and 156 on the tables, those are the inputs	22 see a lot of operators out there on the side in Texas.
1	
23 into the model so that you have different porosities	23 They'll pack their wells really close
<ul><li>23 into the model so that you have different porosities</li><li>24 based on the from the geology at those locations.</li></ul>	<ul><li>23 They'll pack their wells really close</li><li>24 together in whatever position they have are being</li></ul>

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1 been injected into the exact same container. So we	1 an arbitrarily large boundary. They all all of the
2 our view is to space our wells out appropriately right	2 boundaries tend to just show up within a few months.
3 now I think in the in our entire Harris, New Mexico	3 So we got to it's a finite here. They gave us each
4 field, where Severitas is, we have a potential three	4 model followed by that circular reducing on the wells
5 more locations we've identified with proper spacing	5 quite well.
6 and which I think is at least about a mile and a half	6 In reality, the shapes get, you know,
7 to two miles apart.	7 oblong. They could be rectangular. We don't really
8 But this is something that I don't	8 know. But the the important thing is that they are
9 recall exactly off the top of my head, but I think	9 finite and we can represent that finite, that
10 that's you know, relative to the the range of it	10 potential area of impact quite well through a
11 over in the near Papa Squirrel and our Salado Draw	11 cylindrical reservoir model.
12 field, we have two additional locations identified and	DR. AMPOMAH: Yeah. And you obviously
13 properly spaced out.	13 did hard work. You did an amazing analysis. So thank
14 It's not our intention to pack these	14 you.
15 wells in closer. I think I'm, you know, kind of	15 MR. TAYLOR: Yeah. Thank you for your
16 extrapolating your question a little bit. If if we	16 round of questioning.
17 pack a lot of wells too closely, then the water	17 MR. FUGE: Now, I take it there are no
18 pressures will increase it a lot quicker. It's not	18 questions?
19 something we want to see, and we want to be able to	19 MR. FUGE: I only have one. And it may
20 efficiently use the the reservoir in that storage	20 just be implied from the analysis here. But I'm
21 capacity. From my from my perspective, that	21 assuming when you did your sort of individual well
22 cumulative storage number is the most important	22 decline and then the El Mar Field remaining reserves,
23 number. How much is this well going to be able to	23 a check was done. There are no pending applications
24 take over its its entire life?	24 that would suggest any interest in this area or these
25 DR. AMPOMAH: So on page 157, you apply	25 formations?
Page 234	Page 236
1 the pressure showing us how the pressure needs to be	1 MR. TAYLOR: I don't recall. I I
2 away from the well bore, but I really wanted to see	2 did not do that exact that check even with the
3 how the pressure is building up with regard to time.	3 outlines. We're back to look at that.
4 You know, in the more, like, pressure so I can really	4 MR. FUGE: Yes, please.
5 see how the pressure is building up based on the rates	5 MR. TAYLOR: So yesterday, we were I
6 that you are using. I'm sure you have that.	6 went back some questions and just went back to see
7 MR. TAYLOR: Yeah. Yeah, we can we	7 when the last was and so it kind of tells me in
8 can for transform it into that. The way we	8 in short what I think OCD kind of first of all, she
9 presented it here was the time is really represented	9 went with these Cherry Canyon behaviors didn't
10 by those those different curves that we had. They	10 even didn't even require we don't have an exact
11 all go up on the chart. That's the time. And then I	11 I think there is some some
12 tried to give a sense to that on the in the box	12 MR. FUGE: Any other questions for the
13 there, the be calculated that timing there, that	13 witness?
14 four-year, 11-year, 23-year et cetera.	14 MR. TREMAINE: No.
15 Again, we the way we should have	15 MR. FUGE: You may be excused.
16 presented this data was more in terms of distance, as	16 I think I'm going to order to adjourn
17 you said, rather than through time.	17 for a short break. We will reconvene at 3:30.
18 DR. AMPOMAH: Can you comment on the	
19 boundary conditions? So I know that in your	19 MS. BENNETT: Right.
20 application you said it's the closest.	20 MR. FUGE: Mr. Tremaine, how long do
21 MR. TAYLOR: Yeah.	21 you expect you'll need for your first witness?
22 DR. AMPOMAH: So is it really closed.	22 MR. TREMAINE: Our first witness will
23 MR. TAYLOR: So based on the RT8 data	23 be pretty quick, so maybe 15 minutes.
24 that we've seen, these wells really are our closest.	24 MR. FUGE: So at least coming in, just
25 We haven't found one yet that is in the DMG that has	25 sitting in, and so you know this at the outset.
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	Somebody had a harder stop at five today. But at		could orient the Commission to the slide.
	minimum, we're going to do Chevron's last remaining	2	A Yeah. So again, the map on the right is
	witness and OCD's first. If we have some additional	3	just the map you've seen probably a dozen times
4	time, we can discuss that as we're moving forward.	4	already today of the two locations, so I won't harp on
5	So we will return at 3:15. I mean at	5	those. The thing on the left is modified from Zhai,
6	3:30.	6	et al. And it's it's focusing on Permian Basin.
7	(Off the record.)	7	So what I did is just it does a good job of
8	MR. FUGE: Let's get back going, folks.	8	explaining, I think, the major operational practices
9	And I know it's a little toasty in here. I have	9	going on on today's Permian Basin.
	submitted some request to central, wherever that is	10	And so if you look at that, we start with
11	located, to drop the temperature a little bit to the	11	the caprock, which we touched on a little bit. And
12	extent they can.	12	then we get into the the shallow disposal layer,
13	But we will go ahead and get started	13	which in this case is the DMG. Below that are the
14	with Chevron's last witness.	14	Avalon, Bone Spring, and the Wolfcamp production
15	MS. BENNETT: Thank you.	15	intervals. And then you go further below that into a
16	MR. FUGE: And since, Mr. Comiskey,	16	deeper disposal interval, which is typically referred
17	we've already sworn and recognized this, I think we	17	to as the slurry or admission carbonates or deep
18	5 6	18	disposal. And then below that is a basement.
19	MS. BENNETT: Thank you very much.	19	And so what I've annotated on there are kind
20	EXAMINATION	20	of three colored blocks, a pinkish, reddish that looks
21	BY MS. BENNETT:	21	a the shallow injection. And roughly the depths here
22	Q Yes. Mr. Comiskey, you remember that you	22	in Southeast New Mexico of about five to 7,000 feet.
23	were sworn in? Do you agree to tell the truth?	23	Production again that's referring to major
24	A Yes.	24	unconventional development and production of roughly
25	Q So this morning you gave us an overview of	25	about 6500 to 12,500 feet.
	Page 238		Page 240
1	the pilot projects and some of the work that's been	1	And then deep injection is roughly about
2	done. And now we're transitioning to a different part	2	17,000 feet to about 20,000 feet. And then what I've
3	of your testimony. And so what's the purpose of the	3	labeled there below is that seismicity, which I'll
4	testimony you're about to give?	4	show in the in Southeast New Mexico it's roughly
5	1 5 1 5 /	5	located about 20,000 feet or greater.
6	things you'll notice, we did a and took a very	6	So you can see just the vertical
7	thorough review of seismicity at the Permian Basin.	7	differentiation between shallow disposal in the
8	This is one of the cornerstones of of, you know,	8	Permian and then the deep earthquakes that have been
	why we're looking into this kind of project for	9	attributed to deep disposal. And so this kind of just
	produced water optionality. It's partly due to the	10	sets the you can see the schematic there kind of a
	fact of the increase of induced seismicity	11	little bit on the left side.
12	attributable to somewhere across the Permian Basin.	12	You've got, you know, disposal and pressure
13	So through these pilot reviews we undertook	13	front perturbation, which my colleague Bryce mentioned
1		14	on just a minute ago. You've got production, which
14	and we'll go through the review that I undertook to		
	and we'll go through the review that I undertook to assess seismicity risk for these two pilots and just		also creates a a pressure response and then deep
15		15	also creates a a pressure response and then deep disposal again. So your you have various sources
15 16	assess seismicity risk for these two pilots and just	15 16	
15 16	assess seismicity risk for these two pilots and just an overall setting of seismicity through the Permian	15 16 17	disposal again. So your you have various sources
15 16 17	assess seismicity risk for these two pilots and just an overall setting of seismicity through the Permian Basin. Q Thanks. And let's start out with your first	15 16 17 18	disposal again. So your you have various sources and sinks of pressure as fluid is withdrawn or or
15 16 17 18	assess seismicity risk for these two pilots and just an overall setting of seismicity through the Permian Basin. Q Thanks. And let's start out with your first	15 16 17 18	disposal again. So your you have various sources and sinks of pressure as fluid is withdrawn or or molecules are withdrawn or rejected, given a a
15 16 17 18 19 20	assess seismicity risk for these two pilots and just an overall setting of seismicity through the Permian Basin. Q Thanks. And let's start out with your first slide, which is a seismicity review slide.	15 16 17 18 19 20	disposal again. So your you have various sources and sinks of pressure as fluid is withdrawn or or molecules are withdrawn or rejected, given a a specific operation.
15 16 17 18 19 20 21	assess seismicity risk for these two pilots and just an overall setting of seismicity through the Permian Basin. Q Thanks. And let's start out with your first slide, which is a seismicity review slide. MS. BENNETT: And for the Division	15 16 17 18 19 20	<ul> <li>disposal again. So your you have various sources and sinks of pressure as fluid is withdrawn or or molecules are withdrawn or rejected, given a a specific operation.</li> <li>Q One last turn to your next slide, which is slide 127. And can you briefly describe this slide,</li> </ul>
15 16 17 18 19 20 21 22	assess seismicity risk for these two pilots and just an overall setting of seismicity through the Permian Basin. Q Thanks. And let's start out with your first slide, which is a seismicity review slide. MS. BENNETT: And for the Division I'm sorry for the Commission, for reference, and	15 16 17 18 19 20 21 22	disposal again. So your you have various sources and sinks of pressure as fluid is withdrawn or or molecules are withdrawn or rejected, given a a specific operation. Q One last turn to your next slide, which is slide 127. And can you briefly describe this slide,
15 16 17 18 19 20 21 22 23	assess seismicity risk for these two pilots and just an overall setting of seismicity through the Permian Basin. Q Thanks. And let's start out with your first slide, which is a seismicity review slide. MS. BENNETT: And for the Division I'm sorry for the Commission, for reference, and for our other parties, we're starting on page 126 of	15 16 17 18 19 20 21 22	disposal again. So your you have various sources and sinks of pressure as fluid is withdrawn or or molecules are withdrawn or rejected, given a a specific operation. Q One last turn to your next slide, which is slide 127. And can you briefly describe this slide, and in particular where this information comes from
15 16 17 18 19 20 21 22 23	assess seismicity risk for these two pilots and just an overall setting of seismicity through the Permian Basin. Q Thanks. And let's start out with your first slide, which is a seismicity review slide. MS. BENNETT: And for the Division I'm sorry for the Commission, for reference, and for our other parties, we're starting on page 126 of the materials.	<ol> <li>15</li> <li>16</li> <li>17</li> <li>18</li> <li>19</li> <li>20</li> <li>21</li> <li>22</li> <li>23</li> <li>24</li> </ol>	disposal again. So your you have various sources and sinks of pressure as fluid is withdrawn or or molecules are withdrawn or rejected, given a a specific operation. Q One last turn to your next slide, which is slide 127. And can you briefly describe this slide, and in particular where this information comes from and what it represents?
15 16 17 18 19 20 21 22 23 24	assess seismicity risk for these two pilots and just an overall setting of seismicity through the Permian Basin. Q Thanks. And let's start out with your first slide, which is a seismicity review slide. MS. BENNETT: And for the Division I'm sorry for the Commission, for reference, and for our other parties, we're starting on page 126 of the materials. BY MS. BENNETT:	<ol> <li>15</li> <li>16</li> <li>17</li> <li>18</li> <li>19</li> <li>20</li> <li>21</li> <li>22</li> <li>23</li> <li>24</li> </ol>	<ul> <li>disposal again. So your you have various sources and sinks of pressure as fluid is withdrawn or or molecules are withdrawn or rejected, given a a specific operation.</li> <li>Q One last turn to your next slide, which is slide 127. And can you briefly describe this slide, and in particular where this information comes from and what it represents?</li> <li>A Yeah. So this comes from the OCD oil and</li> </ul>

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· ^	the locator. I've I've labeled the the two	1	So those earthquakes are colored by
	locations for the pilots there with the blue stars,		magnitude. Most of those earthquakes occurred from
	and then the colored bullseyes represent the current	1	2019 onward. The two plots on the right if you look
	seismic response areas or SRAs in Southeast New	1	on the the histogram, you'll notice the label is
5	Mexico.	5	depth of the event over time. So it's depth in feet
6	1	6	from surface level. And so the top of hot is
	radius around that, so the also yellow and/or red or	7	referencing just the events within the county
	orange circles, if you look. The small circles are	8	line/state line SRA.
	earthquakes of a certain magnitude. Those are either	9	The bottom is year, and you can see the
10	2.5 to 2.9 magnitude. That's 3 to 3.4. So 2 to 2.9	10	events with the necessary started within 2019, kind of
	are yellows, the oranges are a 3 to 3.4, and then the	11	regressed since then. It started to pick up really in
	reds there's two reds are above the magnitude	1	late 2020 and has progressed fairly consistently until
	3.5.	13	late 2022/2023 where we saw a a reduction, and I'll
14	5		show that in a future slide.
	seismicity protocol that was announced back in 2021.	15	The bottom plot is is looking at the
	The associated colored bands of red and orange and	16	Northern Culberson/Reeves SRA, Texas. The reason for
	yellow represent different radiuses around those		showing this is it's also an area of seismicity that's
	events, representing red for 3 miles, orange for 6 and	1	been attributed to deep disposal operations. And you
	yellow for 10. And again, those are derived from the	1	can see the number of earthquakes there. There's
	OCD's seismicity protocol from 2021.	20	obviously quite a few more earthquakes over time in
21		1	this plot.
	various seismicity protocols within Southeastern New	22	But again, it just relates to the depths of
	Mexico, and we'll go through some of the slides and	1	the event. So both plots, you can see the depths are
	looking at in particular one of the SRAs, which I've	1	well over 18 to 20,000 feet. That is many thousands
25	labeled a county line, state line SRA, which is	25	of feet deeper than than conventional development
	Page 242		Page 244
1	borders Eddy and Lea County and also Loving and Lea	1	and/or shallow disposal, which I'll show in a future
2	County.	2	slide.
3	Q And so those depict the Papa Squirrel as it	3	But the main purpose of this is just to
4	is within one of the SRAs?	4	orientate everybody with the seismicity that's going
5	A Yes, it does depict Papa Squirrel as to be	5	on within the area of interest, the magnitudes, and
6	within one of the SRAs. However, as I'll show in	6	the trends over time and the depths.
7	future slides, the SRAs focused only on deep injection	7	Q And so turning to the next slide, because
8	and not shallow.		
		8	you've taken a closer look at some of the events that
9	Q Let's turn to the next slide then. And can		
	Q Let's turn to the next slide then. And can you orient the commissioners to what this slide is		you've taken a closer look at some of the events that
10		9	you've taken a closer look at some of the events that have occurred in the area?
10	you orient the commissioners to what this slide is then and what you're showing here?	9 10	you've taken a closer look at some of the events that have occurred in the area? A Yes.
10 11 12	you orient the commissioners to what this slide is then and what you're showing here?	9 10 11 12	<ul><li>you've taken a closer look at some of the events that</li><li>have occurred in the area?</li><li>A Yes.</li><li>Q Why don't you walk us through this slide?</li></ul>
10 11 12 13	you orient the commissioners to what this slide is then and what you're showing here? A Yes. Again, so here's an inset map looking	9 10 11 12 13	<ul> <li>you've taken a closer look at some of the events that have occurred in the area?</li> <li>A Yes.</li> <li>Q Why don't you walk us through this slide?</li> <li>A So I'll start on the on the right of the</li> </ul>
10 11 12 13 14	<ul><li>you orient the commissioners to what this slide is</li><li>then and what you're showing here?</li><li>A Yes. Again, so here's an inset map looking</li><li>at Eddy and Lea County, and also the northern part of</li></ul>	9 10 11 12 13 14	<ul> <li>you've taken a closer look at some of the events that have occurred in the area?</li> <li>A Yes.</li> <li>Q Why don't you walk us through this slide?</li> <li>A So I'll start on the on the right of the slide first so that this is a depth of operations</li> </ul>
10 11 12 13 14 15	you orient the commissioners to what this slide is then and what you're showing here? A Yes. Again, so here's an inset map looking at Eddy and Lea County, and also the northern part of the Delaware Basin of Texas. Again, I've highlighted	9 10 11 12 13 14 15	<ul> <li>you've taken a closer look at some of the events that have occurred in the area?</li> <li>A Yes.</li> <li>Q Why don't you walk us through this slide?</li> <li>A So I'll start on the on the right of the slide first so that this is a depth of operations versus seismicity. The depths that you'll see here</li> </ul>
10 11 12 13 14 15 16	you orient the commissioners to what this slide is then and what you're showing here? A Yes. Again, so here's an inset map looking at Eddy and Lea County, and also the northern part of the Delaware Basin of Texas. Again, I've highlighted the two proposed titled SWD locations with blue stars.	9 10 11 12 13 14 15 16	<ul> <li>you've taken a closer look at some of the events that have occurred in the area?</li> <li>A Yes.</li> <li>Q Why don't you walk us through this slide?</li> <li>A So I'll start on the on the right of the slide first so that this is a depth of operations versus seismicity. The depths that you'll see here from the formations are derived from well tops. So</li> </ul>
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10 11 12 13 14 15 16 17 18 19 20 21 22 23	you orient the commissioners to what this slide is then and what you're showing here? A Yes. Again, so here's an inset map looking at Eddy and Lea County, and also the northern part of the Delaware Basin of Texas. Again, I've highlighted the two proposed titled SWD locations with blue stars. I've also highlighted the county line/state line SRA and a and a black oval. The earthquakes on this map are are colored circles represented from a magnitude 2.5 to a magnitude 5.0. So what I'll go on this is the source of this information is the USGS website. They are the authoritative source on earthquakes in Southern New	9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	you've taken a closer look at some of the events that have occurred in the area? A Yes. Q Why don't you walk us through this slide? A So I'll start on the on the right of the slide first so that this is a depth of operations versus seismicity. The depths that you'll see here from the formations are derived from well tops. So there's a fairly accurate so the step goes from 0 to roughly 30,000 feet, again from surface. So the first color block on there is is relation to the Papa Squirrel. So the proposed injection interval that you've seen is the Bell and Cherry Canyon formations, roughly 4600 feet to 7,000 feet.
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	you orient the commissioners to what this slide is then and what you're showing here? A Yes. Again, so here's an inset map looking at Eddy and Lea County, and also the northern part of the Delaware Basin of Texas. Again, I've highlighted the two proposed titled SWD locations with blue stars. I've also highlighted the county line/state line SRA and a and a black oval. The earthquakes on this map are are colored circles represented from a magnitude 2.5 to a magnitude 5.0. So what I'll go on this is the source of this information is the USGS website. They are the authoritative source on earthquakes in Southern New Mexico. They're not in Northern Texas. That is the	9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	you've taken a closer look at some of the events that have occurred in the area? A Yes. Q Why don't you walk us through this slide? A So I'll start on the on the right of the slide first so that this is a depth of operations versus seismicity. The depths that you'll see here from the formations are derived from well tops. So there's a fairly accurate so the step goes from 0 to roughly 30,000 feet, again from surface. So the first color block on there is is relation to the Papa Squirrel. So the proposed injection interval that you've seen is the Bell and Cherry Canyon formations, roughly 4600 feet to 7,000 feet. Below that, you'll see the Avalon

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1			
	production, roughly about 11,000 feet. And then below		the Permian Basin, but anything due to anthropogenie
	that again are deep injection. And that's again		events. And anthropogenic meaning human caused.
3	roughly 17 to 20,000 feet.	3	So when we looked at seismicity in Southeast
4	Even below that again are earthquakes. So		New Mexico as it began to to take an uptick, we're
	the earthquakes that occurred and you referenced the		starting to look at see the correlation between,
6	map on the left to see the location of the earthquakes		you know, analog studies, correlation between deep
7	in XY. The location of earthquakes are again well	7	injection and the seismicity, things like that.
8	below the proposed DMG location interval and again	8	So there's a couple key things on this that
9	below the the deep SWD interval.	9	I think add give us a better understanding of the
10	If you look on the map on the left, you see	10	correlation between deep disposal and the seismicity.
11	the earthquakes again colored by magnitude. That	11	So the same map on the that was on the previous
12	magnitude scale is consistent through all the slides,	12	slide is shown. However, there's a blue kind of
13	I should note. The the red dash outline is roughly	13	colored in circle-ish oval. And what that's depicting
14	the the county line/state line SRA.	14	is just the initial seismic response around the
15	And then the blue boxes are deep disposal	15	initial magnitude 4.0.
16	wells. As I've mentioned this the SRA did not	16	The reason why the red area is much larger
17	impact any shallow disposal wells. It was only		is that's incorporating events that trend up towards
18	focused on deep disposal wells given the preponderance		the south, southwest over time towards the state line.
19	of information that was put forth a couple years ago	19	That's created a much broader polygon. But the
20	from those the industry.	20	initial kind of AOI was that that shaded roughly
21	So all the blue wells in that area have been	21	shaded curtailment area.
22	impacted by the SRA either through enhanced data	22	And so if you look down below, you see the
23	reporting, curtailments, or shut-ins depending on the	23	magnitude 2.0. That's within the initial 4.0
24	distance from the earthquakes. The reference there,	24	response. And again, it's just magnitude 2.5 and
25	there's that orange/reddish circle right there. Yes, Page 246	25	above on the USGS. And you can see the events ove Page 248
	1 420 240		1 450 240
	that is a magnitude 4.0 event that occurred in July of		time.
	2021. That was really the catalyst for the the	2	The dashed line that is noted on that plot
	SRAs and the the change in the protocol in		on the bottom with OCD becomes labeled is the point at
	establishing this SRA.		which the OCD enacted their response, thus curtailing
5	I'll talk a little more about the the		deep disposal within that area. If you look up at the
	evolution of this SRA over time. But the main purpose	6	plot above, this is a plotted SRA. The county
	of this slide is just to enjoy to begin within the		
	of this slide is just to orient to begin within the	7	line/state line SRA deep volumes and barrels of water
8	county line SRA and in particular the Papa Squirrel as	7 8	line/state line SRA deep volumes and barrels of water per month from the OCD website dating back to January
8 9	county line SRA and in particular the Papa Squirrel as it is in the SRA. The depth of the proposed injection	7 8 9	line/state line SRA deep volumes and barrels of water per month from the OCD website dating back to January of 2017 essentially through reporting in October
8 9 10	county line SRA and in particular the Papa Squirrel as it is in the SRA. The depth of the proposed injection interval, the depth of the production, the depth of	7 8 9	line/state line SRA deep volumes and barrels of water per month from the OCD website dating back to January of 2017 essentially through reporting in October roughly.
8 9 10 11	county line SRA and in particular the Papa Squirrel as it is in the SRA. The depth of the proposed injection interval, the depth of the production, the depth of the deep injection, and when the seismicities occur.	7 8 9 10 11	line/state line SRA deep volumes and barrels of water per month from the OCD website dating back to January of 2017 essentially through reporting in October roughly. And you can see that trend continuing up
8 9 10 11 12	county line SRA and in particular the Papa Squirrel as it is in the SRA. The depth of the proposed injection interval, the depth of the production, the depth of the deep injection, and when the seismicities occur. Q Thanks. And down here, this is the part?	7 8 9 10 11 12	line/state line SRA deep volumes and barrels of water per month from the OCD website dating back to January of 2017 essentially through reporting in October roughly. And you can see that trend continuing up over time, reaching a max of nearly 8 million barrels
8 9 10 11 12 13	county line SRA and in particular the Papa Squirrel as it is in the SRA. The depth of the proposed injection interval, the depth of the production, the depth of the deep injection, and when the seismicities occur. Q Thanks. And down here, this is the part? A The Papa Squirrel, yes. The Papa Squirrel	7 8 9 10 11 12 13	line/state line SRA deep volumes and barrels of water per month from the OCD website dating back to January of 2017 essentially through reporting in October roughly. And you can see that trend continuing up over time, reaching a max of nearly 8 million barrels a month in early 2021. However, you can see a sharp
8 9 10 11 12 13 14	county line SRA and in particular the Papa Squirrel as it is in the SRA. The depth of the proposed injection interval, the depth of the production, the depth of the deep injection, and when the seismicities occur. Q Thanks. And down here, this is the part? A The Papa Squirrel, yes. The Papa Squirrel is the black diamond on the map label.	7 8 9 10 11 12 13 14	line/state line SRA deep volumes and barrels of water per month from the OCD website dating back to January of 2017 essentially through reporting in October roughly. And you can see that trend continuing up over time, reaching a max of nearly 8 million barrels a month in early 2021. However, you can see a sharp drop after that OCD curtailment in essentially
8 9 10 11 12 13 14 15	county line SRA and in particular the Papa Squirrel as it is in the SRA. The depth of the proposed injection interval, the depth of the production, the depth of the deep injection, and when the seismicities occur. Q Thanks. And down here, this is the part? A The Papa Squirrel, yes. The Papa Squirrel is the black diamond on the map label. Q Right. Anything else you want to tell about	7 8 9 10 11 12 13 14	line/state line SRA deep volumes and barrels of water per month from the OCD website dating back to January of 2017 essentially through reporting in October roughly. And you can see that trend continuing up over time, reaching a max of nearly 8 million barrels a month in early 2021. However, you can see a sharp drop after that OCD curtailment in essentially December of of 2021, January of 2022.
8 9 10 11 12 13 14 15 16	<ul> <li>county line SRA and in particular the Papa Squirrel as it is in the SRA. The depth of the proposed injection interval, the depth of the production, the depth of the deep injection, and when the seismicities occur.</li> <li>Q Thanks. And down here, this is the part?</li> <li>A The Papa Squirrel, yes. The Papa Squirrel is the black diamond on the map label.</li> <li>Q Right. Anything else you want to tell about the slide? If not, we can move on.</li> </ul>	7 8 9 10 11 12 13 14 15 16	line/state line SRA deep volumes and barrels of water per month from the OCD website dating back to January of 2017 essentially through reporting in October roughly. And you can see that trend continuing up over time, reaching a max of nearly 8 million barrels a month in early 2021. However, you can see a sharp drop after that OCD curtailment in essentially December of of 2021, January of 2022. And so if you look at that OCD curtailment
8 9 10 11 12 13 14 15 16	county line SRA and in particular the Papa Squirrel as it is in the SRA. The depth of the proposed injection interval, the depth of the production, the depth of the deep injection, and when the seismicities occur. Q Thanks. And down here, this is the part? A The Papa Squirrel, yes. The Papa Squirrel is the black diamond on the map label. Q Right. Anything else you want to tell about	7 8 9 10 11 12 13 14 15 16 17	line/state line SRA deep volumes and barrels of water per month from the OCD website dating back to January of 2017 essentially through reporting in October roughly. And you can see that trend continuing up over time, reaching a max of nearly 8 million barrels a month in early 2021. However, you can see a sharp drop after that OCD curtailment in essentially December of of 2021, January of 2022. And so if you look at that OCD curtailment drop and you look at the go back to the bottom
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8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	county line SRA and in particular the Papa Squirrel as it is in the SRA. The depth of the proposed injection interval, the depth of the production, the depth of the deep injection, and when the seismicities occur. Q Thanks. And down here, this is the part? A The Papa Squirrel, yes. The Papa Squirrel is the black diamond on the map label. Q Right. Anything else you want to tell about the slide? If not, we can move on. A No. Q So the next slide discusses curtailments, which you were just alluding to, so why don't you take it away and talk a little bit more about curtailments and why that's relevant to today's discussion? A So when we look at seismicity, the question	7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	line/state line SRA deep volumes and barrels of water per month from the OCD website dating back to January of 2017 essentially through reporting in October roughly. And you can see that trend continuing up over time, reaching a max of nearly 8 million barrels a month in early 2021. However, you can see a sharp drop after that OCD curtailment in essentially December of of 2021, January of 2022. And so if you look at that OCD curtailment drop and you look at the go back to the bottom plug. You can see the seismicity before the curtailment and the seismic reactive curtailments are are very different. And you notice that there's only one event on that bottom plot kind of after that April 13 date.

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1 in that in that oval.	1 the total water production trend, seems to you
2 If you go and look now on the county line	2 know, kind of relates to that. So you can see that
3 SRA earthquakes over 2.5, this is taking into accoun	3 Delta is roughly about 2.5 to 3.5 four to one. So
4 the whole county line SRA. Again, I note the OCD	4 where is that water going?
5 curtailments. You still see seismicity has continued.	5 You have increased oil production, and the
6 You could probably say it's probably equal to what it	6 injections here will be flat. Most of that water is
7 was before. Again, that's representative of the	7 moving across the state line. It's being injected
8 seismicity has migrated. Again, the curtailments have	e 8 into Texas roughly to the tune of about 3 to $3 \frac{1}{2}$
9 only impacted a certain area, not the whole, broad	9 million barrels a day is being injected.
10 area.	10 And I I would argue that probably 90
11 The but the key to this slide though is	11 percent if not 95 percent of that water is being
12 that within the area curtailments on the deep disposa	12 injected into DMG disposal wells. So when we think
13 volumes only and I want to reiterate there was no	13 about, you know, reductions in in, you know, we've
14 shallow curtailments in this there seems to be a	14 we've talked about limited DMG disposal and
15 strong correlation between the curtailments of the	15 Southeast New Mexico as we document its today, talk
16 volumes from the OCD and the seismicity within that	t 16 about predominantly deep disposal in Southeast New
17 immediate response area.	17 Mexico.
18 And this is analogous to other areas	18 However, the rise of seismicity has
19 globally that have seen responses in injection due to	19 curtailed several areas of deep disposal. It's put
20 seismicity, curtailments, or shut-in, and the	20 more more pressure pun intended on the
21 mitigation of seismicity over time.	21 disposal network. And there's been a big move to move
22 Q So this preserved that we intended to	22 a lot of that water across the state line into Texas.
23 talk about earlier, but it's here as well, so why	23 Q Thanks. This slide is entitled "Chevron
24 don't you describe this slide to the commissioners,	24 Undertook In-Depth Technical Review." And this slide
25 and why was it included in here as well?	25 isn't designed to go through that technical review,
Page 250	Page 252
1 A So this is this is somewhat a cornerstone	1 but maybe more or less to be a summary of the
2 of the pilot program. It just kind of relates to	2 technical review?
3 to, you know, where this water's going. So you've	3 A Yes. This is just a graphical
4 seen curtailments. Production has continue to go.	4 representation of the technical review. And so the
5 I'm sure, you know, New Mexico should be very proud of	5 previous slides talked about the seismicity, where
6 being the second largest oil-gas producer in the	6 it's occurring and operational things. Things that we
7 United States.	7 can observe, things that we can we can see.
8 So the plot on the bottom this is just	8 This is trying to look at, you know, what's
9 focused on Southeast New Mexico, so this isn't	9 causing the earthquakes and what are the earthquakes
10 representative of the entire state, just focusing on	10 telling us about the earth? What are they telling us
11 Southeast New Mexico in the Permian.	11 about the relationship to stress, relationship to many
12 You can see an increase in - in green. That	12 different properties we look at.
13 shows up as green. But oil production, that's BOE	13 And so all red everybody to the again,
14 equivalent per day. 2019 obviously till 2023 when	14 the plot on the right the figure on the right is
15 pulled the data, and that's roughly about 3 million	15 the same figure again on and I'll talk about that
16 barrels a day or so. BOEs again.	16 dash line here in a second.
17 The darker blue line, that is average water	17 But if you go to the figure on the left, the
18 injection. Again, this is Southeast New Mexico. And	18 map, you can see that this is again a map of roughly
19 so you can see that premise is roughly flat, but did	19 the same area of Lea and Eddy County and Northern
20 come up a little bit in 2022, then it's roughly been	20 Texas and the Delaware Basin. And then I've I've
21 flat. However, you know, for every BOE that's	21 labeled several things on here, so I'll walk through
22 produced in the Permian Basin, roughly it's anywhere	22 that.
23 between two and a half to five bags of water.	23 If you notice the the blue triangles
24 So and you expect to see that trend	24 here, those blue triangles are seismic monitoring
24 So and you expect to see that trend 25 increase relative to production. So if you look up Page 251	25 stations. This is Chevron's and the industry's

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	operator network that many companies have subscribed		subsurface. Is it a normal faulting environment based
2	into. And essentially, it's a a very robust	2	on the orientation of these mechanisms? Is it a
3	network of seismic monitoring stations.	3	reverse fault environment? Things like that.
4	,	4	But it's very critical understanding the
5	access to over 220 seismic monitoring stations, which	5	stress 'cause that tells us how faults are stable and
	gives us a very robust understanding of where the	6	subsurface unstable. Some faults are stable. You
7	earthquakes are occurring. Space and time, but also	7	could you could increase the "rosavar" [ph]
	very highly accurate understanding of the depth, which	8	pressure to a million psi and it'll never move.
9	is very consistent.	9	Some faults are unstable. You could
10		10	increase the "rosavar" [ph] pressure by one psi and
	through other public reporting agencies the depths are		they will move. So understanding that in relation
12	off. They could be off by 10,000 feet because they	12	to to the geometry is very important when we're
	don't have enough stations to detect the earthquakes		thinking about induced seismicity and what may or may
	accurately. And this has been around for several	14	not cause it. So that that's a key component.
15	years, and it's actually expanded into Mexico more	15	The figure on the top is just a
	frequently in the last couple years because of the		representation of Andersonian faulting. And this is
17	increase in seismicity.		just a broad representation of the fault, this roughly
18	The second thing I want to note on this are	18	dipping that we've interpreted here. They kept kind
19	the colored we call them beach balls in in	19	of becoming SRA area. The deep fault moved. And it's
20	seismology. They're actually moment tensor focal	20	roughly dipping about 50 degrees, striking about 65
21	mechanism solutions. But you can see they're colored.	21	degrees, which is roughly parallel to SHMax.
22	They're colored according to the magnitude scale. And	22	So the the red lines on this map are
23	I apologize that it's hard to read. But the the	23	interpreted based on many different types of data, but
24	darker colors are lower magnitude starting at about a	24	the SHMax in the direction's roughly about 70 degrees.
25	magnitude 2. The warmer colors go up to I believe a	25	So 65 degrees for the strike. Background stress is
	Page 254		Page 256
1	magnitude 3.8 or 9 on this map. And so that's just	1	roughly 70, so they're very well aligned.
2	the magnitudes, so the beach balls are colored by	2	So in a normal faulting environment, when
3	magnitude.	3	you have a fault that's probably parallel to SHMax,
4	What the beach balls tell us and how you can	4	it's more prone to slip, meaning it's more likely for
5	see they're slightly different shaded and again on	5	movement to occur than fault let's say on an
	the scale it might be difficult to see. But you can	6	orthogonal map and I'll show a simplistic model on the
7	also if you take a glance at the map on the middle,	7	next slide on on that. The the map in the
8	you can see similar kind of gray beach balls. And	8	middle is a publication from Jens, et al., and Mark
	what these moment tensor beach ball solutions tell us	9	Zoback at Stanford. This was 2016. There's been a
10	is how faults are moving.	10	subsequent update to this.
11	· ·	11	But this just shows a very good example the
	different different stations to detect different	12	stress direction accomplished of multiple data, some
	first motions and locate the earthquake. And that	13	of which a lot of which industry provided,
	amplitude either up or down tells us how the fault	14	including Chevron, to this. And this just gives a
15	moves each direction.	15	a good understanding of the stress direction. So
16	The the very key component to this, it	16	the the cue in the map in the background is colored
17	tells us the geomechanical orientation of the fault on	17	by normal to strike with faulting environment.
18	the subsurface. And so for several representative	18	And then the the indicators that
19	focal mechanisms, what I've done is I've labeled the	19	directional arrows on the map roughly indicates a
20	spike, dip, and the rake. And those are key	20	stress direction, the maximum horizontal stress
21	components of structural geology.	21	direction, again, which is very critical to
1 ~ ~	But what these tells us is which way's the	22	understanding fault.
22			
	fault leaning, so which direction is the fault? Which	23	So if you if you look at all that, the
23	fault leaning, so which direction is the fault? Which way is it dipping? And those can tell us about so log		So if you if you look at all that, the the kind of the dash line is something we've
23 24	-	24	

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1	moved. And so that's just kind of based on all this	1	this this paper up.
2	information, we're able to ascertain from the geology	2	And so there are there there is
1	ascertain the strike and the fault, the dip, the		earthquakes in Permian Basin attributable to shallow
1	background stretch direction, the stretch direction of		disposal. Absolutely. And I will go through a very
1	the fault, and those two limitations, what's prone to		good case study from Horne, et al., that was published
	slip, what's not prone to slip.		a year ago and looked into this in much detail.
7	e	7	So the map on the left has a lot of
	seismicity, this is a very critical component to		information on here, the reference is there and all
1	constructing your risk management plan when you think		the references I've used are are cited. I would
1	about, you know, disposal operations or anything in		recommend that Commissioners go and and look at
1	particular that has a a net change on the reservoir		this if more interested. There's a lot of information
	or pressure change.		on it, so I'm not going to go through every component
13	6 6		of that. But what I'll note is I did the zoom in and
	just basic seismicity reviews of of two locations.		you can see the red arrow. And this is looking at
1	So the the Papa Squirrel. There's a 10-mile area		Southern Reeves County.
	of review on that. You can see the earthquakes again.	16	Southern Reeves County, the earthquakes here
	We've talked about this before. You know, the		are are much shallower. They are in the Delaware
	earthquakes are are deep. Again, the injection		Mountain Group. And so, you know, the question had
	interval for the Papa Squirrel's about 4500 to 7,000 feet. Earthquakes here are well over, you know,		come up, you know, we have earthquakes due to shallow injection here. Why not, you know, in Southern New
	20,000 feet or so, so there's significant separation		Mexico or other areas? And the answer is geology and
	between the two.		stress.
$\begin{vmatrix} 22\\ 23 \end{vmatrix}$	I should note that the separation between	22	So as I mentioned before, faults that are
	those are many thousands of feet at very tight on		oriented roughly parallel to the stress direction are
	impermeable rock. Obviously, we have to use		more prone to slip. And at Permian Basin, the stress
	Page 258		Page 260
1	hydraulics to stimulate the out of commission	1	orientation rotates. See down here, it's roughly
	reservoirs. They won't flow on their own. So there's		the stress direction is roughly north/northwest to
	a lot of impermeable rock between the shallow		south/southeast. So it's roughly if you look at
	injection or goal and where these deeper quakes are		it, it's roughly oriented about, you know, 330
	occurring. And then Papa Squirrel, the closest neck		degrees. Whereas as I just showed you recently in
	to two and a half is roughly 5 $1/2$ miles away from		Southern New Mexico the stress orientation is about 70
	that bed.		degrees.
8		8	The stress rotates. It is very unique to
	boring slides we'll see today. Thankfully there is	-	the Permian Basin. There are a lot of scholars out
	no there are no events in New Mexico within the		there that are trying to understand exactly why it
	10-mile AOR. I did pull up some events in Texas.		rotates. There's a lot of hypotheses I'm not going to
	Those are pretty small magnitude events. I did label		get into today. But it does rotate. Which means
	again, as reference, this is again just the numbers		its one fault in a certain area may be stable. One
	have changed here relative to the Severitas 2 State		fault in the other area, same direction may be
15	SWD 1 location.		unstable.
16	In the depths you could see the depths of	16	Look at the faults in Southern Reeves. You
17	the earthquakes here very deep. You will note that	17	can see their trend on the seismic cross sections.
18	the plot stops in 2022. It's not because I didn't	18	The two slides there. One is black and white. The
19	I didn't want to pull anything more recent. It's just	19	other is colored. Just looking at a deaf slice and a
20	there were no there had been no earthquakes within	20	coherent slice of seismic data. And you can see those
21	1	21	faults are roughly trending about 330 degrees, right,
22			north/northwest. They are they are oriented and
	seismicity review around this. I I will be remiss	23	they have it makes them prone to slip.
	if I didn't talk about shallow DMG disposal. And	24	The the bottom plot and the colored
25	based on the exhibits from OCD, I'm glad I brought	25	scheme down marked E shows numerous shallow injection
1	Page 259		Page 261

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1 wells in the yellow and green intervals. Those are	1 definitely change in the stress direction as well.
2 the oh, sorry, the in the light green colored	2 Q We're about to move off. Well, we have a
3 interval, those are active shallow injection wells	3 couple more slides on there.
4 that are injecting into the Delaware Mountain Group	4 A Yes.
5 where those stalls are posted.	5 Q So let's talk about those, and then I think
6 And the likely hypothesis there is that	6 what I would like for us to discuss is your
7 those are increasing the far pressure reservoir, which	7 conclusions based on these slides once we finish up
8 reduces the effective stress on a fault. And that	8 with this, the orienting on this one.
9 when that happens, it becomes unstable, and it moves,	9 A So the next slide, which is I believe 136 in
10 generating earthquake.	10 the packet, this again looks at that. So this is from
11 So this is the unique set of circumstances,	11 the same study. At least the figures on the left are.
12 we talked about faults. And you'll note that we have	12 And so again, we're looking at SHMax, the direction
13 we have not shown any slides like this because when	13 here again is roughly 330 or 140 degrees, depending on
14 you go in and interpret these, these faults in	14 which way you look at it. Northwest-southeast.
15 Southern Reeves County are are very obvious in	15 And again, the the researchers here took
16 seismic data.	16 the fault planes. They interpreted those two figures
17 When you move to other parts of the basin,	17 in the panel next to the rose diagram, and you can see
18 we cannot see these structures. And there's likely	18 that these are almost vertical faults. The different
19 just because of the different faulting and the	19 values are colored roughly 60 to 70 degrees, even
20 different stress domain when the basin was formed,	20 higher. And these are oriented roughly parallel to
21 these are thin-skinned faults. These are young.	21 SHMax, so again making it more prone to slip.
22 These do not connect into the basement. They tip out	22 But down the right is using a model. This
23 into the Wolfcamp. It's likely because the timing of	23 is from FFP, some publicly available program. And
24 the basin range extension those dates, the deposition	24 it's very simplistic, but it does a very good job of
25 of the Wolfcamp.	25 visualizing the differences in how important stress
Page 262	Page 264
1 But they are there, but we cannot see these	1 direction is.
1But they are there, but we cannot see these2similar type structures in Southern New Mexico, at	<ol> <li>direction is.</li> <li>And so I've drawn two orthogonal faults with</li> </ol>
2 similar type structures in Southern New Mexico, at	2 And so I've drawn two orthogonal faults with
<ul><li>2 similar type structures in Southern New Mexico, at</li><li>3 least on the on the distribution on the scale that</li></ul>	2 And so I've drawn two orthogonal faults with 3 each other. And its stress direction here again is
<ul> <li>2 similar type structures in Southern New Mexico, at</li> <li>3 least on the on the distribution on the scale that</li> <li>4 we see down here in Southern Reeves County. That's a</li> </ul>	<ul> <li>And so I've drawn two orthogonal faults with</li> <li>each other. And its stress direction here again is</li> <li>roughly about 140 or 330 degrees. And you can see</li> </ul>
<ul> <li>2 similar type structures in Southern New Mexico, at</li> <li>3 least on the on the distribution on the scale that</li> <li>4 we see down here in Southern Reeves County. That's a</li> <li>5 very distinct also cannot see these in the Midland</li> </ul>	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
<ul> <li>2 similar type structures in Southern New Mexico, at</li> <li>3 least on the on the distribution on the scale that</li> <li>4 we see down here in Southern Reeves County. That's a</li> <li>5 very distinct also cannot see these in the Midland</li> <li>6 Basin either.</li> </ul>	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,
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	numbered 11, 12, 13, 23, 5, 17, and 16. They're		key components we have to consider. It's the fault
	roughly orange-ish color, which means they're roughly		orientation. It's the the fault length. It's if
3	about 3 to 4 kilometers in depth.		there's a fault there. It's the pressure change model
4	So there's a strong depth differentiation		to understand what potentially slip is and how those
1	between larger earthquakes you see in the Culberson		are oriented in respect to each other. And so looking
	SRA, which I noted before, and the events in in		at all those criterion together, you know, we feel
	Southern Reeves County. These are shallower. They're		that there's a very low risk of of appreciable
	not as large, and there's a depth depreciation I'm		seismicity associated with with these two locations
9	getting off initially.	9	or a shallow disposal in Southeast New Mexico.
10	The plot on the right is modified from	10	There is, however, as documented, a much
	Zoback and Gorelick. And I think this is a very		larger risk of seismicity from deep disposal, which
	important plot when I think about the potential size		again has been documented and has been implemented to
	of earthquakes. It is very difficult to get a large		through the OCD's protocols around seismicity. And so
	earthquake in a very small hole. When you think about		I we feel that this, you know looking at these
	earthquakes globally, the large earthquakes, the San		pilots provides an optionality to support disposal in
	Andreas Fault, the earthquakes that occurred down in	16	a manner which will mitigate seismic risk.
	Mexico, in Japan, those are on faults that are	17	Q So one of the things that I noticed when I
	hundreds and hundreds and hundreds of miles long.		looked at your slides is that there is a lot of
19	They generate very large magnitude 7 quakes.		information on these slides. But you've also come to
20	There's a direct relationship and this is		a conclusion. So Chevron wasn't just wanting to show
	what this plot is is showing between the the		the Commission this end result; right? You wanted to
	length of the fault and stress built up in the fault		also show the Commission the depth of analysis that
	and magnitude. And the correlation is to have big		you undertook to reach this conclusion. So you sort
24	earthquakes, you have to have big faults.		of wanted to show your math?
25	So we're thinking about shallow disposal,	25	A Yes, that's correct. Yes.
	Page 266		Page 268
1	shallow seismicity. When we think about shallow	1	Q And are you familiar or have you reviewed
2	lineaments or faults or subsurface. They don't have	2	OCD's conditions of approval or conditions for
	the stress built up over time to degenerate large,	3	approval of administrative applications in Exhibit 11?
	appreciable earthquakes. That's just because they're	4	A Yes, I have.
	young. They're not as cranky. And they're they	5	Q And was there a condition of approval or
6	just don't have the stress built up.		condition for administrative applications that
7	When you get larger earthquakes, magnitude 5	7	assessed seismicity?
	3, magnitude 5 4. Those are on larger faults, and	8	A Yes, there was.
	those are generally buried deeper because they have a	9	Q And do you feel like the seismicity review
	higher stress built up. And that's just a general		that you did for these two wells would be consistent
11	trend in in seismology in relationship to faulted	11	with that requirement?
	pods.	12	A Yes, I do.
13	Q And so we're about to move on from	13	Q Let's move on then to the next two sets of
	seismicity. So I was hoping you could find a summary		slides, which relate to your data collection and first
	of your conclusions for admission, and then I'll have	15	of all your response protocol.
	a follow-up question after that.	16	A Yes.
17	A So when we look at seismicity in in	17	Q So if you could explain to the commissioners
	relationship to the Permian Basin, we did a thorough	18	
	review, looking at, you know, what's what's	19	A Yeah, so so this is this was work that
20	inducing earthquakes across the Permian? We recognize		was undertaken, I mentioned earlier today, through the
21			NMOGA work group. And so I'd like to apply industry,
	increase in seismicity and how it relates to to		several of which are in the room here from other
	saltwater disposal operations.		organizations that helped support this framework. And
24	And when we look at, you know, shallow		I think this is an excellent opportunity for industry
25	disposal operations and reflect on seismicity, there's	25	to work together and with with regulators and
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1	others on managing turned around disposal.	1	we progress this.
2	And so what this what this puts together	2	And then if if none of this is
	is essentially taking the culmination of what you	3	successful, you know, we going down, we seek you
	heard today on concerns around disposal interactions	4	know, seek resolution with OCD. We recognize the OCD
5	with potential production intervals, you know,	5	has the authority to suspend operations at any time,
6	potential seismicity, things like that, and it puts	6	and we support that.
7	together a framework which industry can work through	7	But this is a I think a robust framework
8	and work together on to not only document, collect	8	industry could work on in laying out a pragmatic
9	data, assess, report, and then manage potential risks.	9	data-driven approach to manage issues around
10	And so I I won't necessarily walk through	10	injection in this case around shallow injection
11	all the text on the right. I'll mainly just focused	11	into the DMG in Southeast New Mexico.
	on the the colored letter the colored words on	12	Q And again, this was derived from stakeholder
13	the on the left side. But essentially, this is	13	engagement?
14	looking at, you know, once once the pilot starts up	14	A Yes.
15	and starts injecting and monitoring, and we'll talk	15	Q And as you mentioned that there are
16	about the data collection. If there's an event that	16	operators in the room, outside of the room. And
17	kind of triggers this response, this is how this will		you've shared this with the Division in past meetings
18	go in theory.	18	with the Division, this framework?
19	And so if there's an offset producer that	19	A We have shared this with not only OCD but
	and this is mainly getting focused on on impacts to	20	also with State Land Office and other and industry
21	production, quarterly rights, things like that if	21	as well.
22	there's an offset producer that determines that	22	Q You've been talking a lot about data today
23	potential interference is occurring and we note that,	23	and how that's one of the key aspects of the pilot
24	you know we know we can work with monitoring our	24	project. So if you wouldn't mind discussing the slide
25	own producers.	25	for Commissioners and giving the commissioners more
	Page 270		Page 272
1	We hope that other operators, if they see	1	information about the data you intend to get, but also
2	something that changes in their in their production	2	why you think the data is important?
3	profiles or their their watercuts overtime or any	3	A So as you've heard many times today, we are
4	of those information you're bringing a spore to us,	4	Chevron has a vested interest in collecting a
5	we'd like to set up a discussion. We'd like to	5	robust data program with these two pilot wells.
6	review. Again, we we provide information on on	6	There's been a lot of work. They've talked about a
7	FSI in this case or fracture stimulation interference	7	lot of uncertainty in shallow injection.
8	or FDI. We'd like to review that and rule that out if	8	My colleague Bryce Taylor did some work on
9	that's a case of that that change. Today will be	9	some RT wells, and he only used a few. 'Cause there's
10	looking at the the stimulation times of offset	10	only a few wells that have actual data we can leverage
11	wells.	11	out of thousands in the Permian. So we look at this
12	And then if we ruled that out, potential	12	as a very important opportunity to collect a lot more,
13	additional data collection I think it's been	13	a very robust dataset, not only for us but for
14	mentioned, tracers, other data collection options to	14	industry to understand the potential issues.
15	to ascertain potential communication. If we look	15	Someone down here has listed out and I
16	at if there's no, you know, communication, you	16	will note this is this is not necessarily every
17	know, then then potentially no further interaction.	17	single piece of surveillance. We looked at these, and
18	But if there is, we'd take remedial action.	18	these are the things that we think are high priority.
19	And those can be a number of things. It	19	Doesn't mean there may not be other things on the
20	could be reduction in the pressures. It could be a	20	table, you know, depending on what we'd look at. But
21	reduction in the injection pressures and a reduction	21	these are the things that we think are high priority
22	in the injection rates over time. It could be	22	and part of our data collection plan.
1			
	potentially plugging back some of the well. It could	23	So I'm going to briefly run through these
23	potentially plugging back some of the well. It could be a combination of all many things. Again, all of		so I'm going to briefly run through these and just their surveillance and what we're what's
23 24		24	

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	of label these into the the static perspective and	1	It's very challenging sometimes for
2	the dynamic perspectives.		companies to share production data for obvious
3	So first we have the the wire line		reasons. But given that these are on top of our own
	logging procedure that's that's fairly standard in		wells, we we can share data with ourself. And so
5	the industry. And so this is, you know, the quad		this gives us the opportunity to have a really high
	combo logs, gamma ray resistivity, neutron density,		quality rich dataset looking at production changes
7	porosity, sonic. And that's looking at, you know, the	7	very proximal to the to the well locations.
	overall lithology and the reservoir, quality of the	8	So again, this we feel this is a
9	reservoir, stress, things that are core building		cornerstone of our pilot program. We think this
10	blocks of the of the geology.	10	this is going to add a lot of value not only
11	Or else they're going to run the XMRI log,		internally but also to the industry understanding, and
12	which looks at fractures. We talked about natural		not just in Southeast New Mexico, but across the
13	fractures and things like that. It's important to		Permian in general. This can be applied a lot of
	understanding that, how it goes to mechanic worth		places. So we're very, very excited about this, but I
	model. There were some questions earlier about	15	think it's very important.
16	understanding the frac geometry. This is very	16	Q So the pilot project is a two-well pilot
17	critical to understanding that.	17	1 5
18	One of the things here, we're going to have		dovetail with the fact that you chose two wells as
	downhole pressure gauges. Chevron as a program and	19	your pilot project?
20	any of our shallow disposal wells we drill in the	20	A Yes. It it does.
21	Permian, we part of our standard protocol is to	21	Q And why is that? Do you expect different
22	install downward pressure gauge.		data from the different wells?
23	It's very important to understand how	23	A We expect we expect different results
24	pressure changes if we inject over time dynamically.	24	from different wells, I think. Obviously, we talked
25	Dynamically being a key component of that. Not once a	25	about the geology difference in the modeling we came
	Page 274		Page 276
1	month, not once a year, but continuously. Spinner	1	up with was different. So this allows us to be able
2	surveys are something we've also looked at,	2	to look at two different locations.
3	understanding, you know, high prime interlay zones	3	You know, it's very hard to form a trend if
4	where the water is going through injection over time.	4	you only have one datapoint. And so we're starting
5	Water chemistry. Chevron has a robust water	5	with two. We might need three, but we we felt that
6	chemistry program. We look at produced water. This	6	this was adequate to try to further our understanding.
7	seeds into our into looking at other things that we	7	It also dovestail in with other data collection we're
8	look at around around potential beneficiary use and	8	doing in Texas with our operations as well.
9	things like that. So this is a robust program.	9	Q Let's go ahead and talk about the next slide
10	As as colleagues we would be running	10	about the timeline for your data collection efforts.
11	defense and separate tests as well. So those are a	11	A So this is this is a proposed kind of
12	lot of the somewhat static information that we could		guideline. You'll notice it's kind of pre-spud
13	be collecting, some of the more dynamic data that we	13	execution. Injections start up and down the road.
14	could be collecting based on information or tracers.	14	And so this should be looked at as a notional kind of
15	Again, we talked about if there's you know, try to	15	timeline.
16	trace where potentially water is going is going out	16	There's certain data that you will collect
17	of zone, out of confinement. This is a good	17	at one point in time. The logs will be run, and those
18	opportunity to try to understand that.	18	are the logs, right, when we drill the well. There's
19	We have downhole gauges, deployed producers,		other pieces of information like pressure data,
20	monitor pressure changes or communication then		production monitoring, you know, other data that will
21	production monitoring. This is something that, again,		be collected over longer periods of time. They'll
22			report it.
23	earlier in locating these wells where we did and	23	And so so this is just a just an
	trying to take into account many different variables	24	overview of kind of how things will lay out from a
	is locating these on top of our own wells.		from a general timeline as far as execution. So yeah,
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1 obviously, when we drill the well, we'll be logging	1 lot of the data that's been proposed today. And
2 it. We'll be doing the DFITs and the step-rate tests.	2 Chevron is committed to collecting and providing a
3 When we start injection, you know, we'll be,	3 very robust and transparent dataset with these.
4 you know, performing, you know, and slowing down all	4 We feel it's very important not only to the
5 pressure gauges, looking at how the pressure's	5 overall success of the pilot program, but but just
6 changing, and doing some of the treatments,	6 to the further understanding of some of these
7 understanding how that is running spinner surveys,	7 uncertainties that we've talked about and being able
8 things like that, to understand how the dynamic well	8 to provide a lot more granular information to perform
9 performs over time.	9 more higher-level modeling to perform more in-depth
10 I'm feeding into, again, my colleague Bryce	10 analysis than we are able to just because we don't
11 report on rate change analysis. So I'd say collect	11 have enough data.
12 data, be able to execute that modeling work to see how	12 And we're modeling uncertainty on top of
13 the well is performing, looking at offset producers.	13 certainty when we could be actually modeling, you
14 So this is kind of a just a notional timeline that	14 know, actual constrained information. And and so
15 looks at how data will be collected over a period of	15 we support that we support that as part of our
16 time.	16 conditions of approval on on collecting data and
17 And this is this is, I think, very	17 disseminating it as well.
18 important to understand that some day it will come at	18 Q Thanks for that. One of the things that we
19 once. Some day it will come over time. Some day it	19 talked about earlier today was this is kind of
20 will will come continuously just based on the	20 going back to a question that was posed to
21 the nature and the flavor of the data being collected.	21 Mr. Merrifield about how many wells were analyzed to
22 Q And so one of the things that you mentioned	22 come up with a net porosity. And do you have an
23 is a desire to be transparent and to share this data	23 answer to that question?
24 in a collaborative fashion. Can you explain a little	A Yes. It was so that that worked to
25 bit more about that to the commissioners?	25 look at the overall DMG geological understanding took
Page 278	Page 280
1 A Yes. So at a at a very high level that	1 into account hundreds of wells across the Permian
2 we're committed to work with OCD in providing this	2 Basin.
3 data in a public format so that everybody can can	3 Q The next kind of questions I wanted to ask
4 work on. This is one of the big conversations here	4 you about were OCD Exhibit Number 11. Have you had a
5 about the industry on on how to proceed with this.	5 chance to review that?
6 I think this is a little bit new for a lot of of	6 A Yes.
7 us.	7 Q And I just want to ask you some pretty
8 And and maybe the OCD on collection and	8 general questions about it, correcting that I do not
9 dissemination of of such a rich dataset. And so we	9 have them in yet. So you reviewed it and well, let
10 look forward to if moving forward put the pilots	10 me take a step back and talk about what Chevron did to
11 working with the OCD on setting up a plan to to	11 prepare for coming to this hearing today.
12 store and host data in a certain way.	12 Chevron evaluated offset DMG production;
13 Q And then the final slide that you prepared	13 yes?
14 gives a summary of the key takeaways from your	14 A Mm-hmm.
15 testimony.	15 Q And it evaluated potential impacts on offset
16 MS. BENNETT: And I don't want anyone	16 Avalon production?
17 to get the wrong idea that it means his testimony is	17 A Yes.
18 over though, because I do have a bunch of questions to	18 Q And ensured adequate lower and upper
19 ask him.	19 containment?
20 BY MS. BENNETT:	20 A Yes.
21 Q But I would love to hear your key takeaways	21 Q Evaluated faulting and lineaments that
22 from your testimony.	22 connect as pathways?
23 A So I believe I talked on on several of	23 A Yes.
24 the seismic already, so I'll I won't belabor those.	24 Q Assessed seismicity to the extent relevant?
25 But I will continue that again. When we think about a	25 A Yes.
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1 Q Ensured adequate well bore design to protect	1 step-rate test, so I really would like to review some
2 SDWs?	2 of the exhibits proposing this temporary test
3 A Yes.	3 procedure.
4 Q You have come up with reporting for faults?	4 Q And that's not because you disagree with
5 A Yes.	5 doing a separate test. You just have some questions
6 Q Safety monitoring and mitigation measures?	6 about how it is to be performed?
7 A Yes.	7 A That's correct.
8 Q So looking at the well, do you think that	8 Q Some inconsistencies in the volumes to be
9 those analyses are consistent with consistent with	9 performed?
10 the Division's proposed guidance in in Exhibit 11?	10 A Yes. That's correct.
11 A I believe so.	11 Q Some inconsistencies in the volumes?
12 Q Would you consider those to be some sort of	12 A Yes.
13 touchstones for the Division to follow when evaluating	13 Q And then every two years after commencement
14 future shallow DMG applications?	14 of the injection permits, you shall obtain a status on
15 A I believe so.	15 the pressure and review the summary on the performance
16 Q Let's see. I just wanted to take a quick	16 including analysis by fault on a visit. Is that
17 look at paragraph 2, "Criteria for selection of the	17 something Chevron's willing to do?
18 injection interval, excluding the Lamar limestone from	18 A Yes.
19 an inclusion and department interval." Is that	19 Q And publicized monitoring where the new well
20 something that Chevron has done or is willing to do?	20 location is covered. It sounds like you already have
21 A Yes.	21 a very robust monitoring program in place.
22 Q Excluding the lower Brushy Canyon from the	22 A Yes, we do.
23 permitted interval? Is that something that Chevron	23 Q And then I think I've touched on everything.
24 has done?	24 So it sounds like with the exception of wanting to get
25 A Yes.	25 some clarity about the actual mechanics of the
Page 282	Page 284
1 Q Review of the AOR and assessment of evidence	1 step-rate test, Chevron is or is willing to comply
2 of natural frac systems or faults, is that something	2 with all of the conditions in Exhibit 11?
3 that Chevron has done?	3 A Yes.
4 A Yes.	4 Q Did you review the OCD's pre-hearing
5 Q So in terms of the well bore design and	5 statement?
6 construction I'm not going to read all of this.	6 A Yes.
7 But are these consistent with the well bore design	7 Q Did you see the statement that the Papa
8 that you have put forth today?	8 Squirrel is located in an area not favored for DMG
9 A Yes, it is.	9 disposal due to resource potential?
10 Q We already talked about limiting the two	10 A Yes.
11 main to 5 foot, 5 inches. We already talked about	11 Q Is that something that you agree with based
12 craving stimulation, additional testing and	12 on your own review and based on your team's review?
13 monitoring, conducting a cement bottom log for each	13 A No.
14 casing string. Is that something that you had	14 Q And why is that?
15 proposed to do in your original application?	15 A So when we look at the the review of the
16 A Yes.	16 resource, I think we look back at some of the
17 Q Conducting a suite of open-hole logs over	17 historical previous reviews of that, they they
18 the approved injection interval and submitting this	18 brought examples that there are things that are more
19 information to you if needed. Is that part of your	19 complicated than when you first look at.
20 reporting protocol?	20 Look at the if you only look at SWD
21 A Yes, it is.	21 interactions with production, you're only going to
22 Q Conducting a successful step-rate test	22 come up with SWD interactions with production. If you
23 before injection commences. Is that something that	23 only look at potential Wolfcamp to Avalon, as an
24 Chevron is willing to do?	24 example, interactions, you're only going to come up
25 A Yes, we are committed to conducting a	25 with Wolfcamp to Avalon interactions.
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72 (Pages 282 - 285)

1 And so looking at everything consistently	1 A I think we think it's a very important
2 under, you know, a new light of what's going on in the	2 understanding to collect dynamic data on stress in the
3 basin, what's produced water issues. We feel it's	3 reservoir properties. Yes.
4 important to re-look at that and continue to evaluate	4 Q Would Chevron be willing to incorporate that
5 it as things change over time. That that's our	5 into the recommendation in addition to what we've seen
6 view and and the big reason why we're doing this	6 this before in Exhibit 11?
7 pilot program.	7 A Yes, I believe so.
8 Q Did you see the Division statement about	8 Q I want to ask you a follow-up question
9 Papa Squirrel being between two areas where increased	9 generally about this stress orientation that you're
10 water saturation has been reported?	10 talking about and the seismicity in slides 135 and
11 A Yes.	11 136. One of the Division's concerns and in
12 Q Is that a concern that Mr. Parizek addressed	12 presentation we'll get into that more later or
13 today?	13 tomorrow is areas of uncertainty and knowledge of
14 A Yes, I believe so.	14 the geology in the area.
15 Q The final questions I have for you well,	15 And I would argue that present communication
16 is there anything that you would like to say before we	16 with Chevron today actually corroborates some of that
17 conclude our time together?	17 concern that there are certain areas where more data
18 A Yeah, just want to reiterate to to the	18 is necessary. When we hear your presentation related
19 commissioners that we feel this is a very robust data	19 to seismicity, I think it's fair to say that you state
20 collection program and our pilots. We feel that it	20 or implied a relatively high level of confidence that
21 will provide a lot of opportunities to learn, not only	21 there are not unstable faults in the proposed
22 from again, from our perspective, industry	22 injection area.
23 perspective, but from the from the OCD's	23 I'm just wondering if you can articulate and
24 perspective as well as it looks at, you know, the	24 help explain, like, what could be seen as kind of a
25 the important issue around produced water management	25 delta in that confidence. Why, when we're talking
Page 286	Page 288
1 in Southern New Mexico.	1 about an area with geologic uncertainties, are we
2 Q Were the exhibits that we discussed prepared	2 relatively certain about the lack of faults or lower
3 by you or under your supervision?	3 risk seismicity?
4 A Yes, they were.	4 A So when we think about fault, right,
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1	system, those are two different things. And so the		The likelihood of induced seismicity from from	
	2 ability for a fracture system necessary to generate a		2 disposal operations is is I would argue higher.	
3	large earthquake is well, it's not applicable.	3	But also too the geology's different.	
4	5		In that seven part of Culberson County, that's the age	
5	No further questions. Thank you,	5	of the of the Permian Basin roughly. There's a	
	Mr. Chair.	6	large set of old reverse faults. They extend up.	
7	MR. FUGE: Ms. Hardy, do you have any	7 And some of those are are visible on		
	questions for the witness?		the on a foreign figure on slide 135. If you	
9	MS. HARDY: I do not. Thank you.		look if you look over, you can see near where it	
10	1		it says the Apache Fault Zone. Those are deep fault	
11	DR. AMPOMAH: Yes, sir. I do have a		zones. So there's a large set of deep faults that are	
	couple.		roughly yes, yes.	
13	So let's start from page 126. I will	13	You see the earthquakes just above it.	
	probably skip to 127. So on this particular page,		There's a large set of of reverse faults that	
	definitely you showed that the Papa Squirrel is within			
	that SRA?		hypothesis there, again, when you think about the	
17	MR. COMISKEY: Yes.		the deposition and the thrust that kind of formed the	
18	DR. AMPOMAH: But the Severitas 2 State		basin back during the the order mission and the	
	SWD 1 is not in that area?		Silurian and Devonian time.	
20	MR. COMISKEY: Yes.	20	Those faults were were activated.	
21	DR. AMPOMAH: So considering if you		They're reverse faults. Now they're now they're	
1	look at the deeper zones, where there's a lot of		activated normally. And they're oriented in the	
	micro-seismic events happening, why would you not		manner based on focal mechanism data that are roughly	
	consider building this well that's not dealing the SRA		parallel to the stress direction. And so that area	
25	rings, they're deeper. You know, why would you not Page 290	25	has a unique set of of circumstances. It might not	
	rage 290		Page 292	
	consider building that all the way to Devonia because		be a big fault.	
1 2	there's no micro-seismic event there?		Vou house a machanism, which is doon	
		2	You have a mechanism, which is deep	
3	MR. COMISKEY: Chevron has two	3	disposal, and then you have the orientation of the	
3 4	MR. COMISKEY: Chevron has two Devonian deep SWD wells located very proximal to	3 4	disposal, and then you have the orientation of the fault is roughly parallel to the stress direction. So	
3 4 5	MR. COMISKEY: Chevron has two Devonian deep SWD wells located very proximal to Severitas 2 SWD 1 already. And I won't speak to to	3 4 5	disposal, and then you have the orientation of the fault is roughly parallel to the stress direction. So you know, combining those ingredients together makes	
3 4 5 6	MR. COMISKEY: Chevron has two Devonian deep SWD wells located very proximal to Severitas 2 SWD 1 already. And I won't speak to to economic thresholds on drilling deep wells and the	3 4 5 6	disposal, and then you have the orientation of the fault is roughly parallel to the stress direction. So you know, combining those ingredients together makes that area very sensitive to to perturbation. And	
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<sup>74 (</sup>Pages 290 - 293)

	they're acting as conduits of water.		we look at this, this is just a this is just kind
2	A fault isn't all that it was. It	2 of a high level, you know, just just flow. The	
1	if you think about if you think about the San		whole the premise of this is that the stakeholders
	Andreas fault, we often think about it as one long	4	would be engaged on this. And it can be the
1	continuous fault, but we know there's earthquakes in	5 stakeholders that are involved in the well, could be a	
	Los Angeles and there's earthquakes in the Bay Area;	6 mobile working group, and and also the OCD for se	
7	right? But the whole fault doesn't move.	7 process.	
8	Very similar here. I mean, think about	8	DR. AMPOMAH: Let's look at the data
9	these faults that are in the basement. The whole	9	that surveillance program. So I want to ask how often
10	fault doesn't move. Only portions of that fault move	10	are you using poly DFMI to identify natural process?
11	during a period of time.	11	MR. COMISKEY: I'm I'm pretty
12	And so is injection or pressure	12	confident. We've we've had good results in using
13	actually the pressure. It's not direct fluid contact.	13	FDMI logs across the Permian to identify open and
14	It's the pressure. As that pressure goes into those	14	closed heel fractures. We have a we have a very
15	formations and diffuses out, that can create a more	15	robust in-house technology group and our technology
16	lasting change in the reservoir. Can also create a	16	company that that's what they do every day that
17	drip pressure, i.e. reducing the effective stress.	17	that's what they do every day is look at image logs
18	And that lead me through to direct	18	around the world.
19	transformation into the the basement just through	19	So I I feel very confident. We've
20	the through the interval or into some of these	20	had a good success of of recognizing fracture
21	faults. Down the fault, coming to a point where the	21	systems, fracture networks within those concealed,
22	fault is even more critically stressed, inducing slip.	22	closed, you know, open.
23	And we've seen that recently, where you have a fault	23	DR. AMPOMAH: So you want to use the
24	that has moved several different times along the	24	spinner someday to identify the
25	transect of that fault.	25	MR. COMISKEY: Yes.
	Page 294		Page 296
1	DR. AMPOMAH: On your page 137, you	1	DR. AMPOMAH: And is it you will
	DR. AMPOMAH: On your page 137, you talked about the framework that industry has a		DR. AMPOMAH: And is it you will compare with the log data?
2			
2 3	talked about the framework that industry has a	2	compare with the log data?
2 3	talked about the framework that industry has a preference. I want to know at what point does NMOCD	2 3	compare with the log data? MR. COMISKEY: Yes.
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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	talked about the framework that industry has a preference. I want to know at what point does NMOCD come see? MR. COMISKEY: Well, we also have down here, "Seek OCD resolution." But our goal as the as the industry and again, the we will be collaborating and communicating with the OCD through all of this. We're more than willing to be transparent on working with industry. Again, this is an industry problem on produced water management. And so in vision the OCD could come in at any point. We like to keep the OCD or hope to keep the OCD engaged. But we do recognize that, you know, at some point if there's there's scrambling with the other resolution that already is going to agree to the OCD has the ability to to implement and remove the permit or act. And we recognize and support that authority. DR. AMPOMAH: Yeah, because when I look at it, you know, on your lefthand side, if let's say no interference, then that means no action is needed; right? But I don't see where there is a communication	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	compare with the log data? MR. COMISKEY: Yes. DR. AMPOMAH: So which log data are you going to compare that to? MR. COMISKEY: So when we think about the high again, these are these are sandstone, so we can look at the transects. My colleague Tom Merrifield noted that. So we can look at the porosity trends in these sands, depositional geology if you're in a you know, if you're looking at a Bouma sequence looking at those upper finding sequences and looking at where the high porosity, thick channeling sands, blocky sands, so we can look at that from the the porosity and neutron density. And they correlate that to permeability that we there are I would probably defer to my colleague Tom Merrifield on any more detail on that. But it's a pretty standard processing and sands and then relating that to to, you know, high clean zones for water. DR. AMPOMAH: Yeah. For water, that is

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1	loss, like some of these injector zones. It could be	1	questions you're trying to get after. Think when we		
2	easy comparing.	2	2 take a step back and look at the overall status of		
3	MR. COMISKEY: And and to add to	3 just disposal and data collection associated with			
1	that, we do have cork that we have collected in other	4 that. It's very limited.			
5	either disposal wells or not disposal wells, but	5 And so taking a step to collect this			
6	wells we drilled through the DMG to help constrain the	6	data I think is a big step. We hope to continue to		
7	models for those pour process. It's not like we don't	7	progress that. I mean, to more data acquisition than		
8	have any core at all. We do have core to it but.	8	others. Maybe we'll get more more complicated		
9	DR. AMPOMAH: So it's an accident then.	9	modeling efforts. But thinking of the current		
10	MR. COMISKEY: That's right.	10	position we're in right now with just the data we		
11	DR. AMPOMAH: Now, so when I look at	11	have, I see a lot of value for the more simplistic		
12	your program, I see a lot of stunted data collection.	12	models and a lot more uncertainty in the more		
13	MR. COMISKEY: Yes.	13	complicated models just because the data we have		
14	DR. AMPOMAH: Less than our data	14	doesn't necessarily support that.		
15	collection. But I do see you do have the production	15	DR. AMPOMAH: So in regards to the		
	monitoring.	16	tracer, so based on the earlier analysis, you didn't		
17	MR. COMISKEY: Yes.		have control over the other well. Are you saying that		
18	DR. AMPOMAH: So I want to know he		you're going to have control over the wells to be able		
	I'm just going to recommend that you should consider		to perform the tracer test?		
	dynamic modeling, simulation, and also coupled with	20	MR. COMISKEY: Yeah. Yeah, one of the		
	your mechanics too.	21	key things is, you know, we start running. We can		
22	MR. COMISKEY: So we we do have that		we look at this and we need we see the need to run		
	list. We are going to take that. So we're doing		tracers. Obviously, we're going to have the wells,		
	we are currently doing mechanic worth modeling in		you know, next to us so. And when we execute a tracer		
1	this. And so this dynamic data will help feed into		program, if you're trying to understand a particular		
	Page 298		Page 300		
1	that mechanic worth model over time.	1	question or understand something, having the, you		
2	My colleague Bryce mentioned some of		know, control of the wells nearby to be able to test		
	the RTA work. This will help feed that. And so we		that is very important.		
	are we do have robust data modeling. My colleague	4	If you have other other operators or		
	Jason Parizek, he showed some of the modeling work	5	companies, trying to get on the same page sometimes		
	that was done on the on the line the line frac		can can be a challenge. So that's a that's a		
	modeling.	7	strategic advantage and part of the reasons why we		
8	We have we do again, are are	8	picked these locations.		
1	expanding upon that modeling work as we get more	9	DR. AMPOMAH: I don't believe I can ask		
1	dynamic data to be able to, you know, constrain the		questions related to the Exhibit 11 because they don't		
	models and be able to push the models further. So		talk about it.		
		12	MR. FUGE: The witness testified to it.		
13	DR. AMPOMAH: Yeah, but you said you do		So you can ask questions.		
	the mechanics. But what about the hydrodynamic? More	14	DR. AMPOMAH: So if we can go to that		
	complex than the one that Kappa will give you and then		one. And I do have some few questions.		
1	the fracture and then also the potentially gone?	16	So as we review Chevron's application,		
17	MR. COMISKEY: So when we think about		my first question is so you can go to OCD isn't it?		
	going to more complicated modeling, I think the	18	MS. BENNETT: Oh, OCD. I'm sorry about		
19	limiting factors are the data quality and the data		that.		
20	abundance. You we can go to a very, very	$\begin{vmatrix} 1 \\ 20 \end{vmatrix}$	DR. AMPOMAH: So the first question		
20			that I have is the first one. You know, number one,		
	isn't robust enough to support that, the results, I		approved locations outside the identified well		
22	would argue, are are fairly ambiguous.		productions till deleted by the and provided by the		
$\begin{vmatrix} 23\\ 24 \end{vmatrix}$	So we've seen a lot of high value and		as an except, so in one of your wells, you are		
	and running more simplistic models for the		within that area.		
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1			-		

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1 MR. COMISKEY: I believe we're actually	1 And so I think re-looking at all options and how we	
2 in that area in both wells.	2 can can manage that is very important. So I think	
3 DR. AMPOMAH: You're in that area in	3 it's a multitude of things.	
4 both, yeah. In both wells in that area.	4 DR. AMPOMAH: So does that mean that if	
5 MR. COMISKEY: Yes.	5 the commission agrees to Chevron's request, that one	
6 DR. AMPOMAH: So does your	6 needs to be struck down or something?	
7 communication satisfy the admonition?	7 MR. COMISKEY: I would argue that maybe	
8 MR. COMISKEY: It does not. And and	8 it's more of a taking a data-driven approach to	
9 again, the reason why we're trying to re-look at this	9 disposal within within the the Avalon production	
10 is that, you know, we we understand there's concern	10 area. I think that's the way that Chevron is	
11 on this. But generally, drawing a a big circle on	11 advocating for this. We we aren't advocating for a	
12 a map and saying, "Don't go in here anymore" is is	12 free for all in disposal. We're we're advocating	
13 maybe not the best approach when we think about a	13 for again a data-driven, pragmatic approach to to	
14 long-term strategy of produced water management.	14 understanding disposal in in the area.	
15 We understand there's risks. That's	15 DR. AMPOMAH: So on 2Bm, exclude the	
16 why we we come here today. That's why we're	16 lower Brushy Canyon formation from the interval. So I	
17 presenting this robust data collection program.	17 know that you said Chevron was saying it's just going	
18 That's why we're disseminating it. We think that	18 to be different. "We are not going to do any	
19 again having a data-driven pragmatic approach to	19 injection there." But it's still part of what you	
20 disposal is probably a better and more advantageous	20 want the canyon for.	
21 way to understand the risks. So that is why that's	21 MR. COMISKEY: Yes, and I I believe	
22 why they're pushed together.	22 we're not drilling we're not drilling into the	
23 DR. AMPOMAH: Was Chevron part of that?	23 lower Brushy. We're drilling into the upper portion	
24 MR. COMISKEY: I believe Chevron was	24 of the Brushy. The Brushy is roughly 1,000 feet	
25 part of that, yes. I I was not a part of that	25 thick.	
Page 302	Page 304	
1 group. I was not employed at Chevron at the time.	1 DR. AMPOMAH: So there is a separation?	
2 DR. AMPOMAH: So was it more like a	2 MR. COMISKEY: Yes. Yes. We're not	
3 general knowledge or is a settled group like, yeah,	3 drilling through the whole Brushy. We're not drilling	
4 I'll buy them back?	4 into the lower Brushy. We're drilling into the top	
5 MR. COMISKEY: So I I would argue	5 portion, logging it, collecting the data, and then	
6 that things change. When this when this was put	6 again, as was common early in testimony, it will be	
7 up, there was there was good work that was brought	7 sealed off.	
8 forth in my opinion on this.	/ sealed off.	
	8 DR. AMPOMAH: Now, 3C. You've planned	
9 I think we provided testimony that		
9 I think we provided testimony that 10 again if you only look at disposal related	8 DR. AMPOMAH: Now, 3C. You've planned	
	8 DR. AMPOMAH: Now, 3C. You've planned 9 oxidizing. You've planned oxidizing as part of your	
10 again if you only look at disposal related	8 DR. AMPOMAH: Now, 3C. You've planned 9 oxidizing. You've planned oxidizing as part of your 10 demolition plans. That's	
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<ul><li>10 again if you only look at disposal related</li><li>11 interactions with production, you're probably only</li><li>12 going to come up with disposal related questions. If</li></ul>	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	
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1 DR. AMPOMAH: So do you support that	1 universe of producers that might be impacted are going	
2 point? Can Chevron agree to that?	2 to be already known?	
3 MR. COMISKEY: Absolutely. If if	3 MR. COMISKEY: So obviously, we we	
4 there are abilities to look at existing DMG disposals	4 can only communicate this through the the DMG work	
5 for monitoring, absolutely.	5 group, but there's NMOGA. And so that helps a lot.	
6 DR. AMPOMAH: Thank you, and thanks for	6 We also reach out in IPAM. So I'm I'm engaged in	
7 you knowledge on micro-seismicity. It was exact.	7 the the deep the working group that covers that.	
8 MR. FUGE: Mr. Bloom?	8 And so and then too obviously through	
9 MR. BLOOM: Yeah, just a couple	9 through our work with Rowena [ph] Group, we would,	
10 questions. If we go back to 3C for a second.	10 you know, be happy if if we felt like we had	
11 Does an acid treatment create new	11 available to notify any operators through any of that,	
12 fracture systems?	12 we've reached out through our main contacts to make	
13 MR. COMISKEY: No. I mean, the acid	13 that establishment.	
14 treatment we're looking at is mainly on the cleanout	14 MR. FUGE: That's helpful. Thank you.	
15 side. It's to you know, it was common earlier to	15 And then would the potential interference, the sort of	
16 look at skin, you know. You know, clean up some of	16 producer potential interference and I sort of see some	
17 the near well bore. Things like that's the purpose	17 examples of data. It reads to me a little bit kind of	
18 of the action. Acid injections.	18 the first time I looked at it is, is this a stumbling	
19 MR. BLOOM: Just wanted to clarify	19 block? Like we're going to argue about whether	
20 that. Thank you.	20 there's potential interference?	
21 I appreciate your analysis on the	21 Or is this is sort of like she suggests	
22 future proposed seismic monitoring program. I hope	22 that maybe interference either via watercuts or other	
23 that that data is publicly available or that there's	23 changes, and then you immediately jump into the green	
24 some way that the Land Office can access that as you	24 box, which is sort of the intent. They come in with	
25 put out the program.	25 some data that "Hey, we're seeing increased water	
Page 306		
1 We have OCD has its SDA to rick	1 meduation "you'd as into that sort of resolution	
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Page 311 Page 313	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	OCD. And we we have before. So so that is again, we also support expanding the New Mexico territory we've discussed as well. But but that that data, you know, if if needed can be provided. MR. BLOOM: And then I think the last component, and this is just sort of a, you know, conceptual piece. And again, it's a question I asked. I forget of which witness. It may have been you in your first round of testimony. When I think pilot, there's sort of like a lesson learned component with the data and a firm commitment to sort of report out at an interval. And so I see and it's not sort of reporting out on every kind of triggering event that's there. But what I'm not seeing in the proposal is a sort of like "Five years out, we will give a rollup like the Commission has seen for certain" acid	6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	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.
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1 working group who have supported your projects. So do	1 CERTIFICATE OF DEPOSITION OFFICER
2 you know if XTO was part of that original working	2 I, JAMES COGSWELL, the officer before whom
3 group?	3 the foregoing proceedings were taken, do hereby
4 A I believe they were. Yes.	4 certify that any witness(es) in the foregoing
5 Q How about Cimarex?	5 proceedings, prior to testifying, were duly sworn;
6 A I believe they were.	6 that the proceedings were recorded by me and
7 Q Mewbourne?	7 thereafter reduced to typewriting by a qualified
8 A I believe they were.	8 transcriptionist; that said digital audio recording of
9 Q Chevron?	9 said proceedings are a true and accurate record to the
10 A Yes, Chevron was.	10 best of my knowledge, skills, and ability; that I am
11 Q So do you think it's fair to say that	11 neither counsel for, related to, nor employed by any
12 there's been an evolution in thinking since 2016	<ul><li>12 of the parties to the action in which this was taken;</li><li>13 and, further, that I am not a relative or employee of</li></ul>
13 that's shared by more than just Chevron?	14 any counsel or attorney employed by the parties
	15 hereto, nor financially or otherwise interested in the
14 A Yes, I believe so.	16 outcome of this action.
15 Q And that evolution in thinking is what	17 17
16 you're presenting to the commission at this time?	18
17 A Yes.	19
18MS. BENNETT: Thank you. Those are the	20 Harriell
19 only redirect questions I had.	20 Dugwen
20 MR. FUGE: Are you reserving?	21 JAMES COGSWELL
21 MS. BENNETT: Yes. I would like to	Notary Public in and for the
22 reserve with the opportunity to recall Mr. Comiskey as	22 State of New Mexico
23 a rebuttal witness if necessary.	23
24 MR. FUGE: Well, in light of the time,	24
25 I think we're at a natural breaking point since	25
Page 314	Page 316
1 Chevron, I believe, is finished presenting its	1 CERTIFICATE OF TRANSCRIBER
2 witness. So we will resume tomorrow morning at 9 a.m.	2 I, KIRSTEN FITZGERALD, do hereby certify
3 with OCD's witnesses.	3 that this transcript was prepared from the digital
4 For those listening in, and this was in	4 audio recording of the foregoing proceeding, that said
5 all of the announcements announcing the meeting, there	5 transcript is a true and accurate record of the
6 is a different link for tomorrow morning's meeting.	6 proceedings to the best of my knowledge, skills, and
<ul><li>7 Just go to the agenda, click on it. Just click on the</li></ul>	7 ability; that I am neither counsel for, related to,
	8 nor employed by any of the parties to the action in
8 link for Day Two. And we will start promptly at nine.	9 which this was taken; and, further, that I am not a
9 Thank you.	10 relative or employee of any counsel or attorney
10 (Whereupon, the meeting concluded at	11 employed by the parties hereto, nor financially or
11 4:57 p.m.)	12 otherwise interested in the outcome of this action.
12	13
13	14
14	15
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16	17
17	18 K. Mayald
18	KIKS IEN HILZGEKALD
19	19
20	20
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24	23 24
24 25	24
24 25 Page 315	

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