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STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION

Case No. 23580

Friday, November 15, 2024

8:30 a.m. MST

Pecos Hall, Wendell Chino Building  
1220 South St. Francis Drive  
Santa Fe, New Mexico 87505

Job No.: 6963000

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Reported by: Cappy Hallock, RPR, CRR

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1 ALSO PRESENT:

2 Felicia Orth, Hearing Officer

3 Gerasimos Razatos, Acting Director - State of

4 New Mexico Oil Conservation Division

5 Greg Bloom, Commissioner - State of New

6 Mexico Oil Conservation Commission

7 Dr. William Ampomah, Commissioner - State of

8 New Mexico Oil Conservation Commission

9 Sheila Apodaca, Law Clerk - State of New

10 Mexico Oil Conservation Commission

11  
12 Carlos Matutes, Member of Public (virtually)

13 Shelley Mann-Lev, Member of Public

14 (virtually)

15 Kathleen Burke, Member of Public (virtually)

16 Emma Mincks, Member of Public (virtually)

17 Rebecca Sobel, Member of Public (virtually)

18 Nika Beauchamp, Member of Public (virtually)

19 Dr. William Athas, Member of Public

20 (virtually)

21 Laura Watchempino, Member of Public

22 (virtually)

23 José Villegas, Member of Public

24 Colin Cox, Member of Public

25 Senator Harold Pope, Jr., Member of Public

1 ALSO PRESENT: (Continued)

2

3 Sheila Apodaca, Law Clerk

4 Mandy Sackett, Member of Public (virtually)

5 Caitlyn Bizzell, Member of Public (virtually)

6 Kayley Shoup, Member of Public (virtually)

7 Krystal Curley, Member of Public (virtually)

8 Deirdra Velasquez, Member of Public

9 (virtually)

10 Sandra Stulberg, Member of Public (virtually)

11 Hazel James, Member of Public (virtually)

12 Antoinette Reyes, Member of Public

13 (virtually)

14 Senator Jeff Steinborn, Member of Public

15 (virtually)

16 Aria Attoidom, Member of Public

17 Polly Bungum, Member of Public

18 Frankie Baca-Lucero, Member of Public

19 Randon Norine, Member of Public (virtually)

20 Seneca Johnson, Member of Public (virtually)

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P R O C E E D I N G S

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THE HEARING OFFICER: Good morning.  
My name is Felicia Orth. I have been appointed by  
the Oil Conservation Commission to conduct a  
hearing on proposed amendments to the Commission's  
rules to address PFAS in oil and gas extraction.  
It is docketed by the hearing clerk as 23580.

We are going to begin this morning  
with our, what would this be, seventh or eighth  
opportunity for nontechnical comment as part of  
this hearing, and for this session we do have an  
interpreter, her name is Ashley Ortiz, to provide  
interpretation between English and Spanish.

Ms. Ortiz, will you let the folks know  
that you are available?

MS. ORTIZ: (Speaking in Spanish.)

THE HEARING OFFICER: Thank you.

So the folks I have who signed up to  
offer comments and who may or may not be present  
on the platform please raise your virtual hand, or  
turn on your screen if you would prefer, to let us  
know that you would like to offer comment during  
this session.

Let's see, we have first William

1 Athas. Mr. Athas, can you hear me? Can you  
2 unmute yourself?

3 Mr. Athas? No. All right, let's go  
4 to the next one, Sheila. This is Carlos Matutes?

5 MR. MATUTES: Matutes.

6 THE HEARING OFFICER: Matutes. Would  
7 you spell your name, please.

8 MR. MATUTES: Yes. C-a-r-l-o-s, last  
9 name is M-a-t-u-t-e-s. I am the New Mexico  
10 community advocate for GreenLatinos.

11 THE HEARING OFFICER: All right, and  
12 do you swear or affirm to tell the truth?

13 MR. MATUTES: I do.

14 THE HEARING OFFICER: I will start  
15 your three minutes.

16 MR. MATUTES: Thank you, very much.

17 At GreenLatinos we are a national  
18 organization working for environmental justice for  
19 Latino populations and other communities of color.  
20 For us throughout the country high fluoroalkyl  
21 substances, especially surfactants in fracking  
22 fluids, are a major concern. Here in New Mexico  
23 we have an additional concern because of our  
24 governor's desire to create produced water under  
25 her strategic water supply plan.

1           As I'm sure that you have heard  
2 throughout this entire week, a minuscule amount of  
3 PFAS in any kind of drinking water basically makes  
4 it unusable. Here in New Mexico water is  
5 obviously a major concern. We are in a 25-year  
6 drought. We are a desert state. We have very few  
7 options for surface water. We rely very heavily  
8 on groundwater. If we are using PFAS in our  
9 fracking fluids, and again as I am sure you heard  
10 many times throughout the week, these are  
11 considered trade secrets. The only state, to my  
12 knowledge, that no longer has those trade secret  
13 protections for fracking fluids are our neighbors  
14 to the north, Colorado and New York.

15           We would encourage a ban on the use of  
16 PFAS for industrial use, specifically in oil and  
17 gas (distorted sound). There is far too much risk  
18 for ingress into groundwater supplies through  
19 leaks in well casings, through basic spills which  
20 happen every single day, especially in the Permian  
21 Basin.

22           In addition to the risks to our  
23 groundwater, we are very concerned about the risks  
24 to the health and well-being of the New Mexicans  
25 who are working in those oil fields. These are in

1 many cases some of our most vulnerable citizens so  
2 please, please ban the use of PFAS in oil and gas  
3 explorations in fracking fluids.

4 Thank you, very much.

5 THE HEARING OFFICER: Thank you,  
6 Mr. Matutes.

7 Next we have, let's see, a Dr. Emma  
8 Mincks. Can you unmute yourself? I'm not hearing  
9 anything. Dr. Mincks?

10 Okay. Let's move on. We will come  
11 back around to everybody. Let's see, Shelley  
12 Mann-Lev.

13 MS. MANN-LEV: Yes, good morning.

14 THE HEARING OFFICER: Good morning.  
15 Would you spell your name for the transcript,  
16 please.

17 MS. MANN-LEV: It does look like now  
18 that the person you called before me is available.  
19 But my name is Shelley Mann-Lev. My name is  
20 spelled S-h-e-l-l-e-y, M-a-n-n hyphen L-e-v.

21 THE HEARING OFFICER: Thank you. Do  
22 you swear or affirm to tell the truth?

23 MS. MANN-LEV: Yes, I do.

24 THE HEARING OFFICER: I will start  
25 your three minutes.

1 MS. MANN-LEV: Thank you so much.

2 I'm here today, I am a public health  
3 leader in New Mexico. I'm currently the executive  
4 director of Healthy Climate New Mexico, an  
5 organization of New Mexico health care and public  
6 health professionals and students who are  
7 mobilized to advocate for climate solutions that  
8 protect health and promote equity, and this is  
9 both a health equity and a public health issue  
10 that you are seriously considering.

11 PFAS, these very toxic chemicals, and  
12 of course we don't know exactly which, how and  
13 what because that transparency is not available to  
14 us in the fracking industry. PFAS are, as we know  
15 to be, extremely toxic in tiny amounts and we  
16 have, I have as a public health expert practicing  
17 for the last 30 years, three decades in New  
18 Mexico, great concerns about water.

19 Water in New Mexico, especially now in  
20 this time of accelerating heat and climate change,  
21 we know is an accelerating, increasingly scarce  
22 resource, and we need to do everything that we can  
23 in our power to make sure that we have clean,  
24 healthy water that will protect the health of the  
25 people who drink it.

1           So I -- many, many people have  
2 provided specific information about the toxic  
3 impacts. I'm just here to emphasize that as we  
4 see, you know, those of us who not only want to  
5 protect the people here today but for future  
6 generations, and PFAS do not expire quickly. They  
7 stay in water, in ground, that we need to do  
8 everything we can, including this ban, to make  
9 sure that our communities, workers, all of us are  
10 protected.

11           Thank you so much for your time.

12           THE HEARING OFFICER: Thank you so  
13 much.

14           Let's see, this is Rebecca, Rebecca  
15 Sobel. Ms. Sobel, can you unmute yourself?

16           I can't hear you. No. Okay. All  
17 right, we will come back to you.

18           Mrs. Kathleen Burke. Ms. Burke, can  
19 you unmute yourself?

20           MS. BURKE: Good morning.

21           THE HEARING OFFICER: There you are.  
22 Terrific. Would you spell your last name for the  
23 record, please?

24           MS. BURKE: Yes, ma'am. It is Burke,  
25 B-u-r-k-e.

1 THE HEARING OFFICER: Do you swear or  
2 affirm to tell the truth?

3 MS. BURKE: Yes, I do.

4 THE HEARING OFFICER: I'll start your  
5 three minutes.

6 MS. BURKE: My name is Kathleen Burke,  
7 a resident of Sandia Park speaking on behalf of my  
8 household. I begin by sharing with you the  
9 definition of ecocide as defined by the  
10 independent expert panel for the legal definition  
11 of ecocide June 2021.

12 Ecocide has to do with people who are  
13 complicit in the destruction of nature. Ecocide  
14 is unlawful or wanton acts committed with  
15 knowledge that there is a substantial likelihood  
16 of severe and either widespread or long-term  
17 damage to the environment being caused by those  
18 acts. Just like with homicide, genocide and  
19 democide, as with ecocide, destruction is the key  
20 element. There are legal consequences for those  
21 who commit these acts. In the beliefs of many,  
22 there are karmic consequences.

23 The class of PFAS chemicals are a  
24 weapon which already we know is leading us and the  
25 environment around us toward destruction. The

1 Stop Ecocide International Foundation provides  
2 further legal definition for each of the terms  
3 used in the definition of ecocide: A, wanton  
4 means with reckless disregard for damage which  
5 would be clearly excessive in relation to the  
6 social and economic benefits anticipated; B,  
7 severe means damage which involves very serious  
8 adverse changes, disruption or harm to any  
9 elements of the environment including grave  
10 impacts on human life or natural, cultural or  
11 economic resources; C, widespread means damage  
12 which extends beyond a limited geographic area,  
13 crosses state boundaries, or is suffered by an  
14 entire ecosystem or species or a large number of  
15 human beings; D, long-term means damage which is  
16 irreversible or which cannot be redressed through  
17 natural recovery within a reasonable period of  
18 time.

19 Ecocide refers only to the very worst  
20 harms, usually on a major industrial scale such as  
21 fracking. Distribution of PFAS chemicals in oil  
22 industry operations is a clear example of an  
23 industrial sector where unlawful or reckless  
24 conduct will cause this level of harm, which if  
25 left unchecked can and will rise to the level of

1 ecocide. Ecocide further describes what is  
2 happening to our planet, the mass damage and  
3 destruction of the natural living world. It  
4 literally means killing one's home.

5 The European Union recently voted to  
6 include ecocide level crimes in the European  
7 Union's revised crime directive. The historic  
8 decision will strongly reinforce existing  
9 environmental laws establishing a clear, moral, as  
10 well as legal red line aimed at preventing and  
11 punishing the gravest environmental harms. These  
12 are laws which our New Mexico lawmakers will also  
13 soon be considering.

14 In light of the fact that we are now  
15 in the seventh mass extinction of our planet, the  
16 Holocene and Pleistocene extinction event, you  
17 might agree that laws preventing ecocide cannot be  
18 adopted soon enough in the United States, and we  
19 must pay heed to the crimes of ecocide happening  
20 in New Mexico.

21 To commit homicide is to destroy  
22 another. Suicide is to destroy oneself. These  
23 are grave terms for the description of grave moral  
24 and legal choices such as the grave choice you  
25 ladies and gentlemen of the Commission are facing

1 regarding the potential for the ecocide currently  
2 under consideration at this Commission. And  
3 Commissioners --

4 THE HEARING OFFICER: Ms. Burke,  
5 please wrap up.

6 MS. BURKE -- hope you will wisely  
7 avert.

8 Thank you, ladies and gentlemen.

9 THE HEARING OFFICER: Thank you.

10 I think I saw Ms. Sobel come back to  
11 us. Let's see here. I know that was her. Yes,  
12 up there in the upper right there.

13 Ms. Sobel, are you able to unmute  
14 yourself now? I can't hear anything. I'm sorry.

15 All right, so for anyone having  
16 trouble with -- oh, yes. You can go back to  
17 Dr. Mincks. That's a good one.

18 For anyone having trouble unmuting  
19 themselves, please keep working on it. If you  
20 would like, another possibility is to submit your  
21 comments in writing until 5 p.m. today. And there  
22 will be one more public comment period at 4:30  
23 this afternoon.

24 Dr. Mincks, are you able to unmute  
25 yourself?

1 DR. MINCKS: Hello, can you hear me?

2 THE HEARING OFFICER: Yes. Thank you.

3 If you would please spell your last  
4 name.

5 DR. MINCKS: Sure. It's M like Mary,  
6 I like indigo, N like Nancy, C like cat, K like  
7 kangaroo, and S like Sam.

8 THE HEARING OFFICER: Do you swear or  
9 affirm to tell the truth?

10 DR. MINCKS: I do.

11 THE HEARING OFFICER: I will start  
12 your three minutes.

13 DR. MINCKS: Thank you.

14 I'm a childhood cancer survivor. That  
15 is why I have a concern with the forever  
16 chemicals. Also, just the name forever chemicals  
17 indicates they will be around forever, and they  
18 are still under study although there are over  
19 5,000 studies that I was able to find from a quick  
20 Google search that talks about the research done  
21 on PFAS so they have been researched.

22 I find it very concerning that the oil  
23 and gas industry is not required to share what  
24 types of PFAS chemicals they are injecting into  
25 the water here because it does say on the research

1 that I've read that there are various types of  
2 harmful effects from different types of PFAS. So  
3 in the 5,000 articles plus studies I'm looking at  
4 an article by NCBI from 2022. It says that there  
5 is sufficient evidence in the studies, in those  
6 5,000 studies to say that there is a decreased  
7 antibody response in adults and children,  
8 decreased infant and fetal growth, and increased  
9 risk of kidney cancer, and there is suggested  
10 evidence to say there is an increased risk of  
11 breast cancer, liver and enzyme alterations,  
12 increased risk of testicular cancer, increased  
13 risk of thyroid cancer, and thyroid disease and  
14 dysfunction.

15 So as someone who has experienced  
16 having had cancer and had it when I was, you know,  
17 not intentionally exposing myself to any harmful  
18 chemicals, you know, no smoking, no drinking, no,  
19 like, philandering in an oil field or, you know,  
20 just whatever could be said to argue that it would  
21 be an individual's fault of having a disease,  
22 which I don't think it usually is, or ever is, it  
23 is a public health issue and it's something that  
24 you have the responsibility to protect the public  
25 from.

1           And additionally, as has already been  
2       said, we do have a water shortage in New Mexico so  
3       we also have an existing issue with contamination.  
4       There was a recent study done, I'm sure you have  
5       all seen that, on huge levels of radiation and,  
6       like, nuclear contamination near Santa Fe, and I  
7       just -- I feel like at a bare minimum these  
8       companies should be required to disclose their  
9       chemicals.

10           And the fact that they are not only  
11       not required to but have no oversight in, you  
12       know, what they are harming us with is really  
13       scary and I think that, you know, we need to  
14       protect our children and our future generations.  
15       If these things are as harmful as it says they  
16       are, which I'm assuming it is after 5,000  
17       studies --

18           THE HEARING OFFICER:   Would you please  
19       wrap up?

20           DR. MINCKS:   Sure.   And then the other  
21       ones don't have enough information because they  
22       are not disclosed.   I'm assuming that means they  
23       are bad.   You know, point blank.

24           Thank you for your time.

25           THE HEARING OFFICER:   Thank you,

1 Dr. Mincks.

2 Well, we can try Ms. Sobel again. I  
3 think there are some other folks, too. Ms. Sobel?

4 MS. SOBEL: Can you hear me now?

5 THE HEARING OFFICER: Yes, yes. Would  
6 you spell your last name, please.

7 MS. SOBEL: S-o-b-e-l.

8 THE HEARING OFFICER: And do you swear  
9 or affirm to tell the truth?

10 MS. SOBEL: I do.

11 THE HEARING OFFICER: I am going to  
12 start your three minutes.

13 MS. SOBEL: Thank you.

14 Thank you, Commissioners, and thank  
15 you to all New Mexicans that are here today. My  
16 name is Rebecca Sobel. I'm the organizing  
17 director of WildEarth Guardians, and I would like  
18 to acknowledge the hundreds and thousands of  
19 community members who have taken time out of their  
20 lives to raise their voices in defense of our  
21 water.

22 In my twenty years of organizing in  
23 New Mexico I see one issue that cuts across every  
24 line, every community in our state, and that is  
25 protecting our water. As you know, New Mexico has

1 the least groundwater of any state in the nation,  
2 yet we rely on it for most of our public water  
3 supply. Water here is not just a resource, it's  
4 life itself. Driving up the I25 corridor we see  
5 how the land tells us where water touches the  
6 landscape.

7 We are the fifth largest state by land  
8 but we are home to largest oil field in nation,  
9 not even the nation, the world, with explosive  
10 production in the Permian Basin. And yet, despite  
11 our enormous contribution to the oil and gas  
12 industry New Mexico remains the poorest state in  
13 the United States. If oil and gas were going to  
14 make us rich, we would be rich by now.

15 What this industry has brought us  
16 instead is a crisis of contamination. Daily, oil  
17 and gas companies spill toxic wastewater and  
18 chemicals on our lands and into our waters. This  
19 rulemaking gives us the opportunity to stand on  
20 the right side of history prioritizing the health  
21 of New Mexicans over the profits of the richest  
22 industry on the planet.

23 PFAS chemicals exist because of fossil  
24 fuel production. These are human made chemicals  
25 designed to persist, to contaminate, to spread,

1 and to remain long after the companies responsible  
2 for them have packed up and moved on. The oil and  
3 gas industry wants to be exempt from  
4 accountability, even as they inject PFAS and other  
5 toxic substances directly into the ground and  
6 ultimately into our aquifers.

7           Instead of debating the makeup of  
8 countless PFAS compounds, the solution here is  
9 clear: No PFAS in our water, no trade secrets, no  
10 loopholes. If companies know what chemicals they  
11 are injecting then we should, too. And if they  
12 can't operate without PFAS then maybe it is time  
13 to reconsider whether they should be operating at  
14 all.

15           As New Mexicans we have a sacred duty  
16 to protect our water, our land and our people. We  
17 are at a crossroads where our decisions now will  
18 determine the health of our communities for  
19 generations. I will close with the words of  
20 Governor Michelle Lujan Grisham who herself has  
21 lobbied the EPA for PFAS protection. By taking an  
22 urgent and science-based approach to this issue we  
23 are helping communities in New Mexico and around  
24 the country.

25           Thank you.

1 THE HEARING OFFICER: Thank you,  
2 Ms. Sobel.

3 Then we have Nika Beauchamp? Nika  
4 Beauchamp.

5 MS. BEAUCHAMP: Yes, can you hear me?

6 THE HEARING OFFICER: Yes. Would you  
7 please spell your first and last name?

8 MS. BEAUCHAMP: Sure. It's Nika,  
9 N-i-k-a, and Beauchamp is B-e-a-u-c-h-a-m-p.

10 THE HEARING OFFICER: Thank you. Do  
11 you swear or affirm to tell the truth?

12 MS. BEAUCHAMP: I do.

13 THE HEARING OFFICER: I will start  
14 your three minutes.

15 MS. BEAUCHAMP: Great. Thank you.

16 So I just want to share as a mom why I  
17 am fully in support of this proposal to ban PFAS  
18 and other undisclosed chemicals in oil and gas  
19 drilling.

20 So I have a three- and a five-year  
21 old, and I moved to New Mexico a couple of years  
22 ago, and I just want to point out that New Mexico  
23 has done a tremendous amount for families with  
24 young children in recent years with child care  
25 subsidies and raises for teachers working in early

1 childhood education that I was so excited about as  
2 a new family moving here.

3           And then to learn that our, that we  
4 are allowing undisclosed chemicals, including  
5 PFAS, to be injected into the ground and into our  
6 groundwater, which as so many people here have  
7 already very articulately shared, poses a  
8 tremendous threat to young children, and I'm  
9 pretty dismayed. I'm hoping that we all take this  
10 opportunity to stand up for young kids and be  
11 consistent with our other policies and show that  
12 we really believe in protecting the next  
13 generation. And I think the key word is  
14 protection.

15           So I know that New Mexico also  
16 recently got some funding from the FDA to do some  
17 remediation, find sources of PFAS, but what is the  
18 use of that if we are still allowing PFAS to be  
19 purposefully injected into the ground? Prevention  
20 is the most powerful form of protection.

21           I also want to share a story about  
22 Maine, where I moved from. I worked for an  
23 organization that worked with farmers who are  
24 grappling with horrific PFAS contamination of  
25 their land and their soil and groundwater, and as

1 a result of another industry, the paper industry,  
2 lobbying to include its waste in industrial sewage  
3 sludge and allowing that to be spread on farmland,  
4 and while it's a different industry I think the  
5 impact is the same.

6 I worked with a farmer named Adam  
7 Nordel who ran an organic farm with his wife and  
8 his young son and discovered PFAS first in his  
9 drinking water that was 400 times the level of the  
10 safety limit, and then PFAS in his soil, and when  
11 he had his blood tested he discovered just  
12 shockingly high levels. I think the average level  
13 for everyday Americans of these chemicals is so  
14 ubiquitous, is somewhere between 1.4 and 3 parts  
15 per billion, and Adam Nordel had 3,547 parts per  
16 billion of PFAS in his blood.

17 And what breaks my heart the most  
18 about that story, besides the obvious, is that he  
19 has a 3-year-old son, or he was 3 years old when  
20 they discovered the contamination. Adam and his  
21 wife decided not to test their son's blood  
22 levels -- I'm sorry, this always makes me tear up.  
23 I also have a 3 year old son -- and for a child  
24 that young to suffer such a high level of  
25 exposure, you can only imagine the risk to his

1 health, to the risk of cancer, reproductive harm,  
2 neurodevelopmental damage. And that is what we  
3 are risking for our children today, and I really  
4 hope that we take this risk as seriously as it  
5 demands, and I strongly urge you to ban these  
6 chemicals in the oil and gas drilling.

7 Thank you.

8 THE HEARING OFFICER: Thank you, Ms.  
9 Beauchamp.

10 Would you go to Dr. Athas? Let's see,  
11 yes. He was our original number one.

12 Dr. Athas, can you unmute yourself?

13 DR. ATHAS: Yes. Can you hear me now?

14 THE HEARING OFFICER: Yes. Thank you  
15 very much.

16 Would you spell your last name,  
17 please?

18 DR. ATHAS: Yes. It's A-t-h-a-s.

19 THE HEARING OFFICER: And do you swear  
20 or affirm to tell the truth?

21 DR. ATHAS: Yes, I do.

22 THE HEARING OFFICER: I will start  
23 your three minutes.

24 DR. ATHAS: Thank you.

25 Good morning. I'm a retired professor

1 of public health and a doctoral level  
2 epidemiologist. I have conducted human health  
3 risk assessments and been a long-time teacher of  
4 environmental health at the graduate and  
5 undergraduate level, and I fully support the  
6 WildLife Guardians amendments before the OCD.

7 I think we can all agree that  
8 government and not private industry is responsible  
9 for managing the chemical hazards and risks  
10 present in our environment. The scientific  
11 knowledge advances has shown that the risks  
12 greatly outweigh the benefits and that government  
13 must act to address such imbalance. In April of  
14 this year the US EPA issued drinking water  
15 standards for six PFAS compounds, all of which are  
16 much more stringent than for any other regulated  
17 chemical save dioxins. These PFAS standards are  
18 based on human health risk assessment and the best  
19 available science. There is no benefit here that  
20 outweighs the demonstrable risks from not banning  
21 these highly persistent and toxic PFAS compounds.

22 Considering the following: Last week  
23 the majority of the American public voted to  
24 embrace the agenda of Make America Great Again.  
25 OCD has the opportunity to engage that agenda here

1 and now. In a competitive global economy we need  
2 every American child and every American worker to  
3 be as smart, healthy and fit as possible. This  
4 will not happen without proactive government  
5 action. We cannot and should not -- excuse me.  
6 We cannot and should not roll dice on our  
7 children's health.

8 New Mexico is now considering a  
9 widespread environmental release of huge  
10 quantities of treated produced water, a new  
11 chemical hazard source. Given that just traces of  
12 PFAS appear capable of damaging cognitive  
13 development, what societal benefits are achieved  
14 by not taking action to ensure that PFAS is not  
15 present in this waste disposal stream? How does  
16 inaction lead to making America great again?

17 Another agenda embraced in the recent  
18 election is drill baby drill. The sizable federal  
19 lease lands in New Mexico will no doubt lead to an  
20 increased push for environmental release of oil  
21 and gas wastewater. It is inconceivable to me as  
22 a environmental health practitioner that the state  
23 would blindly permit such releases in the absence  
24 of full disclosure. If, as OCD apparently holds,  
25 innovation requires nondisclosure of trade

1 secrets, then we truly are rolling dice on our  
2 children's health. I'm sure smart lawyers can  
3 wrangle a solution forward from a past that never  
4 envisioned intentional release of produced water.

5           Following the status quo benefits a  
6 few, and it's not a recipe for making America  
7 great again. I urge the Commission and the  
8 Division to be protective. To quote Robert F.  
9 Kennedy, Junior, the likely next Secretary of  
10 Health and Human Services, "High quality and  
11 transparent data clearly documented, timely  
12 rendered, publicly available are the sine qua non  
13 of competent public health management."

14           I thank you for your consideration.

15           THE HEARING OFFICER: Thank you,  
16 Dr. Athas.

17           We already did Emma Mincks. So we  
18 have Laura W.

19           Ms. W, can you hear me? This will be  
20 the last comment I take on the platform for right  
21 now, and I have commenters in the room.

22           Laura W?

23           No.

24           All right, I'm going to turn to  
25 commenters in the room. I will return to the

1 platform in just a few minutes.

2 So --

3 MS. WATCHEMPINO: Hello. I'm sorry, I  
4 couldn't unmute myself. This is Laura  
5 Watchempino.

6 THE HEARING OFFICER: All right.  
7 Thank you, Ms. Watchempino. If you would just  
8 spell your last name, please.

9 MS. WATCHEMPINO: Yes.  
10 W-a-t-c-h-e-m-p-i-n-o.

11 THE HEARING OFFICER: Do you swear or  
12 affirm to tell the truth?

13 MS. WATCHEMPINO: I do.

14 THE HEARING OFFICER: I will start  
15 your three minutes.

16 MS. WATCHEMPINO: Thank you for this  
17 time to speak.

18 I am a resident of the Pueblo vacuna  
19 and former water quality specialist for aquama.

20 We know that the oil and gas industry  
21 exploration and production waste is exempt from  
22 regulation under the Resource Conversation and  
23 Recovery Act. That creates innumerable exposure  
24 pathways for hazardous PFAS waste to be widely  
25 dispersed in our environment where they can cause

1 various types of cancer and birth defects, as we  
2 heard earlier.

3 In the event that produced water is  
4 recycled back into our environment, how can these  
5 harmful chemicals be treated without their full  
6 disclosure? The New Mexico Oil and Gas  
7 Association is putting our public health at risk  
8 with such a proposal. It is, therefore, incumbent  
9 on the Oil Conservation Commission and the  
10 environment department to close this regulatory  
11 gap because water produced with PFAS-laced  
12 fracking fluids will be widely dispersed during  
13 the reuse of produced water as well as during  
14 disposal threatening our public health, our  
15 environment, and endangering New Mexico's scarce  
16 freshwater resources.

17 The Commission first and foremost  
18 should ban the use of PFAS and other undisclosed  
19 chemicals used in oil and gas drilling operations.  
20 A total ban will eliminate the burdensome  
21 disclosure requirements like those adopted in  
22 Colorado and will be most protective of our health  
23 and environment. We certainly can't afford to  
24 sacrifice our health, our precious water  
25 resources, as the industry is proposing. Simply

1 permitting nondisclosure would give the industry a  
2 free pass to pollute our environment with toxic  
3 and hazardous materials all without our knowledge  
4 or consent.

5 In fact, the New Mexico Oil and Gas  
6 Association has stated that it supports a  
7 science-based prohibition on the use of PFAS and  
8 supports requiring operators of oil and gas wells  
9 to certify to the Oil Conservation Commission that  
10 no -- that no public -- I'm sorry, that no  
11 PFAS-containing fracturing fluids have been used  
12 in the fracturing of the well.

13 Big oil and gas companies have  
14 exploited New Mexico's land and water and  
15 endangered our lives and health in many ways, from  
16 harmful methane emissions to now undisclosed  
17 chemicals in its fracking fluids. It will  
18 certainly benefit the industry's bottom line to  
19 fight an outright prohibition on the use of PFAS  
20 and the disclosure of chemicals used during  
21 drilling operations because it is already in a  
22 downward spiral due to excessive carbon emissions  
23 that affect our climate.

24 The citizens of New Mexico clearly  
25 expect the Oil Conservation Commission to protect

1 our health and environment, and the environment  
2 department has the duty to do so and should simply  
3 not rely on the industry's goodwill or voluntary  
4 compliance with regulatory measures that are  
5 designed to protect our health and natural  
6 resources. It must impose an outright ban on the  
7 introduction of harmful forever pollutants in oil  
8 and gas drilling operations as well as the  
9 associated waste streams that will then be widely  
10 disseminated into the environment.

11 THE HEARING OFFICER: Please wrap up.

12 MR. VILLEGAS: Excuse me?

13 THE HEARING OFFICER: Please wrap up.

14 MR. VILLEGAS: Therefore, I ask the  
15 Oil Conservation Commission, let's not prolong the  
16 injustice of allowing the industry to regulate  
17 itself. That is your job, and if you need more  
18 funding and staff to do your job make sure the  
19 industry is paying its fair share. We don't want  
20 their liabilities passed off onto us.

21 Thank you.

22 THE HEARING OFFICER: Thank you.

23 All right, I'm going to move from the  
24 platform to the folks who have been waiting  
25 patiently in the room. I will invite more comment

1 from the platform if there is more to be given in  
2 just a little bit.

3 Now, sir, thank you for your patience.  
4 Come up to that microphone, if you would, please.

5 And if you would state and spell your  
6 first and last name.

7 MR. VILLEGAS: I'm José Lemay  
8 Villegas. Villegas, V as in victory,  
9 i-l-l-e-g-a-s.

10 THE HEARING OFFICER: Thank you. Do  
11 you swear or affirm to tell the truth?

12 MR. VILLEGAS: Yes, ma'am.

13 THE HEARING OFFICER: I will start  
14 your three minutes.

15 MR. VILLEGAS: New Mexico Oil  
16 Conservation Commission (speaking in native  
17 language.)

18 On behalf of my indigenous communities  
19 of (indiscernible) land grant association and a  
20 Texas band of Yaqui Indians tribal administrator  
21 government affairs, I would like to submit my 507  
22 words to the New Mexico Oil Conversation  
23 Commission.

24 In a recent Santa Fe, New Mexico  
25 article the New Mexico Oil Conversation

1 Commissioner, the designee for the Energy,  
2 Minerals and Natural Resources Department, stated  
3 that he would like to see more New Mexico-specific  
4 data presented. You are asking a big ask of the  
5 Commission he said. One is banning PFAS and the  
6 other is banning all other undisclosed chemicals.  
7 I want to see real data in our state that should  
8 push us to more or less go the extreme of banning  
9 undisclosed chemicals. Understood.

10 Here is my PFAS triple ASS fire  
11 fighting form industrial chemical blood test and  
12 the results for the Commission to review if you  
13 wish to do so. However, please respect the HIPAA  
14 provisions at the same time.

15 In the real world that we live in in  
16 Santa Fe County with my family and neighbors, we  
17 do not deserve to be disrespected, dismissed and  
18 ignored by the DoD and the New Mexico environment  
19 department, the governor, the EPA and the  
20 municipalities that were supposed to protect us  
21 from environmental justice violations in the first  
22 place. My family has resided on the pueblo over  
23 48 years and generations did not authorize and/or  
24 give permission to the government entities  
25 mentioned to place us in irreparable harm and in

1 danger with these industrial chemicals that are  
2 contaminating our private wells, specifically  
3 endangering our health, welfare and public safety.

4 Frankly, out of the six PFAS, PFOA,  
5 PFOS, et cetera, et cetera industrial chemicals  
6 that were identified by the EPA to be hazardous  
7 substance materials, three were identified in my  
8 blood system and yet I am a healthy veteran Marine  
9 and I am pissed.

10 In conclusion, so how much analytical  
11 real data from New Mexico does this Commission  
12 really need to make a public policy decision to  
13 protect our indigenous communities throughout New  
14 Mexico from irreparable harm from the undisclosed  
15 chemicals that the corporate oil and gas industry  
16 has identified as a trade secret in attempting to  
17 hide it from us? Instead of catering to the  
18 corporate oil and gas industry to increase their  
19 profit margins, this Commission should mandate, to  
20 require the allocation funding sources to pay for  
21 conducting an environmental community health  
22 assessment, a PFAS blood study in my indigenous  
23 community where my family and neighbors have gone  
24 medically sick and dying from these dangerous  
25 hazardous chemicals in Santa Fe and throughout the

1 state of New Mexico. (Native language), that's  
2 enough. (Native language), it's done.

3 Muchos gracias. Thank you.

4 THE HEARING OFFICER: Thank you,  
5 Mr. Villegas.

6 Is there anyone else in the room?

7 If you would state and spell your  
8 first and last name.

9 MR. COX: Colin Cox, C-o-l-i-n, C-o-x.

10 THE HEARING OFFICER: And do you swear  
11 or affirm to tell the truth?

12 MR. COX: I do.

13 THE HEARING OFFICER: I will start  
14 your three minutes.

15 MR. COX: Thank you.

16 Good morning, Commissioners. My name  
17 is Colin Cox with the Center for Biological  
18 Diversity. Thank you for the opportunity to come  
19 in today.

20 I would like to start by just  
21 highlighting how nasty PFAS are. I know you have  
22 heard a lot about this already this week, but  
23 there are thousands of different PFAS compounds  
24 and we don't really know a lot about most of them,  
25 but what we do know is bad. PFAS causes

1 reproductive harm, they cause developmental delays  
2 in children, they cause cancer. They damage the  
3 immune system, the liver, the thyroid and the  
4 cardiovascular system, among other problems they  
5 cause.

6           They are called forever chemicals  
7 because they persist in the environment much, much  
8 longer than most of the other pollution that  
9 humans make. They are a danger to all life. We  
10 all have them in our bodies. Most of us got them  
11 from contaminated water and food. And that's why  
12 protecting our water is so important and why the  
13 Center for Biological Diversity opposes the use of  
14 PFAS in oil and gas production and supports  
15 WildEarth Guardians' petition to ban them.

16           Oil and gas companies must stop  
17 pumping these chemicals into the ground and  
18 spilling them on our land. This week we have  
19 heard representatives of the oil industry insist  
20 that PFAS are not used in oil and gas production  
21 which begs the question why they fight so hard to  
22 continue doing something that they claim they are  
23 aren't doing. But we know PFAS are being used in  
24 oil and gas production, and we know they can be  
25 present in fracking waste, also called produced

1 water, which oil and gas companies spill every day  
2 in New Mexico multiple times per day. So we  
3 really have to stop this industry from poisoning  
4 us and -- (no sound)

5 Am I back? Sorry about that.

6 The Center also supports WildEarth  
7 Guardians' proposal to require the disclosure of  
8 chemicals used in oil and gas production. We have  
9 a right to know what companies are pumping into  
10 our ground and spilling on our soil. But right  
11 now the industry is hiding a lot of that  
12 information from us and asking us to trust them,  
13 an industry, you know, with a century long history  
14 of spoiling the environment and misleading the  
15 public about it.

16 Contrary to what the industries are  
17 doing, disclosure would require the companies to  
18 either voluntarily disclose the chemicals they are  
19 using or not use them in New Mexico. And this is  
20 about disclosing individual chemicals, not  
21 formulas, not recipes, not proportions, and so not  
22 trade secrets protected by law. Uniform Trade  
23 Secrets Act is not an obstacle here, and OCD  
24 cannot misappropriate the identity of the chemical  
25 because it would be voluntarily disclosed by the

1 operator. Operators would have a simple choice:  
2 Either tell us what chemicals they are using or  
3 don't use them here.

4 We should follow the lead of other  
5 states like Colorado which ban PFAS in oil and gas  
6 production and require companies to disclose all  
7 the chemicals they are using in their operations.  
8 Other states are doing this and we must do it  
9 here.

10 The bottom line is that PFAS threaten  
11 our waters, our environment, our wildlife and our  
12 health. We ask the Commission to ban their use in  
13 oil and gas production and require operators to  
14 disclose the chemicals they are using in our  
15 state.

16 Thank you.

17 THE HEARING OFFICER: Thank you,  
18 Mr. Cox.

19 Just as a reminder to everyone, we do  
20 have an interpreter between Spanish and English  
21 and English and Spanish this morning.

22 If you would please state and spell  
23 your first and last name.

24 SENATOR POPE: Sure. State Senator  
25 Harold Pope, Junior. Last name is P-o-p-e, J-r.

1 THE HEARING OFFICER: Thank you, very  
2 much. Do you swear or affirm to tell the truth?

3 SENATOR POPE: I do.

4 THE HEARING OFFICER: Thank you.  
5 Please go ahead. I will start your three minutes.

6 SENATOR POPE: Good morning,  
7 Commissioners. I'm state Senator Harold Pope,  
8 Junior, the senator representing Northwest  
9 Albuquerque, and I just want to provide public  
10 comment.

11 I support the ban on PFAS defined as a  
12 substance with at least one fully fluorinated  
13 carbon atom. Apparently this has been a  
14 controversial topic in this proceeding because  
15 some want to narrow the PFAS definition to include  
16 only well-characterized PFAS compounds. I urge  
17 you not to be narrow but rather be inclusive or  
18 expansive because the lives of New Mexicans are at  
19 stake and here is why.

20 Number one, the precautionary  
21 principle, which is a worldwide social, medical  
22 and legal approach that encourages caution when  
23 there is scientific uncertainty about all the  
24 known potential risks, and in this case may have  
25 severe human and environmental repercussions. The

1 particular import for decisionmakers like you and  
2 like me applies here because there is a very real  
3 possibility that even though every harm is not  
4 conclusively known we have a responsibility to  
5 protect the public from exposure to contamination,  
6 especially when emerging scientific research is  
7 finding that there is plausible risk, a very  
8 serious risk to future generations.

9           Number two, 23 states and Congress  
10 have relied on a more inclusive definition.  
11 Sufficient data exists to characterize the  
12 deleterious effects on human health from PFAS.  
13 Over the past decade 33 states have or are  
14 currently considering regulation and legislation  
15 addressing toxic PFAS chemicals, a class of  
16 chemicals dubbed forever chemicals because of  
17 their inability to break down in nature.

18           Number three, 4 parts per trillion.  
19 While I understand that you are rightfully  
20 concerned that we don't have toxicology data on  
21 all 10 to 15,000 PFAS compounds and that gives you  
22 pause to enact an all-out PFAS ban, which is  
23 understandable, I will ask you to consider that  
24 the EPA did enact water standards for several PFAS  
25 chemicals as low as 4 parts per trillion. Based

1 on this standard for just six chemicals, many  
2 states have jumped into regulatory and legislative  
3 action. I urge you to act now as well.

4 Having a single widely adopted  
5 definition of a ban on PFAS defined as with at  
6 least one fully fluorinated carbon atom creates  
7 important consistency for manufacturers,  
8 retailers, oil and gas industry and regulators.  
9 The definition proposed by the petitioner has been  
10 used in state and federal legislation since 2018.

11 Lastly on this point, there may be  
12 many variants of the Covid virus that have not  
13 been fully analyzed, tested and their DNA mapped.  
14 Does that mean we should just assume that they are  
15 not dangerous simply because the analysis of the  
16 other variants is not complete? Some of the  
17 variants may in fact be harmless but does that  
18 mean that we should just assume that they are  
19 harmless in light of the fact that millions of  
20 people have died from some of these variants and  
21 we just don't know?

22 I turn now to a related topic. NMOGA  
23 put out a call on an e-mail yesterday on the  
24 proposed amendments to the Oil and Conservation  
25 Division rules. On one hand NMOGA said that they

1 are not intentionally using hydraulic fracking  
2 operations and that these chemicals are not  
3 commonly used in oil and gas operations. Yet they  
4 still urge supporters to speak out against the  
5 proposed regulations. I received this e-mail in  
6 my inbox, and for me if they are not intentionally  
7 using PFAS and these chemicals are not being  
8 commonly used in oil and gas operations, then why  
9 are they opposed to these amendments?

10 It was also stated in the e-mail that  
11 they follow all the regulations for disclosure of  
12 fracking fluid and it's done through FracFocus,  
13 but from my understanding -- and we all know in  
14 Colorado they have enacted a PFAS ban and require  
15 full chemical disclosure of oil, from oil and gas  
16 operations -- what this means is the cat is out of  
17 the bag. In Colorado the chemical constituents  
18 are already revealed. These chemicals in their  
19 fracking fluid can't be trade secrets because they  
20 are no longer secrets. They are now showing what  
21 the industry has been doing and that the industry  
22 has not been harmed, and so it also shows that  
23 they won't be harmed here in New Mexico as well.

24 Apparently no one has been harmed and  
25 we haven't seen that. If they would certainly

1 provide evidence of what harm that has been done,  
2 you know, I think we should all see that.  
3 Furthermore, this Commission, or any public  
4 official in New Mexico, for that matter, any  
5 member of the public who is concerned with whether  
6 these fracking fluids contain chemicals that are  
7 dangerous to the health right now, you know, we  
8 would have to travel to Denver to get that  
9 information and I just don't think that's  
10 something that we should have to do. We should be  
11 able to do that here.

12 It is important that, as I understand  
13 it, none of these companies has put evidence in  
14 the record that disclosing chemical formulas has  
15 harmed them, in Colorado or California or any  
16 other states, or that likely harm would happen if  
17 they disclosed it. This whole issue seems really  
18 ridiculous to me in light of the fact that O&G  
19 operators have already disclosed their chemical  
20 constituents in other states.

21 In closing, we have a moral, ethical  
22 and legal duty to protect our fellow New Mexicans  
23 from likely harm. That includes full chemical  
24 disclosure of hydraulic fracking fluids. As a  
25 member of the New Mexico legislature, I urge you

1 implement the broad authority to regulate oil and  
2 gas that we gave you and that protects public  
3 health, the environment and property.

4 Thank you for allowing me to provide  
5 this public comment, and thank you all for your  
6 service.

7 THE HEARING OFFICER: Thank you,  
8 Senator Pope.

9 Let me return to the -- oh, was there  
10 anyone else in the room? I didn't see anyone else  
11 in the room.

12 Okay, so let me return to the  
13 platform. Is there anyone else on the platform  
14 who would like to take this opportunity and who  
15 has not already offered comments? Take this  
16 opportunity. There will be one more public  
17 comment session at 4:30 this afternoon.

18 Please turn on your screen or raise  
19 your virtual hand. Let's see here.

20 Sheila, do you want to see if that  
21 Rita --let's see here. Rita Norwood, did you want  
22 to make a comment?

23 MS. NORWOOD: No, I'm sorry. I'm just  
24 here to listen to everyone else. I was actually  
25 invited into this meeting from one of my friends

1 who works for environmental protection.

2 THE HEARING OFFICER: Okay, thank you.  
3 Thank you.

4 So I don't see any other virtual hands  
5 or screens on. So we are going to return to the  
6 technical case. And near the end of yesterday we  
7 had finished the Division's case, as I understand  
8 it, but let me make sure.

9 Mr. Tremaine.

10 MR. TREMAINE: Good morning, Madam  
11 Hearing Examiner, Commissioners and the public and  
12 parties. Thank you. OCD has no further  
13 witnesses.

14 THE HEARING OFFICER: Great. Thank  
15 you very much.

16 Let me ask if there are any other  
17 matters that we need to discuss before I turn to  
18 other parties.

19 SPEAKER: Madam Hearing Examiner?

20 THE HEARING OFFICER: Yes.

21 SPEAKER: One of our speakers during  
22 public comment, Mr. José Villegas, handed me his  
23 written note which differed a little bit from his  
24 spoken statement. Can we enter this into the  
25 record?

1 THE HEARING OFFICER: Yes, absolutely.  
2 That would go to Ms. Apodaca and would become part  
3 of record.

4 SPEAKER: I will make sure she gets  
5 this. Thank you.

6 THE HEARING OFFICER: All right.  
7 So Mr. Davis.

8 MR. DAVIS: Good morning.

9 Before I forget, I wanted to move a  
10 few exhibits into evidence that Guardians have not  
11 moved. That would be WildEarth Guardians  
12 Exhibit 4, that's the Colorado PFAS ban and  
13 disclosure law; WildEarth Guardians Exhibit 5,  
14 that's the California disclosure law; WildEarth  
15 Guardians Exhibit 7, that is the New Mexico tech  
16 publication about climate change effect on our  
17 fresh water resources in New Mexico over the next  
18 50 years; and WildEarth Guardians Exhibit 8, which  
19 is the exhibit that compiles the 23 state  
20 definitions for PFAS that are consistent with the  
21 Guardians definition. And while I understand that  
22 I can site these, these are state laws and  
23 publicly available publications from state  
24 entities, I do want to move them into evidence so  
25 that they are part of the record and that the

1 Commission has access to them without having to  
2 get on Westlaw and find them.

3 THE HEARING OFFICER: Sure, I  
4 understand.

5 Are there any objections to the  
6 admission of Guardians Exhibits 4, 5, 7 or 8?

7 I don't hear anything. Thank you. 4,  
8 5, 7 and 8 are admitted.

9 (Guardians Exhibit Nos. 4, 5,  
10 7 and 8 were received in  
11 evidence.)

12 THE HEARING OFFICER: Any other  
13 preliminary matters? No?

14 All right, so as I understand it,  
15 EOG -- oh, and thank you very much, Ms. Ortiz.  
16 Our public comment session is ended. Thank you.

17 Oh, as I understand it, EOG is not  
18 going to present witnesses or make an opening  
19 statement. So let me turn to Mr. Maxwell.

20 Mr. Maxwell.

21 MR. MAXWELL: Good morning.

22 THE HEARING OFFICER: Good morning.  
23 Would you like to make an opening statement or  
24 another sworn statement? What would you like to  
25 do?

1 MR. MAXWELL: Your Honor, I will make  
2 an opening statement.

3 THE HEARING OFFICER: Terrific. Go  
4 ahead.

5 MR. MAXWELL: We are here today to  
6 consider a petition proposing rule changes aimed  
7 at banning the use of PFAS in downhole operations  
8 and requiring the disclosure of all chemicals used  
9 in oil and gas production purportedly to protect  
10 public health. While the intention behind this  
11 petition is admirable, I must express significant  
12 concerns about adopting these rules based on the  
13 evidence or lack thereof presented.

14 Throughout this hearing we have heard  
15 a series of ifs, if PFAS contamination is  
16 occurring due to downhole operations; if this  
17 contamination reaches groundwater; if this poses a  
18 health risk unique to the oil and gas industry.  
19 However, these are speculative scenarios without  
20 concrete evidence to substantiate them. The  
21 allegations rely heavily on erratical risks rather  
22 than demonstrable facts.

23 It's important to recognize that PFAS  
24 compounds are ubiquitous in modern society. They  
25 are present in a wide array of consumer products

1 and industrial applications making them  
2 essentially a new bogeyman. Singling out the oil  
3 and gas industry ignores other significant sources  
4 of PFAS exposure. For instance, the use of fire  
5 fighting foam, particularly in combating grass  
6 fires across the expansive grasslands and ranch  
7 areas of Lea County and Eddy County likely  
8 contributes to PFAS presence in the same  
9 environments that are shared by oil and gas  
10 operators. These regions regularly experience  
11 large grass fires where brush trucks deploy fire  
12 fighting foams to protect people, property and the  
13 environment.

14 It's telling that the current focus is  
15 particularly pinned on the oil and gas industry  
16 when there are clearly other routes through which  
17 environmental health may be impacted.

18 Implementing regulations based on speculative  
19 evidence not only risks creating unenforceable  
20 rules but also may extend beyond the fiscal and  
21 operational capacity of the New Mexico Energy,  
22 Minerals and Natural Resources Department.

23 Changes proposed by WildEarth  
24 Guardians would require legislative action rather  
25 than regulatory adjustments, placing them outside

1 the authority of this agency. Adopting such rules  
2 without solid evidence and proper legislative  
3 backing would undermine the regulatory framework,  
4 the public trust.

5 Therefore, I find petitioners'  
6 proposed rule changes should not be adopted in its  
7 original or revised forms. A more comprehensive  
8 evidence-based approach is necessary.

9 This concludes my opening statement.  
10 I will not be presenting any rebuttal witnesses or  
11 evidence, and I return the proceedings to the  
12 hearing officer.

13 Thank you.

14 THE HEARING OFFICER: Thank you, very  
15 much, Mr. Maxwell.

16 Let's see, I wanted to do one thing  
17 before I went to NMOGA. I meant to do it a little  
18 earlier.

19 Sheila, would you come up to the  
20 witness stand, please?

21 Would you state your name for the  
22 record? I have been referring to you for four  
23 days.

24 MS. APODACA: My name is Sheila  
25 Apodaca.

1 THE HEARING OFFICER: Do you swear or  
2 affirm to tell the truth?

3 MS. APODACA: Yes.

4 THE HEARING OFFICER: Do you have in  
5 your hand the same document that I have here,  
6 which is a Notice of Compliance?

7 MS. APODACA: Yes.

8 THE HEARING OFFICER: Would you  
9 explain what that is, please?

10 MS. APODACA: Sure. This is a  
11 Certificate of Compliance that I filed into the  
12 case file in this matter showing the matters that  
13 I took to comply with the state rules act on  
14 giving notice to the public of the meeting.

15 THE HEARING OFFICER: Thank you.

16 I would like to make this single-page  
17 document Hearing Officer Exhibit 1 so that we have  
18 in the record a clear basis for a statement, any  
19 statement of reasons, for example, that the  
20 Commission would adopt that all notice  
21 requirements were met.

22 Are there any objections to that?  
23 Would you like to see it, Mr. Davis?

24 Okay, or you can even take Sheila's  
25 copy or this copy. It's all the same. It sets

1 out all the various ways in which --

2 SPEAKER: Madam Hearing Officer?

3 THE HEARING OFFICER: Yes.

4 SPEAKER: It possible for Ms. Apodaca  
5 to make that part of the record?

6 THE HEARING OFFICER: Right. For the  
7 same reason Mr. Davis made certain parts of the  
8 record exhibits, so that they are prominent and  
9 easily findable, that's what I'm doing.

10 Thank you.

11 MR. DAVIS: Guardians have no  
12 objections.

13 THE HEARING OFFICER: All right.  
14 Anyone else? Thank you, very much.

15 Does anyone have a question of  
16 Ms. Apodaca?

17 All right, thank you very much.

18 (Hearing Officer Exhibit  
19 No. 1 was marked for  
20 identification and  
21 received in evidence.)

22 THE HEARING OFFICER: All right, now  
23 we turn to NMOGA. Ms. Mulcahy.

24 MS. MULCAHY: Good morning. Good  
25 morning, Madam Hearing Officer. Good morning to

1 all the parties and folks in the audience. I am  
2 going to call NMOGA's first witness, Dr. Janet  
3 Anderson.

4 THE HEARING OFFICER: Good morning.

5 WHEREUPON,

6 JANET ANDERSON, Ph.D.,

7 A Witness called for examination, having  
8 been first duly sworn, was examined and testified  
9 as follows:

10 THE HEARING OFFICER: Go ahead,  
11 Mrs. Mulcahy.

12 MS. MULCAHY: Thank you.

13 Can I share my screen, please?

14 THE HEARING OFFICER: Sheila, would  
15 you allow that, please?

16 MS. MULCAHY: Thank you.

17 DIRECT EXAMINATION

18 BY MS. MULCAHY:

19 Q. Good morning, Dr. Anderson.

20 A. Good morning.

21 Q. Could you please spell your name for  
22 the record?

23 A. Last name is Anderson,  
24 A-n-d-e-r-s-o-n. First name Janet, J-a-n-e-t.

25 Q. Dr. Anderson, did you provide direct

1 written testimony marked as Exhibit E and attached  
2 Exhibits E1 through E29 for this hearing?

3 A. Yes, I did.

4 Q. Dr. Anderson, do you have any changes  
5 or additions to your direct testimony or exhibits?

6 A. No, I do not.

7 Q. Dr. Anderson, do you adopt your  
8 written testimony marked as Exhibit E as your  
9 sworn testimony today?

10 A. Yes, I do.

11 Q. Is this testimony true and accurate,  
12 to the best of your knowledge?

13 A. Yes, it is.

14 MS. MULCAHY: I'm going to go ahead  
15 and move into the record for admission Exhibit E,  
16 NMOGA Exhibits E through E29, and NMOGA Rebuttal  
17 Exhibit E30.

18 THE HEARING OFFICER: I believe we  
19 were sent E30 via e-mail.

20 Are there objections to E through E30?

21 No?

22 All right, hearing none, they are  
23 admitted.

24 (NMOGA Exhibits E through E30  
25 were received in evidence.)

1 MS. MULCAHY: Thank you.

2 BY MS. MULCAHY:

3 Q. Dr. Anderson, could you provide a  
4 brief summary of your testimony?

5 A. Yes, it would be an honor.

6 Good morning, everyone. Based on my  
7 experience with PFAS, I have been working in the  
8 state for over a decade, and I'm a board certified  
9 toxicologist and human health risk assessor.

10 I have been asked to essentially do  
11 three things: One, provide support to NMOGA on  
12 their PFAS definition; two, ensure that statements  
13 about concerns for PFAS exposure and risk are  
14 accurate and fact-based; and then three, provide  
15 some guidance around the risk communication of  
16 disclosure of chemicals.

17 So to that end my colleague,  
18 Dr. Richardson, who you will hear later, he and I  
19 worked together to propose a definition for PFAS.  
20 Our definition is consistent with the US EPA Toxic  
21 Substances Control Act, so that's TSCA. It's a  
22 regulatory definition adopted by EPA because it  
23 covers a very, very large broad list of PFAS that  
24 present the most, they call it highest concern.  
25 It also covers the PFAS that have the physical and

1 chemical characteristics that are relevant to this  
2 rulemaking.

3 I want to be really clear on  
4 something. I think the concern and the  
5 devastating impacts of certain PFAS and PFOS in  
6 the environment are not even to be considered. I  
7 agree. These chemicals are, as we have heard from  
8 the wonderful testimony of the public, found in  
9 the environment. They are mobile in the  
10 environment. PFOS and PFAS are bioaccumulative  
11 and they do have toxicity at very low levels,  
12 regulatory levels that we have rarely seen.

13 However, to make statements such as  
14 all PFAS are exceptionally toxic is simply just  
15 not true. To make statements that all PFAS are  
16 mobile in the environment is not true. To make  
17 statements that PFAS are all bioaccumulative, not  
18 true. To make even the statement that all PFAS,  
19 using the definition proposed by WildEarth  
20 Guardians, are persistent is not true.

21 That means that, again, I want to be  
22 clear, I support the ban of PFAS in hydraulic  
23 fractioning fluid provided that the rulemaking is  
24 tangible, executable and enforceable, and that the  
25 definition of PFAS, too, will protect public

1 health.

2 I also support the full disclosure of  
3 chemicals used in hydraulic fracturing to OCD and  
4 in the event of loss of a well integrity. Why? I  
5 do think that it is our regulators that are  
6 trained and have the experience to best interpret  
7 that information on a site-specific level, and  
8 then have the authority to execute the  
9 site-specific actions that need to take place to  
10 investigate the release, the well integrity event,  
11 and to best protect public health.

12 Lastly, I just want to say thank you  
13 for being here. This has been quite a week. It  
14 has been really an honor to be here and to listen  
15 to this, and I want to commend the Commission for,  
16 I mean it's a yeoman's job to try to understand a  
17 complicated chemistry, a complicated rulemaking,  
18 and I really appreciate the stakeholders that are  
19 here and your interest in hearing from all sides.

20 So with that I will be happy to answer  
21 any questions. Thank you.

22 Q. Thank you, Dr. Anderson.

23 MS. MULCAHY: I will go ahead and  
24 share on my screen what has been marked as NMOGA  
25 Rebuttal Exhibit E30. If my computer will

1 cooperate, I will do that.

2 Q. Dr. Anderson, can you see what I have  
3 put up as NMOGA Rebuttal E30?

4 A. Yes, ma'am.

5 Q. Dr. Anderson, we have heard a lot of  
6 testimony this week that there is three different  
7 PFAS definitions. Some are broad, some are  
8 narrow, they are all over the map. Could you  
9 please respond to whether we are really seeing  
10 three different PFAS definitions?

11 A. Yes. There has been interesting  
12 nuances, obviously, but the reality is in  
13 practicality, as can be executed, there is not  
14 differences in these definitions materially. The  
15 two most closely aligned would be New Mexico OCD's  
16 and NMOGA's. At the end of the day, again to  
17 execute and to enforce these definitions, they are  
18 practically the same. And so I think that  
19 that's -- that sort of reduces the pressure and  
20 the temperature on that just a little bit.

21 Q. Absolutely. Thank you, Dr. Anderson.

22 And let me ask you here, on the OCD  
23 definition, while we are looking at it, do you see  
24 where it says, "United States Environmental  
25 Protection Agency US EPA Standard Analytical

1 Method"? Do you see that line?  
2 A. Yes, I do.  
3 Q. And then it lists Method 537.1?  
4 A. Yes.  
5 Q. And Method 533?  
6 A. Yes.  
7 Q. And Method 8327?  
8 A. Yes.  
9 Q. And Method 1633?  
10 A. Correct.  
11 Q. Have these been standardized methods?  
12 A. Yes, they are.  
13 Q. And what does that mean from your  
14 field, when a method is standardized?  
15 A. So standardized methods are the gold  
16 standard for what we use in environmental  
17 investigations and for compliance. It means that  
18 labs that are certified and follow the standard  
19 analytical method procedure can reliably produce  
20 results that can be validated, have the proper  
21 QA/QC, and that can be sort of high confidenced,  
22 reliably reproducible using that data.  
23 Q. And these methods that I just listed  
24 here, 537.1, 533, 8327, 1633, are they able to  
25 analyze for a single fully fluorinated carbon

1 atom?

2 A. They are not.

3 Q. Thank you.

4 Dr. Anderson, I have now put up on the  
5 screen Slide 2 here, and there was some  
6 discussions and questions about NMOGA's definition  
7 of PFAS and why that was put forward, and I  
8 believe it was Dr. Hansen who testified that that  
9 would not be protective of public health. Could  
10 you explain why NMOGA chose that definition  
11 specifically?

12 A. Sure. Dr. Richardson and I really  
13 wanted to make sure that the definition we  
14 proposed was a regulatory definition that we could  
15 point to. EPA has a ton of documentation and  
16 literature around why this is their definition  
17 under the TSCA program, and I think this quote  
18 here really summarizes that well. It focuses on  
19 the PFAS of concern, because these are the PFAS  
20 that are known to be persistent and the potential  
21 presence of which in the environment may present  
22 both a human exposure and then, therefore, a human  
23 health risk.

24 So what is important is the contrast,  
25 right? So for chemicals with only one fully

1 fluorinated compound, those are not persistent.  
2 They also don't have the characteristics of  
3 stability, durability, the thermal, you know,  
4 protectiveness. All the things that we think  
5 about when we think about PFAS are not associated  
6 with the single fluorinated. These are gases.  
7 These are pharmaceuticals. I have been told  
8 potentially agricultural chemicals, but typically  
9 when we think about in the traditional definition  
10 of PFAS it is always these highly stable compounds  
11 that repel water and oil and grease and that are  
12 highly stable under extreme temperatures, and that  
13 requires at least two fully fluorinated carbons.

14 Q. Thank you, Dr. Anderson.

15 You said persistent, that these  
16 compounds that NMOGA proposed, that the single  
17 fully fluorinated carbons are not persistent.  
18 When you say persistent what do you mean by that?

19 A. Sure. So environmental persistence,  
20 so chemicals in the environment can be degraded or  
21 transformed because the microbes chew them up,  
22 because of UV light, right, or temperature  
23 pressure, so if the chemical is persistent they  
24 are resistant to those kinds of things. If they  
25 are able to degrade that means the atoms in the

1 molecule can be broken apart, and so for a  
2 chemical to just have one fully fluorinated  
3 carbon, it can break apart. It is not protected  
4 by those chlorines.

5 As said here, what it degrades to is  
6 just that end carbon, that trifluoroacetic acid  
7 that is well-studied here in the US, especially  
8 under the air program because of gases, the  
9 hydrofluorocarbons that were introduced to replace  
10 greenhouse gases, degrading trifluoroacetic acids.  
11 The EU presented an extensive dossier on PFA. So  
12 again, persistence meaning potential just to  
13 degrade, and we need to make sure that we do  
14 capture those in our definition and consideration  
15 that the terminal deadend products -- that's what  
16 we call the sort of the last little bits of the  
17 chemicals that can't degrade any further -- we do  
18 want to make sure we capture those, and that would  
19 be considered two carbons or more.

20 Q. Thank you.

21 Doctor, I understand there has also  
22 been a lot of discussion this week about  
23 fluoropolymers, nonpolymers, and everything that  
24 is toxic in both categories. Could you please  
25 explain what we are looking at here and why it's

1 not necessarily true that all PFAS are extremely  
2 toxic?

3 A. Sure. This is an admittedly woefully  
4 simplified family tree for PFAS, but what it is  
5 attempting to demonstrate is that PFAS, broadly  
6 speaking, can be divided into polymers and  
7 nonpolymers, and sometimes even that terminology  
8 is tricky. So nonpolymers is a small, just small  
9 molecular weight shown here, typically defined as  
10 less than 1,000 Dalton molecules. That includes  
11 the normal PFOS, PFASOA, the alphabet soup that we  
12 are talking about.

13 Contrast that with polymers, though.  
14 So polymers are massively large compounds, so over  
15 one hundred thousand up to over a million Daltons,  
16 and basically what a polymer does is it takes a  
17 monomer, so a small piece, and you repeat it over  
18 and over and over and over and over, like, you  
19 know, Lego blocks put together.

20 So to make a size comparison, if you  
21 think of the monomer or the small little piece  
22 equivalent to like a nonpolymer small chemical the  
23 size of a marble -- and this is an analogy so I'm  
24 not trying to be super precise here, but my  
25 organic chemists tell me that it's close enough.

1 So if a monomer is the size of a marble the  
2 polymer would be the size of a football field.  
3 That is the difference in size.

4 And so polymers, especially  
5 fluoropolymers like PTFE, I want to be very clear,  
6 are designed to be really stable, so there is a  
7 long, long, long, long, long huge chain. They are  
8 considered to be not biologically available. They  
9 are so big they don't readily absorb through a  
10 cell membrane. They are just too big.

11 Also, there are several because the  
12 fluoropolymers specifically have to be stable they  
13 don't have reactive groups on them. And I think,  
14 Ms. Mulcahy, could you go to the next --

15 Q. Yes, absolutely. I just have a quick  
16 question --

17 A. Sure.

18 Q. -- please, Dr. Anderson, on this  
19 slide.

20 You said that the PTFE is not  
21 biologically available. Could you explain what  
22 biologically available means?

23 A. Sure. And I want to be real careful  
24 again. Language matters.

25 So fluoropolymers like PTFE are so big

1 that they can't absorb through a cell wall. So if  
2 we ingest it the data suggests so far that it just  
3 gets estreated. Kind of like a grain of sand,  
4 right? Like, it doesn't get absorbed. These  
5 nonpolymer chemicals, it depends on the chemical  
6 structure, but they can get absorbed. They  
7 combine the proteins. They can do a bunch of  
8 stuff that interacts with the cellular biology.  
9 That is the difference.

10 Does that answer that?

11 Q. Yes. You also mentioned the  
12 differences in molecular weight between these  
13 compounds.

14 A. Yes.

15 Q. Why does molecular weight matter?

16 A. Molecular weight and size and  
17 structure of compounds and the chemistry of that  
18 dictates both how it might move in the  
19 environment, and from my perspective then how  
20 people and receptors might be exposed and how it  
21 is going to move in our bodies and what it might  
22 do.

23 So if one thing is huge it is going to  
24 behave very differently than something that is  
25 small. That is an overgeneralization, of course,

1 because there are many other things that matter,  
2 but the molecular weight or the size of the  
3 chemical gives us an indication of a line of  
4 evidence of potential toxicity, potential  
5 exposure, potential fate and transport.

6 Q. And is it a fair characterization to  
7 say that not all PFAS have the same molecular  
8 weight, that's the analogy that you did with the  
9 marbles?

10 A. Oh, of course. Yeah. So again,  
11 across this entire family there are, I mean,  
12 innumerable, exponentially a large number of  
13 different molecular weights. There are certain  
14 cutoffs of molecular weights, what we understand  
15 to be biologically available, that can come  
16 through a cell wall. Some compounds and some PFAS  
17 are tiny, meaning they really don't even bind to  
18 proteins well. And so, again, that molecular  
19 weight really tells us a lot. It's not the be-all  
20 and end-all, but it tells us a lot about how  
21 chemicals might behave in both the environment and  
22 in the human body.

23 Q. And in your field of toxicology,  
24 Dr. Anderson, why does it matter that a receptor  
25 can bind?

1           A.       Oh.  Sorry.  Again, I know that it's a  
2 really good question.  When we talk about receptor  
3 binding, again my background is molecular biology.  
4 This is how chemicals actually interact in our  
5 bodies.  And PFAS, specifically for, for example,  
6 PFOA and PFOS, unfortunately they are the sweet  
7 spot, perfect size to bind to a lot of proteins in  
8 our body.  They bind to proteins in our blood,  
9 they bind to proteins in our kidneys, and that's  
10 why we hang onto them.  They stay in our body.

11                       But PFAS that are smaller than that  
12 just don't bind as well.  It's kind of like trying  
13 to catch a Ping-Pong with a catcher's mitt, right?  
14 It's not the right size, you are going to drop it.  
15 The PFAS that are too big also won't bind to that  
16 protein.  So binding to proteins is one way  
17 bioaccumulations, which means exposure to very  
18 small amounts of a chemical but it stays in our  
19 body, we don't eliminate it very quickly.  So  
20 that's one mechanism of bioaccumulation specific  
21 to PFAS.

22                       It also is a mechanism for potential  
23 toxicity, the binding to receptors and then  
24 causing those protein receptors to do things in  
25 the cell, to signal different activities.  And so

1 that binding to receptors, which is contingent on  
2 the size and charge and shape of chemicals, is  
3 critical to understanding toxicity.

4 Q. And so I just want to make sure, when  
5 you said those really small compounds that can  
6 bind to receptors, you were saying PFOS and PFOA?

7 A. Correct.

8 Q. Okay. Just because PFAS is a thing to  
9 say, it sounds different on this end of the mic.

10 A. I will spell out when I'm saying a  
11 specific chemical. I will spell out the alphabet  
12 soup.

13 Q. Thank you.

14 A. I will try to remember.

15 Q. Thank you.

16 And, again, while we are on this  
17 conversation about polymers and nonpolymers,  
18 Dr. Anderson, there has been lots of conversation  
19 this week, testimony that again all PFAS are  
20 toxic, all PFAS are the same. Could you explain  
21 what we have here on this slide to discuss that  
22 point?

23 A. Sure. I just wanted to put some of  
24 the key PFAS in their correct family. So as  
25 mentioned, PTFE is a fluoropolymer, completely

1 different in size. Dramatically different, right?  
2 PFOA and PFOS, they fall under the perfluoroalkyl  
3 substances family. What that means, the per means  
4 all. Chemistry lesson there, per means all. The  
5 F for fluoro so all fluorines. What that means is  
6 that the carbons are fully fluorinated. The O  
7 actually stands for the number of carbons, octo,  
8 so that's how you kind of decipher this alphabet  
9 soup.

10 That subset of chemistry, the fully  
11 fluorinated, varies based on both chain lengths  
12 and what is at the end, and that's either the A  
13 for carboxylic acid, or an F for sulfonate. So  
14 the best I can tell, there is about two dozens of  
15 those, and that's it. But those are the ones that  
16 we have studied because they were used the most as  
17 fluorosurfactants, highest volume, and those are  
18 the ones that we have information about toxicity,  
19 bioaccumulative nature. They are not all  
20 bioaccumulative, going back to the protein  
21 binding, but that's the family.

22 All the poly, so poly means many, not  
23 all, so highly fluorinated. Many fluorines, but  
24 not all, so a lot of discussion around all the  
25 rest of the PFAS falls into that category. That

1 is probably the biggest family of PFAS. So the  
2 boxes here are not drawn to scale, but everything  
3 else, like the GenX, the fluorophilic alcohols,  
4 the fluorophilic sulphonates, all of those fall  
5 into that polyalcohol group.

6 Q. Thank you.

7 And you said, Dr. Anderson, that there  
8 was a group that was the most studied because  
9 those are the most concerned, and you didn't say  
10 what those are. Could you just clarify for the  
11 record what those are?

12 A. Yes. We started with the fully  
13 fluorinated, the perfluoroalkyl substances, so  
14 PFOA PFOS used in highest production, according to  
15 the industry, and used in the widest range of  
16 applications due to their fluorosurfactant nature  
17 and their ability to be highly stable, repel oil  
18 and grease and water, and all of those things.

19 They are also the terminal degradation  
20 products. So degradation and impurities are an  
21 important thing when talking about PFAS, and those  
22 terminal sort of, if you are going to have  
23 something break down it's going to be at a carbon  
24 that is not fluorinated or maybe an oxygen that is  
25 stuck in the middle of a group or something weird.

1 It will break down to and stop breaking down at  
2 the fully fluorinated chain.

3 I'm hoping I'm making, that makes  
4 sense. The fluorines around the carbon kind of  
5 protect those carbons. If a carbon is not fully  
6 fluorinated it's not protected. It can be broken  
7 apart, or if there is a different molecule in  
8 there that is not fluorinated, like an oxygen, it  
9 is not protected. So those polyfluoroalkyl  
10 substances, and even bits and pieces of the side  
11 chain fluorinated polymers can break down into the  
12 fully fluorinated substances.

13 So those are the most well-studied  
14 because at the end of the day not only were they  
15 the most used, not only do they have similar  
16 physical chemical characteristics including  
17 protein binding, size, shape, but they also can be  
18 the degradation, the common degradation products,  
19 so many of the other PFAS.

20 Q. Were any of the class of nonpolymers  
21 that you were just talking about, PFOA and PFOS,  
22 used in the oil and gas industry, to your  
23 knowledge?

24 A. Not that I have seen. Not to my  
25 knowledge.

1 Q. Could you give us a common example of  
2 what a PFOS or a PFOA might be? Would that be,  
3 like, fire fighting foam?

4 A. Both are present in the older  
5 formulations of ASSS. PFOS was also heavily used  
6 in things like Scotch Guard surface treatments,  
7 textile treatments, both of them. PFOA is a  
8 common breakdown product of other  
9 fluorosurfactants as well because, again, anything  
10 that has got eight or more carbons can break down  
11 to PFOA.

12 Q. And let me ask you, Dr. Anderson, in  
13 the definition of PFAS, P-F-A-S, that NMOGA  
14 proposed here, did that definition include PFOA?

15 A. Yes, it did.

16 Q. Did that definition include PFOS?

17 A. Yes, it did.

18 Q. Did it include the breakdown products  
19 of PFOA?

20 A. PFOA is the breakdown product.

21 Q. And so it then included the breakdown  
22 products?

23 A. Yes, it did.

24 Q. And the analytical method that the  
25 OCD, Oil Conversation Division, included in their

1 definition, do those analytical methods analyze  
2 for breakdown products?

3 A. The perfluoroalkyl substances, yes,  
4 these degradation products.

5 Q. Thank you.

6 Dr. Anderson, since we are having the  
7 most fun with a chemistry lesson this morning I  
8 thought why not actually put some chemical  
9 structures up and show everyone what we are  
10 talking about. I think that might, as a lawyer  
11 pretending to be a chemist, I thought that might  
12 be helpful to everyone. So could you please  
13 explain, Dr. Anderson, what we are looking at here  
14 in terms of what we have heard this week from  
15 other witnesses?

16 A. Sure, and I will promise not to, to  
17 try to not make this too painful, again as a  
18 toxicologist walking through chemistry. Again,  
19 the chemistry, the chemical structures are really  
20 important to understand the toxicology, the fate  
21 and transport.

22 So the first column shows just an  
23 example of fully fluorinated substances. Anywhere  
24 where there is two lines that touch, that is a  
25 carbon. We don't rate the disease just because it

1 gets a little too busy, but there is carbon. And  
2 you can see those carbons are in a chain and that  
3 every single carbon has a fluorine around it.  
4 That's what it means.

5 And so you can see that you have got  
6 some with eight going down to seven that are  
7 fluorinated in the PFOA molecule, but technically  
8 eight carbons. And then there is an example, just  
9 a small little one at the bottom, the B for bute  
10 or 4.

11 The middle column, those are just some  
12 examples of some common polyfluorinated  
13 substances. These are the ones that we have.  
14 Some of them we have studied. The 62:FTS for  
15 example. GenX is at the bottom. That is drawn a  
16 little wonky, and I don't know why. All of these  
17 structures come from the EPA's chemistry  
18 dashboard. But what you can see is that there are  
19 carbons, for example the 6:2-FTOH at the end. You  
20 will see how there are some lines drawn that don't  
21 have fluorines attached to them. Those are the  
22 carbons that break off. And when it degrades, it  
23 just degrades to that chain that has the F.  
24 That's where it breaks.

25 And so similarly the molecules below

1 it -- and to be fair I don't actually know the  
2 full chemical name of this one. I can certainly  
3 look it up but the acronym is listed there for  
4 you -- it would degrade similarly so even though  
5 we don't have toxicity information for FPeSAA, you  
6 can see how the molecules are pretty similar with  
7 that key fully fluorinated chain, and in our  
8 bodies and in the environment the N groups can  
9 break off. We do have the toxicity information on  
10 that chain.

11 While we may not have  
12 chemical-specific information on the FPeSAA, we  
13 have some really good indications of what might be  
14 happening, and FPeSAA is not included in the  
15 analyte list. It is included in our definition.  
16 But we can measure and monitor for the degradation  
17 product and we can have some information about  
18 potential risk because it's the chain, that piece,  
19 that binds to the receptors in our body that then  
20 causes the myriad of potential health effects.

21 And so even with GenX you can see,  
22 even though it is drawn a little wonky, they kind  
23 of stretch it out a little bit, it can still fit,  
24 it can still do that same pattern of fitting into  
25 a, of a -- of a binding or a receptor. But I will

1 say, for example, GenX is not bioaccumulative. We  
2 eliminate it pretty quickly, in a matter of days  
3 and weeks. Why is that? You can look here and  
4 see it does have sort of a dangling piece -- my  
5 chemistry coming out, right? All the chemists  
6 listening are flinching -- but it has got that  
7 dangly piece which means it doesn't fit into the  
8 receptor as well.

9           So in our kidneys when we try to  
10 eliminate chemicals, our kidneys think that these  
11 long chains are lipids. So fatty acids are  
12 carbons in a row fully hydronated with hydrogen.  
13 So our body is like, oh, fatty acid, I need that  
14 for energy, I need that for metabolism, so it  
15 pulls it back in. It doesn't do that as well as  
16 the really small ones, and with GenX, and it  
17 doesn't do it as well with the really big ones  
18 because they can't bind.

19           And the box that I have shown is just  
20 the structure for PTFE and what we have been  
21 calling here as FPEG, in quotes, so no one thinks  
22 that this is the official formal definition. We  
23 made it up. You have to squint, but what I would  
24 like to call your attention to is the small little  
25 n outside of the brackets. That indicates that

1 those are repeating units over and over and over  
2 and over. And so that's what is in that chemical  
3 structure there. But you can see PTFE fully  
4 fluorinated, highly, highly stable. Honestly, not  
5 a lot is known about the FPEG, but the group on  
6 the end has fluorines with an n meaning repeated  
7 over and over and over and over.

8           And then on the bottom I just put some  
9 random different PFAS that fit the various  
10 definitions, and you can see they have vastly  
11 different structures. So as soon as you get away  
12 from the fully fluorinated alkyl acid chain of  
13 carbons you start getting all kind of funky  
14 cyclic, you get rings, you get all sorts of crazy  
15 things. And even if we don't know the toxicity, I  
16 can look at this molecule and say it will behave  
17 differently than PFOA, for example. Fully  
18 fluorinated, I'm talking about the per, again all,  
19 fluoro t-butycyclohexane. It is fully fluorinated  
20 suggesting that it is highly stable, but it  
21 doesn't, so it doesn't have any degradation points  
22 in it but it also doesn't looks like a chain that  
23 would bind to the same receptors.

24           So those are just a couple examples.

25           Q.     I just have a few questions on the

1 things that you said. You said that, one of the  
2 things you said is that the middle category there,  
3 the polyfluorinated substances can degrade; is  
4 that correct?

5 A. They can, yes.

6 Q. And when they degrade what do they  
7 degrade into?

8 A. That is a whole area of research, to  
9 be honest, and so what we know for sure is that  
10 the fully fluorinated bits, the pieces, the  
11 tailends, are going to be where they stop. Under  
12 what conditions they degrade, how quickly they  
13 degrade, and what might be what we call  
14 intermediates, they are still an active area of  
15 research.

16 Q. Okay, and the category of  
17 perfluorinated substances on that left-hand  
18 column, do we have analytical methods for those?

19 A. The per, so fully fluorinated --

20 Q. Yes.

21 A. -- first column, yes.

22 Q. Okay, and on the bottom right-hand  
23 corner I see a chemical structure that says  
24 Paxlovid. Is that Paxlovid as in the Covid  
25 treatment?

1           A.       It is indeed, yes.

2           Q.       And so am I to understand that  
3 Paxlovid uses PFAS?

4           A.       Paxlovid meets the definition of a  
5 PFAS as proposed by the WildEarth Guardians.  If  
6 you look closely on the molecule on the farthest  
7 left-hand side, there is three fluorines all  
8 around a carbon so that carbon is fully  
9 fluorinated, so it has one fully fluorinated  
10 carbon.  That is very, very common in  
11 pharmaceuticals.  I don't know exactly why.  I  
12 have asked, but adding various fluorines to drugs  
13 is very, very common and still being approved for  
14 use.  Lipitor is another example.

15                       So I wanted to show that the rest of  
16 the molecules look nothing like a PFAS.  In fact,  
17 this molecule breaks down, not persistent in our  
18 bodies, certainly isn't considered an oil  
19 repellancy or water -- you know, water repellancy.  
20 It doesn't have the fluorosurfactant properties.

21           Q.       Thank you, Dr. Anderson.  We are  
22 talking about all of the different areas of PFAS,  
23 fluoropolymers, nonpolymers, and where there are  
24 still areas of what we know and where there are  
25 still areas of research.  So could you please

1 explain what we are seeing here to respond to some  
2 of the other testimony that we have heard this  
3 week about we don't know enough about PFAS, we  
4 have no idea, it's all still developing science?

5 A. Sure. So this is a figure that was  
6 put together by the team that worked on the ITRC.  
7 That's an acronym that stands for the Interstate  
8 Technology and Regulatory Council. It's a group  
9 of, sort of we all volunteer our time and work  
10 with state regulators to put together guidance  
11 documents on key chemistries and key issues in the  
12 environmental space. I do believe this was  
13 referenced in some of Dr. Horwitt's or  
14 Mr. Horwitt's testimony.

15 This was a figure that was first  
16 created as the initial version, the first version  
17 of the guidance as meant for PFAS. And what it is  
18 showing is that, yes, PFOA and PFOS grab our  
19 attention right away, rightly, but we quickly move  
20 to the very similar like-structured other fully  
21 fluorinated compounds, and that is shown in the  
22 orange and the purple. So that is a list of the  
23 fully fluorinated or perfluoroalkyl substances,  
24 and we have a lot of attention, a lot of data on  
25 those. You can see this says Early Attention and

1 this was even five years ago.

2 We then move to the green to start to  
3 understand well, what about all these weird  
4 fluorotelomers and the perfluoroalkyl ethers --  
5 that's the GenX. Oh, no, I'm sorry,  
6 polyfluoroalkyl ether is the GenX -- but these  
7 other subclasses of the poly. So the green is  
8 where we start to introduce the polyfluorinated  
9 substances.

10 And then finally, at the very bottom  
11 that is then the rest, right, the rest of the PFAS  
12 that don't fall into those. But it is getting  
13 increasing attention, even as of five years ago.  
14 I do want to read the footnote under this that  
15 says that this diagram is not meant to depict,  
16 again, any kind of accurate sizes. Scaling is not  
17 accurate. The number of the other PFAS is not  
18 necessarily, it says "not a greater quantity by  
19 mass, concentration, or frequency of detection."  
20 So even though it is a bigger slice it was just  
21 meant to represent other chemicals, not -- you  
22 know, not by mass.

23 Q. So Dr. Anderson, in terms of what we  
24 understand today for PFAS, where are we, looking  
25 at NMOGA Rebuttal Exhibit 30.5 in terms of color,

1 where are we?

2 A. I mean, we are already in the blue,  
3 what we understand today. Now, fully  
4 characterized toxicity information on a chemical  
5 by chemical basis, we are in the purple, right,  
6 and actually some of the green 62:FTOS and then  
7 FTOH, but definitely continuing to rapidly expand  
8 our information.

9 Q. And all of those PFAS that have been  
10 analyzed for toxicity to date, are they all  
11 extremely toxic in low levels?

12 A. No. So we have toxicity information  
13 on -- actually, just this week EPA released their  
14 what they call the regional screening levels to  
15 what we use to screen groundwater in soils. It  
16 contains 31 PFAS. So we have toxicity information  
17 at least sufficient to screen groundwater in soil  
18 for 31 PFAS from EPA. It is from a compilation of  
19 different sources, but that's what the regional  
20 office puts out.

21 And so while going all the way through  
22 rulemaking under the Safe Drinking Water Act, it  
23 is limited to six. We actually have toxicity  
24 values for maybe about ten to a dozen, and then  
25 the ability to screen based on human health risk

1 concerns here in the U.S. Section 31, and that  
2 number is going to continue to grow for sure.

3 Q. Thank you.

4 A. But I do, I'm not sure if I fully  
5 answered your question. You did ask about the  
6 range of toxicity?

7 Q. Yes.

8 A. And so what is important from that  
9 information is, while we have toxicity values  
10 meaning potential for human health concerns for  
11 sure, the level at which or the potency of that  
12 toxicity varies by, if my math is correct, eight  
13 orders of magnitude so it's one hundred million  
14 full difference.

15 So, for example, PFDoA, and this is in  
16 my testimony, has a screening level of 800 parts  
17 per billion, and that's compared to the screening  
18 level again for PFOA which we know is  
19 bioaccumulative, has multiple potential human  
20 health effects associated with it, right? There  
21 is a reason that number is so low, so to say they  
22 are all exceptionally toxic when there is such a  
23 wide range.

24 And again, toxicologists put toxicity  
25 in relation to exposure. There has to be exposure

1 for there to be a risk, so if a PFAS, if we are  
2 not exposed to it there is not going to be a risk,  
3 right? If it's not in our water we are not able  
4 to ingest it. If we are not breathing it in, it's  
5 not in our food, and it doesn't get into our  
6 bodies then there is no real risk. There is no  
7 toxicity.

8 Q. Thank you. Just give me one more  
9 moment. I have some other items I would like to  
10 bring up.

11 Dr. Anderson, did you review New  
12 Energy Economy Exhibit KH-1BB of Dr. Kristen  
13 Hansen?

14 A. Yes, I did.

15 Q. Is Dr. Hansen a toxicologist?

16 A. No, she is not.

17 Q. Did you review Dr. Hansen's direct  
18 testimony?

19 A. Yes, I did.

20 Q. Did you review Dr. Hansen's rebuttal  
21 testimony?

22 A. Yes, I did.

23 Q. Okay. May I share -- oh, I think can  
24 I -- yes, thank you.

25 What I have in front of you,

1 Dr. Anderson, is New Energy Economy Exhibit A  
2 which is the direct testimony of Dr. Hansen.

3 A. It's not sharing yet.

4 Q. Oh, I'm sorry. Let me try again.

5 There we go. I don't mean to scroll  
6 through this, I'm sorry -- oh, that's not it.

7 Excuse me.

8 There we go. Now I have New Energy  
9 Economy Exhibit A in front of you. I'm sorry to  
10 make everybody motion sick by scrolling through  
11 here. I don't know a better way to do it.

12 I'm on Page 10 of Dr. Hansen's direct  
13 testimony, Lines 19 through 22. It reads, "PFAS  
14 are a class of 10,000 to 15,000 different  
15 compounds reflecting a diverse set of chemical  
16 characteristics. And these characteristics  
17 explain why different PFAS are used in different  
18 applications."

19 Dr. Hansen, do you agree with this  
20 statement?

21 A. The highlighted statement?

22 Q. Yes.

23 A. Yes, I do.

24 Q. In terms of toxicology, does diversity  
25 matter, the diversity of the PFAS matter?

1           A.       If we are talking specifically about  
2 the diversity of molecular size, functional  
3 groups, reactive groups and physical chemical  
4 characteristics, yes, for sure.

5           Q.       And would that diversity be what we  
6 looked at on that slide of all the different  
7 chemical structures of this PFAS; is that what you  
8 mean?

9           A.       Correct, and I just showed a small  
10 snippet of the diversity.

11          Q.       Page 6 here.

12                    I'm now on Page 6 of Dr. Hansen's  
13 direct testimony starting at Line 6. She says,  
14 "There are six well-characterized PFAS compounds,"  
15 and I'm just going to say the acronyms, not the  
16 full names, "PFOA, PFOS, PFHxS, PFBS, PFNA, and  
17 HPFO-DA or GenX. These well-characterized PFAS  
18 span a range of chemistries and are therefore  
19 reasonable surrogates for the thousands of  
20 under-studied/unstudied members of the class in  
21 considering environmental mobility and toxicity to  
22 humans."

23                    Did I read that correctly?

24          A.       Yes, you did.

25          Q.       Do you agree with Dr. Hansen that

1 there are six well-characterized PFAS?

2 A. If by well-characterized here she is  
3 meaning on the toxicity front for human health,  
4 yes.

5 Q. Do you agree that these six  
6 specifically have been well-characterized for  
7 toxicity?

8 A. These six have been through the Safe  
9 Drinking Water Act and, as I said previously,  
10 there are actually a few others.

11 Q. Do analytical methods exist for these  
12 six PFAS?

13 A. Yes, they do.

14 Q. And is that because they have at least  
15 two fully fluorinated carbons?

16 A. I don't know why these are on the  
17 analytical list but they behave similarly and they  
18 are found, you know, with a frequency of  
19 occurrence so they are the attention of the  
20 researchers putting together the analytical  
21 methods.

22 Q. Would these six compounds be included  
23 in the definition of PFAS as NMOGA proposes?

24 A. Yes.

25 Q. Okay.

1                   And in terms of surrogacy, do you  
2 believe that these six compounds are reasonable  
3 surrogates for the under-studied or unstudied  
4 members of the class in considering full  
5 environmental mobility and toxicity?

6           A.       I do not agree with that statement.

7           Q.       Why not?

8           A.       Because they would only serve as  
9 reasonable surrogates if we understood that the  
10 under-studied or unstudied specific PFAS might  
11 degrade into one of them. So if a PFAS has in its  
12 structure eight carbons that are fully  
13 chlorinated, it would degrade to PFOA and we might  
14 reasonably assume that there would be similar  
15 concerns with that one. But if a PFAS does not  
16 have those t-carbons in the chain, with the right  
17 number, because that matters, again PFBS, GenX,  
18 are not bioaccumulative. They are too small.  
19 They wouldn't represent a good surrogate for  
20 assumptions about environmental mobility or  
21 toxicity.

22           Q.       Would it be a fair characterization of  
23 your testimony that just because something is a  
24 PFAS you cannot assume that it is mobile and  
25 toxic?

1           A.       That is correct.

2           Q.       Thank you.

3                    THE HEARING OFFICER:   Ms. Mulcahy,  
4 would you identify a good stopping point? We need  
5 a break.

6                    MS. MULCAHY:   Yes. I apologize.  
7 Right now would be fine.

8                    THE HEARING OFFICER:   Let's come back  
9 at 10:40.

10                   (Recess taken -- 10:25 a.m.)

11                   (After recess -- 10:43 a.m.)

12                   THE HEARING OFFICER:   When we broke,  
13 Ms. Mulcahy, you were putting Dr. Anderson through  
14 some rebuttal testimony.

15                   Ms. Mulcahy.

16                   MS. MULCAHY:   Thank you.

17 BY MS. MULCAHY:

18           Q.       I'm scrolling to Page 7 of  
19 Dr. Hansen's direct testimony. I'm looking at  
20 Lines 9 through 10 here. Excuse me, 9 through 11.  
21 "Of the well-studied PFAS compounds, all but one  
22 U.S.A.-DA bioaccumulate in humans with half-lives  
23 ranging from between several weeks, PFBS, to  
24 several years, PFOA, PFOS, PFHxS, PFNA."

25                   Did I read that correctly,

1 Dr. Anderson?

2 A. Yes, you did.

3 Q. Do you agree with this statement from  
4 Dr. Hansen?

5 A. No, I do not. First, just to clarify,  
6 if she is just referring to those one, two, three,  
7 four, five, six, it is accurate, but their  
8 bioaccumulation or their half-life -- half-life is  
9 their, the elimination half-life are how quickly  
10 it takes for the human body to get rid of about  
11 half -- that is correct, several weeks for PFBS to  
12 several years. Several weeks is not typically  
13 considered bioaccumulative, and in fact some of  
14 the regulatory cutoffs for bioaccumulation do not  
15 actually even include PFOA, but I disagree with  
16 that, so it's just a little too oversimplified.

17 We also have bioaccumulation  
18 information on a whole host of other PFAS. Some  
19 are bioaccumulative and some are not.

20 Q. And you mentioned half-life. From a  
21 toxicology perspective, why do half-lives matter?

22 A. So in order for a chemical to cause  
23 potential adverse effects it has to be in our  
24 body. So the half-life is how long it is in our  
25 body before it either degrades, like some of the

1 polyfluorinated compounds or more traditional  
2 compounds that we are used to. And why that is  
3 important is for other classic chemicals we  
4 eliminate them pretty quickly, either through our  
5 urine or through our bowel movement, and so they  
6 don't stay in our bodies. They don't stick around  
7 and have the opportunity to cause adverse effects,  
8 but we are especially concerned about  
9 bioaccumulative compounds, PFOA and PFOS, the long  
10 chains fully fluorinated alkyl acids for sure.

11 Q. And when you said we are concerned  
12 about the bioaccumulative compounds, and then you  
13 said PFOA and PFOS, I just want to make sure the  
14 record is clear, you're saying P-F-O-A, P-F-O-S?

15 A. Yes. Sorry, I meant to spell them  
16 out. I forgot the rule.

17 Q. That's okay. No problem.

18 And I'm still here on Page 7, and I'm  
19 now looking at Lines 12 through 15 where  
20 Dr. Hansen says, "According to the CDC's Agency  
21 for Toxic Substances and Disease Registry the  
22 well-studied PFAS compounds, all are linked to one  
23 or several health effects in humans including  
24 cancer, developmental toxicity, endocrine  
25 disruption, cardiovascular disease, immune system

1 toxicity and liver toxicity."

2 Did I read that correctly,  
3 Dr. Anderson?

4 A. Yes, you did.

5 Q. Do you agree with this statement from  
6 Dr. Hansen?

7 A. No, I do not.

8 Q. Why not?

9 A. There is a few little problems.  
10 First, the terminology "linked to," I'm going to  
11 use ATSDR, that is a more common acronym for the  
12 Agency for Toxic Substances and Disease Registry.  
13 They typically and more commonly, toxicologists  
14 and risk assessors will use the phrase "associated  
15 with." There is no citation to this statement, so  
16 I can't be for sure what, where she is getting  
17 this information. So that is one problem. I  
18 would have rewritten it to be "associated with."

19 The several is that the health effects  
20 listed here, while certainly may be a concern for  
21 one or more of the PFAS, not all that are listed  
22 here even. Does that make sense? So if we are  
23 talking about, again, just the six, for example,  
24 only PFOA has been associated with a few very  
25 specific types of cancers in humans and only PFOS

1 has been associated with the potential risk for  
2 cancer based on laboratory animal data.

3 The, for example, PFBS to my knowledge  
4 hasn't been associated with immune system toxicity  
5 so there is some differences. I do want to be  
6 clear, these PFAS do have similar toxicities but  
7 it's not correct to be, like, they are all  
8 associated with the same list. Overlapping, yes.  
9 They share very similar chemical structures.

10 Q. Thank you.

11 And you said that you are going to  
12 change the language from "linked to" to  
13 "associated with." Why is that language  
14 important?

15 A. I know it sounds like a crazy nuance  
16 but toxicologists and risk assessors are very  
17 careful and most often use "associated with."  
18 That means there is a line of evidence that  
19 strongly supports from a statistical association  
20 either in humans -- well, typically with humans.  
21 We reserve words like "cause" for real  
22 experimental studies, where you are hypothesis  
23 testing, you have a control, and those are done in  
24 animals or perhaps cells in petri dishes, those  
25 kinds of things. Very rarely would we ever use

1 the word "cause" if we are associated with a  
2 chemical. And because we know that toxicity is  
3 associated with exposure and different doses and  
4 there is a lot of nuance there.

5 Q. Thank you.

6 I'm going to stay on Page 7 and I'm  
7 going to scroll down to Lines 17 through 19.  
8 Dr. Hansen testifies, "Pathways of human exposure  
9 to PFAS include gestation via placenta, ingestion  
10 including via breast milk, drinking water, and  
11 food, inhalation and dermal adsorption."

12 Did I read that correctly?

13 A. Yes, you did.

14 Q. Dr. Anderson, do you agree with this  
15 statement by Dr. Hansen?

16 A. No, I do not.

17 Q. Why not?

18 A. Because here she drops the use of the  
19 well-studied and just uses PFAS so one might  
20 assume then that she is referring to the entire  
21 class, and that's just simply incorrect. If we  
22 are talking about a few very specific PFAS, then  
23 this could be true with the exception of dermal  
24 adsorption. Dermal adsorption is not widely  
25 accepted as a potential pathway for potential

1 exposure for even PFOA or PFOS.

2 Q. While we are talking about this topic  
3 of well-studied PFAS and toxicity and other  
4 characteristics of these well-studied PFAS, since  
5 we are in this subject matter, then would it be  
6 accurate to say that all PFAS, P-F-A-S, compounds  
7 bioaccumulate?

8 A. No, it's not accurate.

9 Q. Would it be correct to say that all  
10 PFAS compounds, as Dr. Hansen points out, have the  
11 same toxicity?

12 A. No.

13 MS. NANASI: Objection to that  
14 question. That's not what Dr. Hansen said and she  
15 is mischaracterizing Dr. Hansen's testimony.

16 THE HEARING OFFICER: All right, we  
17 are looking at it Ms. Mulcahy. I don't see that  
18 it says they are all equally toxic. I see that  
19 all are linked to one or several health effects.

20 MS. MULCAHY: Okay.

21 BY MS. MULCAHY:

22 Q. Dr. Anderson, did you hear the  
23 testimony from Dr. Sandau earlier this week?

24 A. Yes, I did.

25 Q. Did you hear when Dr. Sandau testified

1 that some PFAS are inert?

2 A. Yes, I did.

3 Q. Would you agree with that statement?

4 A. Yes, I would.

5 Q. Do you have any examples of inert PFAS  
6 or could you talk about why some PFAS are inert?

7 A. Sure. I don't know exactly what  
8 Dr. Sandau is referring to, but my example would  
9 be a fluoropolymer, for example, PTFE. It is, as  
10 mentioned earlier, so large that it can't adsorb  
11 through a cell membrane, as I said earlier. It  
12 doesn't have reactive groups on it meaning there  
13 is not side bits that could react with cells.  
14 It's not even water soluble. It's a solid. It's  
15 almost just sitting there. In fact, it is used in  
16 the medical implantation device industry, so we  
17 implant things with PTFE in our bodies and have  
18 been for decades.

19 Q. And if it is implanted in our bodies  
20 does that mean that it is not toxic to humans?

21 A. It means that as the conditions of  
22 being used in our body we have not found any  
23 reaction from it being there. There is no adverse  
24 effects that have been noted. So, yes, I would  
25 say that from the medical literature it's use on

1 those products have been deemed safe and  
2 appropriate.

3 Q. Thank you.

4 There was much talk and testimony this  
5 week about produced water and exposure pathways  
6 from produced water in terms of PFAS. Do you  
7 recall that testimony?

8 A. In general, yes, I do.

9 Q. Okay. So if a substance, such as  
10 produced water, contained PFAS and it was spilled  
11 on the ground would that automatically mean that  
12 there was a risk to human health and the  
13 environment?

14 A. Absolutely not.

15 Q. Could you explain why not?

16 A. In order for there to be risk there  
17 has to be an exposure pathway, one; and two,  
18 exposure at a concentration or dose that would  
19 elicit an adverse health effect. So if a receptor  
20 were in contact with a spill of material and if  
21 the material contained chemicals at a  
22 concentration or dose level that could cause an  
23 adverse health effect, then that would mean that  
24 there is a potential for risk. But both of those  
25 hypotheses would have to be true.

1 Q. And when you say exposure pathway,  
2 what do you mean by that, Dr. Anderson?

3 A. The easy one we typically hear, and  
4 then talked quite a bit a lot here, is drinking  
5 water, so if any of those chemicals were to reach  
6 a drinking source. But we also consider  
7 incidental ingestion of soil. Anything that might  
8 get unto our bodies via ingestion, whether  
9 intentional or incidental, and just again,  
10 generally speaking, not speaking about PFAS but in  
11 general, also air, right, if there is chemicals in  
12 the air.

13 Q. And you said not speaking about PFAS,  
14 but would the same apply to PFAS?

15 A. For the ones that might be volatile,  
16 yes.

17 Q. And in terms of, you said dose, so  
18 there has to be both an exposure pathway and a  
19 dose. Could you explain a little bit more by what  
20 you mean by dose?

21 A. Sure. Toxicologists, sort of the  
22 central tenant of one of the challenges of our job  
23 is that literally everything is toxic at some  
24 dose, some exposure. The easiest and silliest  
25 example is true water. If you drink a, drink

1 enough water quick enough, fast enough, it can  
2 cause death. Your kidneys, right, so that's the  
3 dose. I know that's a silly example but it  
4 actually has happened.

5 And so by dose we understand there to  
6 be a threshold for chemicals that at or below you  
7 are not really increasing your risk of adverse  
8 effect. Our bodies can handle it. It's our  
9 liver's job to process and manage chemicals and  
10 get them eliminated from our body. And so that  
11 dose matters because if you are above the dose you  
12 are going to increase your risk of that health  
13 effect. If you are below the dose your body  
14 manages it and there is no increased risk.

15 Defining that dose is your key.

16 Q. And so would it be a fair  
17 characterization of your testimony to say that in  
18 order for produced water spilled on the ground to  
19 be a concern to human health or the environment  
20 you both have to, one, have an exposure pathway;  
21 and then two, have an appropriately large dose?

22 MS. NANASI: Objection, asked and  
23 answered.

24 THE HEARING OFFICER: Ms. Mulcahy?

25 MS. MULCAHY: I'm asking her to just

1 summarize what we have just talked about in  
2 several incremental steps to clarify it for both  
3 the Commission and everyone in the room.

4 THE HEARING OFFICER: You don't think  
5 she has already given a summary?

6 MS. MULCAHY: I do not believe, no.

7 THE HEARING OFFICER: Okay, go ahead.

8 THE WITNESS: So would you like me to  
9 just state the summary?

10 BY MS. MULCAHY:

11 Q. I just asked you is that a fair  
12 characterization of your testimony. What I said  
13 is that in order for there to be a harm to human  
14 health in the environment from produced water that  
15 may contain PFAS would it be a fair  
16 characterization of your testimony to say that  
17 there must both be an exposure pathway and an  
18 appropriately large dose?

19 A. Yes.

20 Q. Okay.

21 Earlier you also talked, and maybe  
22 this goes to what you just talked about so if it  
23 does just let me know, but we earlier talked about  
24 the various different PFAS and receptors. Do you  
25 recall that testimony?

1           A.       Yes.

2           Q.       Okay, so how do you as a toxicologist  
3 and risk assessor determine if there is a  
4 connection or pathway between, like, a spill and a  
5 receptor?

6           A.       Sure.

7                    So I don't want to confuse the term  
8 receptor because you used it in two different  
9 ways.

10          Q.       Okay, sure.

11          A.       So I just want to be really clear. So  
12 if there is a spill I utilize the expertise of  
13 environmental scientists such as our engineers and  
14 hydrogeologists and experts in fate and transport  
15 like Dr. Richardson to help me understand how  
16 chemicals will move to the environment, what media  
17 they will be in, air, soil, water, biota. And  
18 then as a toxicologist I can then assess and have  
19 understanding of different receptors' interactions  
20 with those media: How much water do we drink a  
21 day, how much air do we drink a day, how much food  
22 does an ecological receptor eat from various food  
23 groups. We have that information. That's how you  
24 combine and figure out an exposure pathway plus  
25 the amount or the dose that is going to be

1 ingested.

2           Once a chemical is ingested that is  
3 where the binding to receptors and the  
4 bioavailability takes place, so a chemical has to  
5 be able to get into our system, it has to be able  
6 to elicit a toxicological effect, and that can  
7 happen through a whole myriad of ways.

8           Q.     Thank you.

9           I'm going to scroll to Page 8 of  
10 Dr. Hansen's direct testimony, Lines 10 through  
11 12. She states, "PFAS compounds are pervasive and  
12 persistent in the environment. Many are highly  
13 mobile in the environment, many bioaccumulate,  
14 many are toxic to humans and to biota at very low  
15 levels."

16                     Did I read that correctly?

17           A.     Yes, you did.

18           Q.     Do you agree with this statement,  
19 Dr. Anderson?

20           A.     The first statement, "PFAS compounds  
21 are pervasive and persistent in the environment,"  
22 I disagree with that. One, I believe Dr. Hansen  
23 was operating under the WildEarth Guardians'  
24 definition of PFAS, and as per their definition  
25 some PFAS, the ones with fully fluorinated

1 carbons, are not pervasive and persistent in the  
2 environment. Two, even under our definition and a  
3 broader definition, the polyfluorinates can break  
4 down. They do break down into other PFAS, to be  
5 clear, so I think there is some confusion and I  
6 don't quite agree with that sentence.

7           The second sentence, the use of "many"  
8 is a little questionable. We do know that some  
9 PFAS are mobile. I don't know how she is defining  
10 many and I don't know how she is defining highly.  
11 Even for the PFAS for which we have data we know  
12 there are differences in how they move in the  
13 environment. That is information I get from my  
14 fate and transport experts like Dr. Richardson.

15           We know that some bioaccumulate but we  
16 actually know that many don't, and again I'm not  
17 defining many very well either. For example, EPA  
18 has done a machine-learning exercise of over 4,000  
19 PFAS, and they found that 50 percent of them do  
20 have a half-life that is greater than several  
21 months. Again, that doesn't mean they  
22 bioaccumulate, but at least have a longer  
23 retention time in our body, half of them. But a  
24 third of them was less than a week. That's not  
25 bioaccumulative.

1           Now, that was around 4,000 that they  
2 tested and that was in a machine-learning  
3 algorithm, complicated, so it is still yet to be  
4 determined, but their machine-learning algorithm  
5 took into consideration the molecular shape, the  
6 chemistry, the physical chemical properties, and  
7 the internal biological properties that mimic like  
8 receptor binding, movement of them through our  
9 body.

10           And so again, and then the last part  
11 of the sentence "toxic," to a toxicologist that  
12 needs to be qualified. What route of exposure and  
13 at what exposure level are we talking about?  
14 Certainly agree that PFOA and PFAS are really of  
15 concern at low levels in the environment.  
16 Definitely agree with that.

17           Q.       And then when you say --

18           A.       P-F-O-A and P-F-O-S. Sorry.

19           Q.       That's okay, no problem.

20           And I want to ask you specifically  
21 about her statement that many are highly mobile,  
22 and you said that you disagree with that; is that  
23 correct?

24           A.       Correct.

25           Q.       From a toxicology perspective why does

1 mobility matter?

2 A. It matters to me because I need to  
3 understand exposure pathways, and we, the  
4 terminology we use is a complete exposure pathway.  
5 So we understand that certain chemicals that may  
6 be spilled over here may travel and have risk to  
7 receptors way over here. We understand that. But  
8 which ones and how fast and in what media, so  
9 that's the mobility piece.

10 So PFAS like PFOA, PFOS and the  
11 similar compounds in that group are water soluble.  
12 They have different mobilities. They travel, even  
13 the ones that look the same travel differently in  
14 the water. But other PFAS like PTFE is not water  
15 soluble and some PFAS are gases, so they are not  
16 even in the water.

17 The gases like the hydrofluorocarbons  
18 degrade in the environment, in a few days in the  
19 atmosphere.

20 Q. Okay, thank you.

21 I'm going to stay on Page 8 but -- oh,  
22 excuse me, I'm going to scroll to Page 9 now of  
23 Dr. Hansen's direct testimony. I apologize, I  
24 don't have it highlighted here, but Dr. Hansen  
25 suggests the Commission adopt the following

Page 107

1 definition of PFAS. "A class of compounds  
2 including chemicals with at least one aliphatic  
3 perfluorocarbon moiety."

4 Do you agree with Dr. Hansen that the  
5 Commission should adopt this definition of PFAS?

6 A. No, I do not. As I said earlier, the  
7 definition that I recommended is a line with the  
8 EPA TSCA program. It includes the PFAS of most  
9 highest concern and of relevance to this  
10 rulemaking.

11 Q. And earlier you testified that there  
12 are no standardized analytical methods in  
13 existence today that can test for one  
14 perfluorocarbon moiety. Do you recall that  
15 testimony?

16 A. Yes, I do.

17 Q. So let me ask you, Dr. Anderson, if  
18 there are no standardized analytical tests that  
19 exist today that can test for one perfluorocarbon  
20 moiety how would the Division be able to enforce  
21 any such prohibition?

22 A. They could not.

23 Q. I'm going to now go to New Energy  
24 Economy Exhibit B, which is the rebuttal testimony  
25 of Dr. Hansen. Okay. I'm at the bottom of Page 1

1 on to Page 2. This is long but I am going to read  
2 it as fast as I can.

3 "The production and utilization of  
4 PFAS compounds such as fluoropolymers and  
5 fluorosurfactants include a significant percentage  
6 of both PFAS impurities and PFAS residuals.  
7 Whether or not a PFAS compound is specifically  
8 produced for use by the industry, residual PFAS of  
9 a different structure may be present in the  
10 overall formulation. It is the responsibility of  
11 the industry to control the use of both the  
12 compounds produced for their purposes and  
13 additional PFAS compounds that are part of that  
14 formulation, final formation including residuals  
15 and impurities.

16 "Additionally, many PFAS as well as  
17 the impurities and residuals present in a PFAS  
18 product may undergo some level of degradation in  
19 the environment resulting in a smaller persistent  
20 perfluorinated compound. Again, the industry  
21 needs to control not only the chemicals necessary  
22 for their processes, but also the eventual  
23 breakdown products of those PFAS into shorter  
24 chains long-lived molecules. These residual  
25 impurities and degradation products are covered by

1 the broader definition I have proposed," which is  
2 the definition that you just mentioned.

3 Dr. Anderson, did I read correctly?

4 A. I believe so, yes.

5 Q. Do you understand what Dr. Hansen is  
6 talking about when she mentioned impurities here?

7 A. Can you scroll up just a little to the  
8 beginning?

9 Q. Sure.

10 A. Impurities for fluoropolymers, as I  
11 understand, yes.

12 Q. Is there something that you don't  
13 understand?

14 A. I don't know what she means by  
15 impurities for fluorosurfactants.

16 Q. Why don't you understand that?

17 A. I'm just not aware what those might  
18 be. Certainly degradation products and residuals,  
19 yes. If that's what residuals means, degradation  
20 products.

21 Q. Okay.

22 Do you understand what Dr. Hansen is  
23 talking about when she says breakdown products  
24 here?

25 A. Breakdown products for the

1 fluorosurfactants, yes. Fluoropolymers are not  
2 known to break down.

3 Q. Do you agree with Dr. Hansen's  
4 statements here on Pages 1 and 2? And I'm happy  
5 to scroll up or down if you might need to see  
6 something to address that.

7 A. There is a lot here to unpack. I  
8 think, starting with the bottom line up front in  
9 the bigger picture of what I think she is getting  
10 at, I agree that we need to control for and think  
11 about the potential impurities in fluoropolymers  
12 and the potential breakdown products of  
13 fluorosurfactants or any other PFAS. And I agree  
14 that her definition includes that, but so does  
15 ours because those impurities and breakdown  
16 products are the fully fluorinated as small as two  
17 carbon n groups, and so we do account for those.

18 There is some nuances and some  
19 confusion that I have and disagreements with  
20 individual statements, but I think what she is  
21 getting at I agree with and we are accounting for  
22 that.

23 I do want to say things like  
24 significant percentage of impurities in  
25 fluoropolymers, that hasn't proven to be true, and

1 especially today's manufacture of fluoropolymers  
2 are made without many, can be made without PFAS  
3 used as processing aids at all so the chance for  
4 PFAS impurities in those specific fluoropolymers  
5 is absent. But nonetheless, historically both for  
6 fluoropolymers and fluorosurfactants today, I do  
7 think that our definition and my recommendation  
8 for consideration is yes, I agree with her, keep  
9 those in mind.

10 Q. Okay, and I heard you talk about "our"  
11 definition. Do you mean NMOGA's definition?

12 A. The one that I and Dr. Richardson  
13 proposed, yes.

14 Q. Okay, and let me ask you then do the  
15 analytical methods that the OCD, the Oil  
16 Conservation Division, proposes as part of its  
17 definition for PFAS include these impurities?

18 A. It's to the extent we are talking  
19 about, again, those fully fluorinated alkyl acids  
20 and in instances perhaps sulphonate so those  
21 chains of carbons that are fully fluorinated,  
22 those are on the standard analytical method and  
23 fall under everybody's definition.

24 Q. Okay, and so then in terms of the  
25 analytical methods that OCD proposes as part of

1 its definition for PFAS, does it include breakdown  
2 products?

3 A. As far as we know as the breakdown  
4 products being those terminal fully fluorinated  
5 PFAS, yes.

6 Q. When you say as far as you know, is  
7 that your testimony that not all PFAS break down?

8 A. Correct.

9 Q. Thank you.

10 Dr. Anderson, in both -- Dr. Hansen in  
11 both her direct and rebuttal testimony mentions,  
12 quote, "additive toxicity of PFAS compounds." Do  
13 you recall Dr. Hansen mentioning additive toxicity  
14 in her testimonies?

15 A. Yes, I do.

16 Q. Can you please explain what additive  
17 toxicity is?

18 A. Yes, and I'm taking a deep breath.  
19 It's a doozy.

20 So what she is referring to is a  
21 special subdiscipline of toxicology called  
22 mixtures toxicology. It really is a specialized  
23 field because it's very complicated, highly  
24 statistically driven, high need to understand  
25 molecular biology and chemistry, and so to

1 simplify it as much as I can, and to use more  
2 accurate terminology, there is a default  
3 assumption to be health protective that certain  
4 compounds that have similar toxicological profiles  
5 or similar toxicity may be additive. And by  
6 additive I mean dose additive, not concentration  
7 additive. I know. You are rolling your eyes  
8 back. I'm sorry. I didn't make up these words.

9           What that means is additive relative  
10 to its own dose-response and potency. That's the  
11 Hazard Index approach. It does not mean two of  
12 this chemical plus two of a second chemical would  
13 equal four. It means the risk or the potency of  
14 the dose is additive, so a risk of, let's say, you  
15 have just a marginal risk for one chemical and a  
16 marginal risk for another, we assume that added  
17 together you now have an increased risk above  
18 either one.

19           So that's what I think she was  
20 referring to, although she didn't use the right  
21 accurate terminology and, again, additive or  
22 mixtures assessment for PFAS is a very, very  
23 active area of research including some of the  
24 world's experts at EPA. I have published in this  
25 area a few years ago, and it is what is underlying

1 EPA's conservative and health-protective  
2 assumptions of the Hazard Index approach under the  
3 Safe Drinking Water Act.

4 Also in CERCLA, under Superfund sites,  
5 we also always do a Hazard Index approach for  
6 PFAS, and for all chemicals, actually. So it is a  
7 default assumption that we understand to be  
8 health-protective, especially when chemicals have  
9 similar toxicity profiles. That is the key, you  
10 have to at least start there. The assumption is  
11 not all chemicals are additive, it's they are  
12 additive if they seem to be both affecting, say,  
13 the liver or if they are both affecting, say, the  
14 thyroid. Then you might be increasing the risk  
15 for adverse effects in that target organ.

16 Q. Dr. Anderson, I heard you say that  
17 this is an area of study. So has there been any  
18 scientific analysis and review of additive  
19 toxicity for PFAS compounds?

20 A. There has been a ton of research of  
21 the potential for mixtures of facts, dose  
22 additivity, relative potency, and also synergism  
23 or of antagonism for certain PFAS. Namely the  
24 ones we are finding most often associated with  
25 AFFF and in the environment so PFOA, PFOS, PFHxS,

1 that similar alphabet soup. There is literature  
2 on those and it is growing by the week. That  
3 literature does suggest that there may be a  
4 potential for dose additivity for some of the PFAS  
5 but not all as the literature is not solid clear  
6 yet.

7 So as a default and health-protective  
8 approach, that's why EPA did the Hazard Index and  
9 that is why we use the Hazard Index to screen for  
10 all 31 PFAS at Superfund sites. It's important --  
11 I mean, unfortunately, EPA's own document on the  
12 Hazard Index approach is almost 150 pages and  
13 their Science Advisory Board has an equally  
14 voluminous document on this. This is a very  
15 complicated area of research.

16 I think the bottom line is, yes, we  
17 need to be aware that we may be exposed to  
18 multiple PFAS, and for those individual PFAS where  
19 there are similar toxicities it is  
20 health-protective to assume that there may be some  
21 concern about additivity, dose additivity, scaled  
22 by potency.

23 But, for example, PSBS isn't  
24 considered to be a risk until you exceed two parts  
25 per billion. You have no risk to PFBS in drinking

1 water, according to EPA, unless you exceed two  
2 parts per billion, two thousand parts per  
3 trillion. Did I do my unit conversion correctly?

4 Q. Yes.

5 A. So that's important to keep in mind,  
6 that it's the potency that is being scaled. We  
7 recognize that even these PFAS that are  
8 well-studied have different toxicological  
9 potencies. They don't act the same, but it's not  
10 concentration adding.

11 I don't know if that is helping or  
12 making a lot of sense. I know that it's  
13 confusing. I also will say that PFOA and PFOS are  
14 not included in EPA's Hazard Index approach.

15 Q. Maybe I can help clarify it by asking  
16 this question. Dr. Anderson, do all PFAS, whether  
17 you are defining it as 10,000, 15,000, millions,  
18 do they all have the same toxicity profile?

19 A. Absolutely.

20 MS. NANASI: Objection, asked and  
21 answered. We know that they don't. She said that  
22 many times.

23 THE HEARING OFFICER: Okay.

24 Ms. Mulcahy, please move along.

25 MS. MULCAHY: Thank you.

1 Q. Dr. Anderson, did you hear Mr.  
2 Horwitt's direct -- excuse me, did you review  
3 Mr. Horwitt's direct testimony?

4 A. Yes, I did.

5 Q. And did you review his rebuttal  
6 testimony?

7 A. Yes, I did.

8 Q. And did you hear him in person testify  
9 earlier this week?

10 A. Yes, I did.

11 Q. Okay.

12 In his direct and rebuttal testimonies  
13 Mr. Horwitt discussed requiring broad disclosures  
14 about various oil and gas operations to a litany  
15 of individuals including schools, government  
16 actors, first responders, and many other entities  
17 and individuals.

18 Do you recall this testimony?

19 A. Yes, I do.

20 Q. Do you agree with Mr. Horwitt that  
21 these broad disclosures should be made?

22 A. No, I do not.

23 Q. Why not, Dr. Anderson?

24 A. Because I feel like and have  
25 experienced in my own professional work that

1 simply disclosing chemicals to stakeholders and  
2 individuals who cannot put that into context is  
3 not appropriate. First line of risk communication  
4 101, put the risk in context, provide information  
5 to the audience that will help them understand and  
6 hear the information and make well-informed  
7 decisions for themselves. And so because a  
8 disclosure of chemicals does not provide any  
9 information about potential pathways of exposure,  
10 concentrations or levels of exposure or toxicity,  
11 then the recipients of that information can't make  
12 informed decisions.

13 Q. Dr. Anderson, you said in your own  
14 work you have experienced that broad disclosures  
15 are not advised. Could you please provide some  
16 examples of that?

17 A. Sure. There is a few. I think from a  
18 personal experience I have presented to  
19 communities that have been devastated by the  
20 effects of AFFF release in the communities and  
21 contaminated water. Back a decade ago when we  
22 didn't have good information about guidance from  
23 federal agencies or public health agencies it was  
24 hard to present information on even with the  
25 complete exposure pathway and not the context

1 about what that meant from a risk, and it is  
2 really disturbing and upsetting to all parties,  
3 but especially to the people to receive that  
4 information and then having delivered the  
5 information unable to put it in context.

6 And I vividly, you know, similar to  
7 the testimonies we have been hearing all week,  
8 people deserve to understand, to have this risk  
9 put into the appropriate context by people who  
10 have the right information and have the training  
11 and expertise to interpret that information.

12 Another example, I had the honor of  
13 being on what is called the Water and Health  
14 Advisory Council, and we support local mayors with  
15 information around emerging contaminants in  
16 drinking water, and one of my council colleagues  
17 studies clinical science and social science and  
18 the policies around political decisions around  
19 chemicals in drinking water and public trust. So  
20 specifically his work looks at, and I have  
21 experienced this myself because I have also worked  
22 with municipalities, they have to issue public --  
23 water systems issue what is called Consumer  
24 Confidence Reports, CCRs, and in those they have  
25 to disclose chemicals that have been detected, and

1 bacteria as well, without a lot of context. And  
2 his work, and others in the published literature,  
3 have demonstrated that that actually reduces the  
4 confidence that people have in our tap water  
5 system.

6 And I, you know, have been,  
7 unfortunately, helping guide clients that need to  
8 put context and risk in context because simply  
9 listing chemical names again doesn't provide that  
10 right information that the public deserves to  
11 have.

12 Q. Thank you, Dr. Anderson.

13 In that same vein, has NMOGA proposed  
14 a manner by which to disclose all chemicals to the  
15 Division when and if needed?

16 A. Yes, I believe we have.

17 Q. In your professional opinion would  
18 that protect the public?

19 A. Yes, it would.

20 So what the proposal is, is full  
21 disclosure of all chemicals to OCD. Right? It  
22 allows them, and this is in context with the ban  
23 of PFAS, right, but then allows OCD, the trained  
24 experts and with the authority and the ability to  
25 then interpret that information and make sure that

1 any potential exposure pathways are mitigated.

2 Q. Thank you.

3 I don't mean to jump around here, but  
4 I want to go to what has been marked as Dusty  
5 Horwitt's Rebuttal Testimony which is WildEarth  
6 Guardians Exhibit 94.

7 I'm sorry, give me one moment. I  
8 thought I had it pulled up, but I guess I don't.

9 I'm now sharing what has been marked  
10 WildEarth Guardians Exhibit 94 which is the  
11 rebuttal testimony of Mr. Horwitt.

12 Mr. Horwitt states, "The Interstate  
13 Technology Regulatory Council, ITRC, tracks the  
14 regulation of PFAS in drinking water across the  
15 United States and shows that these regulations  
16 reflect the exceptional toxicity of PFAS for which  
17 significant toxicity data exist."

18 Did I read that correctly,  
19 Dr. Anderson?

20 A. Yes, you did.

21 Q. Dr. Anderson, are you familiar with  
22 this ITRC publication for drinking water standards  
23 that Mr. Horwitt mentions here?

24 A. Yes, it's a table.

25 Q. Why are you familiar with it?

1           A.       I developed it and sponsored it.

2           Q.       Could you discuss this ITRC process  
3 here for developing and tracking drinking water  
4 regulations as it relates to PFAS?

5           A.       Sure.   Especially in the early days  
6 when there wasn't so many, it was really important  
7 to provide guidance to states on the various  
8 different regulations that were coming out for  
9 PFAS.  It's not just drinking water, actually,  
10 it's groundwater, surface water, soil.  It depends  
11 on the tab you click on.  And so we, there was a  
12 small team of us -- it's much bigger than one  
13 person could do -- monitored and tracked and had  
14 feedback and feelers out to all the state agencies  
15 and compiled their information in a massive  
16 tracking table that just continues to grow and  
17 grow.

18                       The table includes which state under  
19 which program for which media and for which  
20 specific PFAS the level, whether it's draft, final  
21 or promulgated or not, because some of these are  
22 guidance, and then also contains a reference link  
23 to ensure that people can always go back to the  
24 authoritative source.

25                       So we -- that was part of what we

1 would call an evergreen part of the ITRC PFAS  
2 technical regulatory guidance document, which  
3 actually I referred to earlier from the graphs of  
4 the slide. That guidance I think is posted  
5 online. It has been updated once. We are in the  
6 process of re-updating it as well, but the table  
7 we try to update every month or so. It has not  
8 been updated in a while because, frankly, it got  
9 quite arduous.

10 Q. Thank you.

11 Can you explain some of the  
12 assumptions that EPA uses in studying drinking  
13 water standards for PFAS?

14 A. Sure. So for the PFAS for which we  
15 have MCLs drinking water standards, generally the  
16 assumptions are that the standards are  
17 health-protective for even the most sensitive  
18 population. There is modifying factors or  
19 uncertainty factors, depending on what terminology  
20 you want to use, to ensure that it includes and  
21 protects the variability in human response.

22 They also assume a certain amount of  
23 exposure to drinking water per day for your  
24 lifetime, so two and a half liters -- well, I  
25 should clarify. It depends on the receptor that

1 the drinking water value is derived for, so we  
2 know, for example, how much drinking water an  
3 average lactating woman consumes, and that's  
4 important because it's, one of the critical  
5 effects is developmental. We want to make sure  
6 that we are considering the increasing water  
7 intake for a woman while she is lactating, and we  
8 don't use the pregnant woman because it's typical  
9 that a lactating woman drinks more and for longer.

10 Similarly if it's a child, we assume  
11 body weight and drinking water ingestion. There  
12 is also an assumption for the four, for GenX,  
13 PFBS, HxS, but the majority of our exposure  
14 actually does not come from drinking water, and  
15 that is calculated numerically adjusted and the  
16 number.

17 Q. Thank you.

18 And so Mr. Horwitt says these studies  
19 show -- these regulations reflect the exceptional  
20 toxicity of PFAS for which significant toxicity  
21 data exist.

22 Do you know how, what PFAS analytes  
23 have toxicity data for them?

24 A. Just toxicity data, gosh, hundreds  
25 really. As I mentioned, bioaccumulation numbers

1 coming out of EPA, there is actually about two  
2 dozen PFAS that have classic rodent toxicity  
3 studies. That's in a lab where someone is  
4 experimentally doing sort of the traditional --  
5 now whether those are cancer biopsies or clinic, I  
6 would have to go in piece by piece -- but we have  
7 good information for a large, a good handle. You  
8 know, again the modifiers of many are large and  
9 hard, what does that mean.

10 Q. And Dr. Anderson, the definition of  
11 PFAS that NMOGA proposes, would it be protective  
12 of drinking water?

13 A. It would include all of the PFAS for  
14 which we understand occur in drinking water or  
15 have the potential to, yes. Am I answering that?  
16 Yes. Okay.

17 Q. Thank you.

18 Did you hear Dr. Brown testify earlier  
19 this week?

20 A. I did, yes.

21 Q. And in his testimony Dr. Brown stated  
22 that all PFAS are toxic at very, very low  
23 concentrations. Do you recall his testimony?

24 A. I do, yes.

25 Q. Do you agree with that testimony?

1 A. I do not, no.

2 Q. Why not?

3 A. Because he uses the word "all" PFAS  
4 and that's what we have been discussing. They are  
5 very different.

6 Q. Did you hear Dr. Brown's testimony  
7 that scientists do not know how PFAS act in  
8 receptor systems?

9 A. I don't recall if that is the exact  
10 wording that he used but I recall that sentiment,  
11 yes.

12 Q. Would you agree with that sentiment?

13 A. He used it in all?

14 Q. Yes.

15 A. Correct. Oh, that sentence, no, I  
16 don't agree with that statement.

17 I'm sorry, can you repeat the sentence  
18 again?

19 Q. Yes, sure.

20 I said did you hear Dr. Brown's  
21 testimony that scientists do not know how PFAS act  
22 in receptor systems.

23 MR. DAVIS: I'm going to have to  
24 object. I do not recall that being Dr. Brown's  
25 testimony.

1 THE HEARING OFFICER: Can you point to  
2 where you heard that?

3 MS. MULCAHY: I don't have a line  
4 marker because we don't have a written transcript,  
5 but it was on his afternoon testimony that he said  
6 that scientists do not know how PFAS act in  
7 receptor systems, and he was talking about his  
8 studies in Pennsylvania and saying that's why you  
9 have to have full disclosure, so that we can see  
10 what chemicals are out there so we can look at how  
11 they might be picked up in receptors.

12 THE HEARING OFFICER: I remember  
13 something like that, Mr. Davis.

14 Go ahead.

15 MR. DAVIS: Okay. I would just like  
16 to note that I believe he was referring to when he  
17 doing this in Pennsylvania under a situation where  
18 there is no full chemical disclosure.

19 THE HEARING OFFICER: Okay, thank you.

20 Go ahead, Ms. Mulcahy.

21 BY MS. MULCAHY:

22 Q. Do you agree with that statement, that  
23 scientists do not know how PFAS act in receptor  
24 systems?

25 A. I don't know exactly what you mean by

1 receptor systems, but I would agree that we do not  
2 know even for the PFAS that we have studied  
3 exactly how they act to cause adverse effects.  
4 That's how I would say that, and I think that is  
5 what he was trying to get at there.

6 Q. Okay, thank you.

7 Dr. Brown also testified that all  
8 disclosures of all chemicals to the public should  
9 be required because it allows public health  
10 officials to make the best decision. Do you agree  
11 with that?

12 A. I don't understand how -- no, because  
13 I don't understand how information to the public  
14 helps public health officials make decisions.

15 Q. Could you talk about some general best  
16 practices in terms of risk communications to the  
17 general public?

18 A. Sure.

19 So there are two different scenarios  
20 that I think we have to be mindful of. In the  
21 scenario where we don't know if there is a risk --  
22 that's the one I'm going to answer -- meaning we  
23 don't know if there is a complete exposure  
24 pathway, we don't know that there is chemicals in  
25 someone's drinking water, that's not a scenario.

1 In that situation the best approach -- well,  
2 really for all of them -- is have a trusted  
3 authority deliver the information, the standard  
4 101 risk communication, to make sure that the  
5 information is in a context that could be  
6 understood and appreciated and heard by the  
7 public. Three, have actionable, sort of what are  
8 we doing about it, kind of statements, you know,  
9 and I guess maintain an open line of  
10 communication.

11 Those are the hallmarks of good  
12 communication practices. Consistent communication  
13 from trusted authorities with the information  
14 correctly put in context around risk and what that  
15 means to the public.

16 Q. Thank you.

17 Now, I want to sort of switch gears  
18 here. Did you hear Dr. Martin's testimony this  
19 week?

20 A. Yes, I did.

21 Q. Did you hear Dr. Martin's testimony  
22 about PFAS compounds that have actually been  
23 studied?

24 A. Yes.

25 Q. Do you agree with Dr. Martin's

1 testimony that it is only about ten PFAS compounds  
2 that have been studied?

3 A. No.

4 Q. Do you know why some PFAS compounds  
5 are studied and others -- well, sorry, let me back  
6 up.

7 How many PFAS compounds have been  
8 studied, Dr. Anderson?

9 A. Well, again, this "have been studied"  
10 is quite ambiguous. The number ranges in the  
11 hundreds as far as data collected that might  
12 inform potential human health or ecological  
13 toxicity. That data could span from computer  
14 models that EPA is running. Academic research  
15 that is being published again in the hundreds. If  
16 we are talking about derivation of toxicity values  
17 which means that threshold for where exposure is  
18 acceptable or not, then, yes, that list gets  
19 narrowed to about a dozen.

20 Q. Okay.

21 Do you have an understanding of why  
22 some PFAS compounds are studied and others are  
23 not?

24 A. Yeah. As we have heard, and I think  
25 it's common knowledge, but as we heard in

1 Dr. Hansen's testimony, PFOA and PFOS started the  
2 whole problem, and there is disclosures about  
3 finding them in the environment and remote places,  
4 and so because of the volume of use of  
5 fleurosurfactants that are similar to PFOA and  
6 PFOS, because of the known concerns we look for  
7 the worst first. Right?

8 You have a list of cast members. You  
9 understand their chemical structure, and you look  
10 at the ones that we can say those look similar.  
11 We better study them and understand. Are they  
12 showing up in the same places, are the exposure  
13 pathways the same, and are their toxicity profiles  
14 similar. So it's not random. It's not let's pick  
15 a PFAS out of the air and let's study it. It's a  
16 deliberate lines of evidence approach to ensure  
17 that we are trying to look at the ones that may  
18 pose the most concern for human health.

19 Q. Thank you. That's helpful.

20 Sort of along that line, can you then,  
21 Dr. Anderson, could you extrapolate that the PFAS  
22 that have been studied and that have been found to  
23 be toxic means that all PFAS are toxic?

24 A. No.

25 Q. And I'm pretty much done here with

1 your rebuttal. I would just ask after listening  
2 to this week's testimony and reviewing the written  
3 testimony of other witnesses in this matter, is  
4 there anything that I didn't ask you to rebut but  
5 that you think would be helpful to rebut, helpful  
6 to the Commission, helpful to the parties in this  
7 proposed rulemaking?

8 A. Not that I can think of sitting here.  
9 I just think I would like to reiterate that if  
10 definitions proposed by all three parties include  
11 PFOA, PFOS, the ones that have drinking water  
12 regulations, that we understand, A, toxicity  
13 information and, B, a broader list that may  
14 similarly be acting, and so just assurance that,  
15 like, we are all getting to the similar -- you  
16 know, like the intentions are all there.

17 Q. Thank you.

18 MS. MULCAHY: I have nothing further.  
19 I pass the witness for cross.

20 THE HEARING OFFICER: Thank you.

21 I would turn to Mr. Davis. Mr. Davis,  
22 would you prefer to leap into your cross or to  
23 take a lunch break?

24 MR. DAVIS: I will defer that to  
25 Ms. Nanasi. I believe she is next in order of

1 cross.

2 THE HEARING OFFICER: Oh, okay. I was  
3 going to go around the bend there, end with NMOGA.  
4 I start with you, end with NMOGA, so I was going  
5 to go back to the beginning. But you can cross in  
6 any order you like.

7 MS. NANASI: I'm happy to go.

8 THE HEARING OFFICER: All right.  
9 Thank you.

10 MS. NANASI: Can you just give me an  
11 idea of what time you want to stop for lunch?

12 THE HEARING OFFICER: So Commission,  
13 any input there? You want to do it now?

14 MS. NANASI: I can also, if it pleases  
15 the Commission, I can just go for 15 like minutes  
16 and then stop.

17 (Discussion among the Commission.)

18 THE HEARING OFFICER: Thank you, Ms.  
19 Nanasi.

20 CROSS EXAMINATION

21 BY MS. NANASI:

22 Q. Dr. Anderson, good afternoon almost.

23 A. Almost there.

24 Q. You are a vice president of GSI  
25 Environmental; is that correct?

1 A. Yes, ma'am.

2 Q. How long have you been with GSI  
3 Environmental?

4 A. 2019.

5 Q. How much are you getting paid for your  
6 testimony in this case?

7 A. \$350 an hour.

8 Q. And it is correct that you have been  
9 here this entire week; is that right?

10 A. I arrived late morning on Tuesday so I  
11 missed, unfortunately, the very beginning public  
12 statements.

13 Q. In your CV, which is NMOGA Exhibit E1,  
14 you list a lot of experience working for oil and  
15 gas companies; is that right?

16 A. I have some experience working for oil  
17 and gas. I also have experience working for a  
18 wide range of stakeholders.

19 Q. You have worked for oil and gas and  
20 chemical companies in cases against the State of  
21 Alaska, the Commonwealth of Pennsylvania, the City  
22 of Arcadia; is that correct?

23 A. Could you read what the Commonwealth  
24 of Pennsylvania was in? That was -- because that  
25 is not oil and gas, I don't believe. I just want

1 to make sure I'm thinking of the same one.

2 MS. MULCAHY: If we are going to ask  
3 her about the exhibit would you mind if we pull it  
4 up so we can know what she is referencing?

5 THE HEARING OFFICER: We can pull it  
6 up, or you can read it, Ms. Nanasi.

7 BY MS. NANASI:

8 Q. In your CV, NMOGA Exhibit E1, you list  
9 your work on behalf of Dow Chemical; is that  
10 correct?

11 A. Correct.

12 Q. Is that the same Dow Chemical that in  
13 2011 agreed to pay a two and a half million dollar  
14 civil penalty to EPA for violations of the Clean  
15 Air Act, Clean Water Act, and the Resource  
16 Conservation and Recovery Act known as RCRA,  
17 R-C-R-A, at its chemical manufacturing and  
18 research complex in Midland, Michigan for  
19 unpermitted outfall discharge --

20 MS. MULCAHY: Objection. Objection.

21 MS. NANASI: I'm not done with my  
22 question.

23 THE HEARING OFFICER: Let her finish  
24 the question.

25 Q. -- to the Kilwasi River in addition

1 Dow failed to prevent pollution from running into  
2 nearby water bodies during rain events.

3 THE HEARING OFFICER: What is your  
4 objection, Ms. Mulcahy?

5 MS. MULCAHY: I am going to object.  
6 That is outside the scope of both Dr. Anderson's  
7 direct and her rebuttal testimonies. I have no  
8 issues with Ms. Nanasi asking Dr. Anderson about  
9 specific things that are listed on NMOGA  
10 Exhibit E1, but about other items and other  
11 companies not listed there I'm going to object.

12 THE HEARING OFFICER: Ms. Nanasi, I  
13 don't know what pertinence Dow's, say, compliance  
14 history would have to this proceeding unless there  
15 was some direct impeachment of Dr. Anderson  
16 through that. Do you have -- just a general  
17 reference to Dow's environmental compliance  
18 history doesn't, I don't think, help us out here.

19 MS. NANASI: Well, this is  
20 impeachment, I believe, and this is the expert  
21 that NMOGA is calling and I believe that I could  
22 ask initial foundation questions, but I believe  
23 that Dr. Anderson was the expert for Dow Chemical  
24 against EPA when EPA found Dow Chemical to have  
25 committed these violations. I think it's

1 relevant, especially when it has been -- it's  
2 about contamination of waterways.

3 MS. MULCAHY: Dr. Anderson was not a  
4 Dow chemical expert, and that is not what she is  
5 listed on Exhibit E. That's a complete  
6 mischaracterization of what is on that exhibit.

7 THE HEARING OFFICER: All right, so  
8 Ms. Nanasi, you can ask her if she was Dow's  
9 expert there, as I think you have just indicated  
10 you have reason to believe.

11 Is that true, Dr. Anderson?

12 THE WITNESS: I was not.

13 THE HEARING OFFICER: Okay.

14 BY MS. NANASI:

15 Q. What is, on E1-3 it says that you  
16 performed expert services on behalf of Shell and  
17 Dow Chemical, that you served as an expert on use  
18 and interpretation of regulatory standards and  
19 toxicity values for 1,2,3 and I have to spell  
20 this, t-r-i-c-h-l-o-r-o-p-r-o-p-a-n-e?

21 A. Could you put it up on the screen?  
22 But in general 1,2,3-Trichloropropane, the work I  
23 did for Dow and Shell was in California.

24 Q. Okay, so you did perform these expert  
25 services for Dow Chemical and Shell?

1           A.       Specific to a litigation matter in  
2 California.

3           Q.       Okay.

4           A.       And that case should be cited  
5 appropriately. Please show me if I have not.

6           Q.       What was your -- what did your expert  
7 testimony involve?

8           A.       In that matter I was opining on the  
9 regulatory state for 1,2,3-Trichloropropane.

10          Q.       What was the result of that case?

11          A.       I actually do not know.

12          Q.       Referring to your testimony on Page 5,  
13 is this your expert testimony that because  
14 insufficient data exists for all 10,000 plus  
15 members of the PFAS class that the logical  
16 conclusion from these data gaps is that the  
17 compounds should be considered safe?

18          A.       Can you pull up what you are referring  
19 to? I don't believe I used the word safe, no.

20          Q.       No, I'm just asking. Is it your  
21 expert testimony that because insufficient data  
22 exists for all 10,000 plus members of the PFAS  
23 class that the logical conclusion from these data  
24 gaps is that those compounds should be considered  
25 safe?

1           A.       No.

2                   MS. MULCAHY:  Objection.  That is a  
3  mischaracterization.

4                   Ms. Nanasi said in your written  
5  testimony you talk about insufficient data on  
6  these PFAS, which Dr. Anderson does talk about  
7  insufficient data.  That is not what she concluded  
8  in her written testimony.

9                   THE HEARING OFFICER:  And she has  
10 already given her answer which was no, that was  
11 not her testimony.

12                   Go ahead, Ms. Nanasi.

13                   MS. NANASI:  For the record I would  
14 respectfully request that, first of all, my name  
15 is Nanasi, and second of all that Ms. Mulcahy  
16 states her objection and not try and influence the  
17 witness' testimony.

18 BY MS. NANASI:

19           Q.       Do you agree from a risk management  
20 standpoint it makes sense that we not continue to  
21 add more of the PFAS compounds into the  
22 environment on the basis of ignorance about the  
23 toxicity, mobility or reactivity of a specific  
24 compound?

25           A.       I'm sorry, can you repeat that?

1 Q. Do you agree from a risk management  
2 standpoint it makes sense that we not continue to  
3 add more of these PFAS compounds into the  
4 environment on the basis of ignorance about the  
5 toxicity, mobility or reactivity of a specific  
6 compound?

7 MS. MULCAHY: Objection. That is a  
8 compound question.

9 THE HEARING OFFICER: Would you break  
10 that down, please?

11 Q. Do you agree from a risk management  
12 standpoint that it makes sense that we not  
13 continue to add more PFAS compounds into the  
14 environment?

15 A. Which PFAS compounds are you referring  
16 to?

17 Q. Any.

18 A. So can you repeat your question, make  
19 sure I understand?

20 Q. Do you agree from a risk management  
21 standpoint it makes sense that we not continue to  
22 add more PFAS compounds into the environment?

23 A. I think I have to disagree, if I'm  
24 understanding your statement correctly. I'm not  
25 sure that I am, but ...

1 Q. You would agree that Goliath on cancer  
2 is not the only worthy toxicity endpoint, correct?

3 A. If you are asking me if there are  
4 other adverse effect, health endpoints that are  
5 important than cancer, yes, I agree with that.

6 Q. You would agree that studies have  
7 shown that various PFAS compounds suppress immune  
8 response especially in children, for instance?

9 A. Those have only been shown for some of  
10 the PFAS compounds.

11 Q. You would agree that studies have  
12 shown that some of the PFAS compounds have been  
13 demonstrated to result in preeclampsia in pregnant  
14 people as well as to result in low birth weight  
15 babies, correct?

16 A. Some of the PFAS and some of the  
17 studies, yes.

18 MR. RUBIN: I'm sorry. Could we pause  
19 for a second? We just have a lot of activity. I  
20 think we are looking for some documents up here.

21 THE HEARING OFFICER: Ms. Shure (ph)  
22 was looking for the CV and this big booklet went  
23 through D but not E.

24 (Inaudible)

25 THE HEARING OFFICER: All right, I

1 think we are settled? Yes?

2 Go ahead.

3 MS. NANASI: Thank you.

4 BY MS. NANASI:

5 Q. Is it true that chronic toxicity by  
6 its nature takes many years to characterize?

7 A. Characterize by what? Can you -- I  
8 don't understand the question.

9 Q. Let me ask this. Do you agree that  
10 the phrase there is no evidence, quote-unquote, is  
11 not the same as saying we have studied this  
12 extensively and here is the data demonstrating  
13 that there is no risk?

14 A. Yes, I agree with that.

15 Q. Do you know that the CDC's Agency for  
16 Toxic Substances and Disease Registry mission is  
17 to protect communities from harmful health effects  
18 related to exposure to natural and manmade  
19 hazardous substances? We do this by responding to  
20 environmental health emergencies, investigating  
21 emerging environmental health threats, conducting  
22 research on health impacts of hazardous waste  
23 sites, and building capabilities and providing  
24 actionable guidance to state and local health  
25 partners?

1 MS. MULCAHY: Objection. Compound  
2 question. I have no issue with her asking the  
3 question if she breaks it down.

4 THE HEARING OFFICER: Yes. Please  
5 break it down.

6 Q. This is the mission statement of CDC's  
7 Agency for Toxic Substances and Disease Registry.  
8 If you would just let me know if you think this is  
9 an accurate statement of their mission statement.

10 ATSDR protects communities from  
11 harmful health effects related to exposure to  
12 natural and manmade hazardous substances.

13 A. I don't -- I'm not familiar with the  
14 ATSDR's mission statement.

15 Q. But you are aware that the CDC's  
16 Agency for Toxic Substances and Disease Registry  
17 addresses exposure to hazardous substances,  
18 correct?

19 A. Correct.

20 Q. And you are also aware that ATSDR  
21 responds to environmental health emergencies; is  
22 that correct?

23 A. I believe so, yes.

24 Q. And that they also investigate  
25 emerging environmental health threats, correct?

1 A. Correct.

2 Q. They also conduct research on health  
3 impacts of hazardous waste sites?

4 MS. MULCAHY: Objection. I don't  
5 believe that Dr. Anderson testified at all about  
6 hazardous waste sites.

7 THE HEARING OFFICER: Let me just ask  
8 for a general bit of guidance, Dr. Anderson. If  
9 something is without -- sorry, outside of your  
10 expertise, please say so.

11 And I understand your objection also  
12 goes to scope; is that correct?

13 MS. MULCAHY: Yes.

14 MS. NANASI: Madam Hearing Officer, if  
15 I could respond, I believe that there was a fair  
16 number of questions, actually, about Dr. Hansen's  
17 site, which was on the screen and was asked about,  
18 about CDC's Agency for Toxic Substances and  
19 Disease Registry specifically.

20 THE HEARING OFFICER: Okay. Let's  
21 just go a little ways here and see if it can be  
22 tied back to her testimony.

23 Go ahead.

24 BY MS. NANASI:

25 Q. Are you aware that the CDC Agency for

1 Toxic Substances and Disease Registry also  
2 researches, conducts research on health impacts of  
3 hazardous waste sites?

4 A. I am not familiar with that work, no.

5 Q. Okay.

6 You were asked by your counsel about  
7 what PFAS or PFAS compounds the oil and gas  
8 industry has used in New Mexico. Do you recall  
9 that?

10 MS. MULCAHY: Objection. I didn't ask  
11 that question.

12 MS. NANASI: I'm asking that question.

13 Q. Do you have any idea about the PFAS or  
14 PFAS compounds that the oil and gas industry has  
15 used in New Mexico?

16 A. No, I do not.

17 MS. NANASI: I have no further  
18 questions.

19 THE HEARING OFFICER: Thank you.

20 Let's take an hour for lunch. We will  
21 return at 1:00 to questions by Mr. Davis.

22 (Luncheon recess.)

23 -o0o-

24 AFTERNOON SESSION

25 (After recess -- 1:00 p.m.)

1 THE HEARING OFFICER: All right. We  
2 are back after a lunch break. When we broke Dr.  
3 Anderson was -- just had questioning completed by  
4 NEE, so now we turn to Petitioner, WildEarth  
5 Guardians. Mr. Davis.

6 Okay, she said she was done with her  
7 questioning. So Mr. Davis, do you have questions  
8 of Dr. Anderson?

9 MR. DAVIS: I do.

10 CROSS EXAMINATION

11 BY MR. DAVIS:

12 Q. Hello. I'm Kevin Davis. I represent  
13 the Petitioners, WildEarth Guardians.

14 A. Hello.

15 Q. I looked over your CV and I just want  
16 to confirm that you are not a chemist?

17 A. Correct.

18 Q. Do you mind if I ask you one more  
19 chemistry question today?

20 A. I can try.

21 Q. I believe that you testified earlier  
22 today about the breakdown of PFAS. Do you recall  
23 that?

24 A. Correct.

25 Q. Is it your testimony that when PFAS

1 breaks down that the carbon fluorine bonds break?

2 A. Okay. So if you're asking all PFAS  
3 and any carbon fluorine bond, that's too broad.  
4 The carbon fluorine bond, from what I understand,  
5 is extremely difficult to break, but we do see  
6 some breakage under different scenarios of that  
7 carbon fluorine bond. It depends on where the  
8 carbon is. It depends on the fluorination state,  
9 and you would have to ask a chemist and somebody  
10 special in fate and transport. It can happen,  
11 yes.

12 Q. And when you say it can happen, is  
13 that breakdown in the natural environment?

14 A. Can you clarify your question for me,  
15 please?

16 MS. MULCAHY: I'm just going to object  
17 in that I don't know that she was testifying  
18 about -- I will strike that, and I will listen to  
19 this line.

20 THE HEARING OFFICER: I heard her  
21 testify about degradation.

22 MS. MULCAHY: Go ahead. I will listen  
23 to the line of questioning.

24 BY MR. DAVIS:

25 Q. My question is I believe you just

1 stated that the carbon fluorine bond can break  
2 under certain circumstances, and my question about  
3 that is whether the carbon fluorine bond can break  
4 when it's degradation in the natural environment.

5 A. From what I understand, that's still a  
6 pretty active area of research. You would have to  
7 ask somebody who is studying that intensely to get  
8 the nuance.

9 Q. Would you suggest I ask a chemist?

10 A. Or someone who is working in the fate  
11 and transport of those PFAS.

12 Q. Would you agree that the  
13 perfluorinated component of an original PFAS  
14 compound that breaks down remains so the  
15 perfluorinated component remains perfluorinated as  
16 a breakdown?

17 A. It depends.

18 Q. What does it depend on?

19 A. The molecule you are talking about,  
20 the conditions under which the chemical is exposed  
21 and sitting.

22 Q. Can you give me an example of when a  
23 perfluorinated component would break down?

24 A. Not with a lot of detail, but I have  
25 seen the degradation pathways with some of the

1 polyfluorinated and you do get smaller pieces.  
2 You get chunks. Again, you will have to ask  
3 somebody with that kind of chemistry experience to  
4 talk about the dissipative association energy  
5 between those different bonds.

6 Q. Those smaller pieces that remain, are  
7 they sometimes perfluorinated?

8 A. Could you rephrase? What do you mean  
9 by --

10 Q. Sure. You said that when they break  
11 down some smaller pieces remain. Those smaller  
12 pieces would have a carbon fluorine bond?

13 A. Depends where on the molecules, but  
14 could, yes.

15 Q. At Page 7 of your direct testimony you  
16 state that PFAS should be more specifically  
17 enumerated unless delineated between PFAS for  
18 which there is toxicology data and potential  
19 concerns for human health risks and those PFAS for  
20 which no such data or concerns exist. Statements  
21 regarding potential, human or environmental risk  
22 must be limited to the compounds for which data  
23 are available to inform what exposure levels may  
24 be present and unacceptable, increasing risk on a  
25 chemical specific nature.

1                   Is that an accurate reading of your  
2 testimony?

3           A.       I don't have it in front of me but it  
4 sounds good.

5           Q.       PFAS for which no toxicological data  
6 exists, does that mean they are not toxic?

7           A.       Could you repeat your question?

8           Q.       Sure. Do you agree that there is  
9 multiple, many, PFAS for which no toxicological  
10 data exists?

11          A.       There are some, yes.

12          Q.       And those PFAS for which we have no  
13 toxicological data, does that mean that they are  
14 not toxic?

15          A.       No.

16          Q.       On Page 14 of your direct you state  
17 that proper public risk communication regarding  
18 chemicals potentially present in the environment  
19 is essential to avoid, quote, chemophobia which is  
20 known to result in a decrease in public health and  
21 other social and economic adverse effects.

22                   Do you recall that?

23          A.       Again, I don't have a copy in front of  
24 me but it sounds accurate, yes.

25          Q.       Are chemicals already being disclosed

1 in New Mexico oil and gas operations?

2 A. To the extent that I am aware of the  
3 disclosure in FracFocus, that's all I can answer.

4 Q. Are you aware of any clinically  
5 diagnosed and treated -- sorry. Strike that.

6 Are you aware of anyone who has been  
7 clinically diagnosed and treated for chemophobia  
8 in the United States?

9 A. I don't -- can you ask the question  
10 again, please?

11 Q. Are you aware of any person who has  
12 been clinically treated and diagnosed for  
13 chemophobia in the United States?

14 A. I'm not sure that chemophobia is a  
15 treatable disease.

16 Q. Chemophobia is a disease?

17 A. Could you rephrase your question? I  
18 was trying to use your words. I apologize.

19 Q. Sure. Are you aware of any person  
20 that has ever been clinically diagnosed and  
21 treated for chemophobia in the United States?

22 A. I don't think that that's a possible  
23 thing.

24 Q. Is chemophobia a disease?

25 A. I don't believe so.

1 Q. Do you agree that some chemicals are  
2 already being disclosed in New Mexico?

3 A. I believe what I just answered is only  
4 to the extent of what is in FracFocus is my  
5 understanding.

6 Q. Is it fair to call that partial  
7 disclosure of chemicals?

8 A. I don't know.

9 Q. Is the disclosure of chemicals in New  
10 Mexico currently causing chemophobia?

11 A. I do not know.

12 Q. Are you familiar with the Colorado oil  
13 and gas disclosure and the PFAS ban law that has  
14 been referenced in this hearing?

15 A. Only at the highest level.

16 Q. Do you know about the community  
17 notification provisions of that law?

18 A. I am not.

19 Q. Are you aware of any chemophobia that  
20 is happening in Colorado as a result of that law?

21 A. I have not looked into it.

22 Q. Are you aware of any chemophobia that  
23 is happening in California as a result of its oil  
24 and gas chemical disclosure law?

25 A. I have not looked into it.

1 Q. You cite a document that is entitled  
2 Scared to Death to support your testimony about  
3 chemophobia; is that correct?

4 A. I believe the title is longer than  
5 that. It's End Time 2011.

6 Q. That's right. I will read the whole  
7 title. The title is Scared to Death, How  
8 Chemophobia Threatens Public Health: A Position  
9 Statement of the American Council on Science and  
10 Health; is that correct?

11 A. Yes.

12 Q. This is a position statement of the  
13 American Council on Science and Health; would you  
14 agree with that?

15 A. As stated, yes.

16 Q. Would you agree that the American  
17 Council on Science and Health is a pro industry  
18 advocacy group?

19 A. I actually don't know anything about  
20 them.

21 Q. Were you aware that the American  
22 Council on Science and Health, the founding of  
23 that organization was funded by Paul Oreffice?

24 MS. MULCAHY: Objection.

25 THE HEARING OFFICER: Your objection?

1 MS. MULCAHY: She just said she  
2 doesn't know anything about who founded them, and  
3 he is asking her additional questions about that.

4 MR. DAVIS: I had not finished my  
5 question, actually, about who funded the founding.  
6 This is Exhibit E25, I believe? It's an exhibit  
7 to her testimony. I believe I can probe that.

8 MS. MULCAHY: Anything about the  
9 founding of it is not part of that exhibit.

10 MR. DAVIS: I can ask her if she is  
11 aware.

12 THE HEARING OFFICER: He can explore  
13 that.

14 Go ahead.

15 BY MR. DAVIS:

16 Q. Where was I?

17 Were you aware that the creation of  
18 the American Council on Science and Health, the  
19 founding of that organization was funded by Paul  
20 Oreffice?

21 A. No.

22 Q. Were you aware that Paul Oreffice was  
23 the president of Dow Chemical?

24 A. No.

25 Q. You cited the Flint water crisis as an

1 example of chemophobia in your testimony; is that  
2 correct?

3 (Witness is muted.)

4 A. Sorry, my mic turned off.

5 It's an example of psychological  
6 distress in a community.

7 Q. To be clear, people in Flint were  
8 poisoned by the water they were drinking; is that  
9 correct?

10 A. People in Flint had elevated levels of  
11 lead in their water, yes.

12 Q. You disagree that they were poisoned  
13 by that lead?

14 A. I don't know how you define poisoned.

15 Q. Would you agree with the statement  
16 that the people in Flint who drank  
17 lead-contaminated water suffered adverse health  
18 effects?

19 A. Actually I don't know the medical  
20 records of the people in Flint. I do know they  
21 were exposed to lead, some of them.

22 Q. You are a toxicologist?

23 A. Yes, sir.

24 Q. Would you agree that lead can have  
25 adverse health impacts?

1 A. Of course.

2 Q. Would you agree that lead in drinking  
3 water is a pathway to exposure?

4 A. Of course.

5 Q. Would you agree that the government  
6 responsible in Flint, Michigan withheld  
7 information from the people who were affected by  
8 that contamination?

9 MS. MULCAHY: Objection.

10 THE HEARING OFFICER: I think you need  
11 to lay a foundational question there. She said  
12 she doesn't really know much about the Flint  
13 situation so I think you have to ask her what she  
14 knows about the Flint.

15 BY MR. DAVIS:

16 Q. Did you reference the Flint water  
17 crisis as an example to support your chemophobia  
18 testimony?

19 A. I believe there is a publication that  
20 I referenced that talks about the psychological  
21 distress that occurred in that community, yes.

22 Q. I will move along.

23 On Pages 14 and 15 of your direct  
24 testimony you state, "It is often assumed that  
25 presenting the public and stakeholders with

1 factual information is always in the public's best  
2 interests, and the stakeholders will be readily  
3 able to develop appropriate," and then you have a  
4 quote here, quote, "beliefs, attitudes and  
5 behaviors related to a given risk."

6 Do you recall that testimony?

7 A. Again, I don't have it in front of me  
8 but it sounds accurate, yes.

9 Q. Just for the record, this is NMOGA  
10 Exhibit E25.

11 That quote, "beliefs, attitudes and  
12 behaviors related to a given risk," is from the  
13 US EPA Exhibit E25; is that correct?

14 A. If that's the website with the sole  
15 framework, yes.

16 Q. It may be helpful for me to try to  
17 share my screen here.

18 THE HEARING OFFICER: Sheila, please  
19 give him permission.

20 MR. DAVIS: May I approach the witness  
21 to hand her a copy of her testimony?

22 THE HEARING OFFICER: Yes.

23 And, by the way, we do have one extra  
24 notebook up here with all the E exhibits.

25

1 BY MR. DAVIS:

2 Q. I have placed in front of you a copy  
3 of your direct testimony in this matter, and I  
4 just wanted to make sure that you agree that that  
5 is your testimony that I have placed in front of  
6 you.

7 A. Is it okay if I scroll just a bit?

8 Q. For sure.

9 A. Okay, thank you. The Mac scrolls  
10 opposite.

11 Yes, that looks right.

12 Q. And specifically the phrase that I  
13 just, I don't know, five minutes ago quoted was  
14 from a US EPA document that is labeled as NMOGA  
15 Exhibit E25. The quote is "beliefs, attitudes and  
16 behaviors related to a given risk"?

17 A. Yes, that's correct.

18 Q. Do you agree that's the portion of  
19 your testimony that is quoted and attributed to  
20 the US EPA?

21 A. Yes.

22 Q. Do you agree the word immediately  
23 preceding that, appropriate, is your word?

24 A. I believe so.

25 Q. So my question is, who can develop

1 appropriate beliefs, attitudes and behaviors  
2 related to a given risk, specifically an oil field  
3 worker who is given access to chemical  
4 information, can he develop appropriate beliefs  
5 related to that risk?

6 A. Can you ask the question again? I'm  
7 not sure I understand.

8 Q. Sure.

9 Your testimony is that it's not always  
10 in the public's best interest and the stakeholders  
11 will readily -- strike that, please.

12 Your testimony is that it is often  
13 assumed that presenting the public and  
14 stakeholders with factual information is always in  
15 the public's best interests, and the stakeholders  
16 will be readily able to develop appropriate  
17 beliefs, attitudes and behaviors related to a  
18 given risk. So my question is whether an oil  
19 field worker can develop appropriate beliefs,  
20 attitudes and behaviors related to a given risk if  
21 that oil field worker has access to the chemicals  
22 that are being used at a well site where he works?

23 A. So the very next sentence after that,  
24 what you are reading, says, "According to the  
25 EPA," US EPA, "research has shown this not to be

1 true." And I think you have to recognize that it  
2 is always in the public interests, so I think it  
3 just depends. And you're giving me a hypothetical  
4 and I can't answer because it will depend.

5 Q. The word appropriate is your word?

6 A. I believe it is.

7 Q. Is your testimony in front of you?

8 A. Yes. What I'm saying is I don't know  
9 if the EPA used the word appropriate because I  
10 didn't put it in quotes.

11 Q. If the EPA used the word appropriate  
12 you didn't put that in quotes?

13 A. I can look if you would like me to.

14 Q. As you are sitting here right now it  
15 appears to be your word?

16 A. That's why I said I believe it is,  
17 yes.

18 Q. I want to ask you about CAS numbers.

19 A. Do you want this back or me to keep  
20 it?

21 Q. I can get it.

22 MR. DAVIS: May I approach?

23 A. It's just hard to see you. I'm sorry.

24 Q. Are you familiar with CAS numbers?

25 A. Chemical Abstracts Service's registry

1 numbers, yes.

2 Q. Those are unique chemical identifiers?

3 A. Yes, in most cases.

4 Q. Anyone can take that number and do a  
5 Google search to find out information about a  
6 given chemical?

7 A. You should be able to, yes.

8 Q. A member of the public has a CAS  
9 number. Do they need someone with special  
10 training or experience to look up what chemical  
11 that refers to?

12 A. To look up the chemical name?

13 Q. Yes. Sure.

14 A. No.

15 Q. Could they relate a CAS number to the  
16 healthcare provider?

17 A. You mean communicate the CAS number  
18 directly to their healthcare provider?

19 Q. Yes.

20 A. Of course.

21 Q. Earlier this morning your -- well,  
22 strike that.

23 Earlier this morning NMOGA's lawyer I  
24 think jokingly asked you if Paxlovid has ever been  
25 used in New Mexico oil and gas operations. I

1 actually want to ask you that question. Do you  
2 know if Paxlovid has ever been used in New Mexico  
3 oil and gas operations?

4 A. I don't.

5 Q. Do you know if any specific PFAS has  
6 ever been used in New Mexico oil and gas  
7 operations?

8 A. As I answered earlier, only what I  
9 have seen disclosed in the frack book.

10 Q. So the reason that you know they have  
11 been used is because they have been disclosed?

12 A. Correct.

13 MR. DAVIS: I have no further  
14 questions.

15 THE HEARING OFFICER: Thank you,  
16 Mr. Davis.

17 Let's see, so that is Guardians, NEE.  
18 Now we move to the Division.

19 Mr. Tremaine.

20 MR. TREMAINE: Madam Hearing Officer,  
21 I believe my questions have been covered.

22 THE HEARING OFFICER: Terrific. Thank  
23 you very much.

24 EOG had said they would not have  
25 questions.

1                   Mr. Maxwell, do you have questions of  
2 Dr. Anderson?

3                   MR. MAXWELL: I do not have questions  
4 for Dr. Anderson. Thank you.

5                   THE HEARING OFFICER: Thank you.

6                   Ms. Mulcahy, do you have any redirect  
7 before I go to the Commission?

8                   MS. MULCAHY: Thank you. I have just  
9 one question.

10   REDIRECT EXAMINATION

11 BY MS. MULCAHY:

12                   Q. Dr. Anderson, Mr. Davis asked you just  
13 because we do not have toxicology data does not  
14 mean that the PFAS for which we have no data are  
15 not toxic, correct? Do you recall that question?

16                   A. If that's how he worded it, I think  
17 so.

18                   Q. Just because we do not have toxicology  
19 data for every PFAS, does that mean that they are  
20 toxic?

21                   A. No, it does not.

22                   Q. Thank you.

23                   MS. MULCAHY: Nothing further.

24                   THE HEARING OFFICER: Thank you,  
25 Ms. Mulcahy.

1                   Let's go to the Commission.

2                   Mr. Chair, do you have questions of  
3 Dr. Anderson?

4                   MR. RAZATOS: I do, Madam Hearing  
5 Officer.

6                   First off, thank you, Dr. Anderson.  
7 Very informative. We appreciate it just like we  
8 have appreciated all of our experts on this.

9                   Dr. Anderson, just to make sure, I  
10 heard that you are a board certified toxicologist,  
11 correct?

12                   THE WITNESS: Yes, I am.

13                   MR. RAZATOS: Okay. I just wanted to  
14 make sure that I heard that correctly.

15                   Doctor, in your direct testimony on  
16 Page 4 there is two bullet points. The second  
17 bullet point you state, and I will just quote it.  
18 I know you don't have a copy in front of you, but  
19 if you will hear me out and tell me if it sounds  
20 correct.

21                   You said, "Some compounds broadly  
22 identified as PFOS," and then you open a  
23 parenthesis and you say, "i.e, compounds that  
24 contain a single fully fluorinated methyl or  
25 methylene carbon moiety," close parenthesis, "are

1 routinely used as pharmaceuticals prescribed to  
2 children and adults such as Lipitor, Flonase,  
3 Paxlovid and Prozac, and are often prescribed with  
4 dosing regimens that maintain long-term exposure  
5 levels but have been deemed as safe for human  
6 use."

7 I'm sure you can see here as a  
8 Commission here that poses a little bit of a  
9 difference when we hear about PFOS. Do you mind  
10 just delving a little more into that, maybe  
11 clearing that up a little for us?

12 THE WITNESS: Sure, I would be happy  
13 to.

14 The key is that fluorines are attached  
15 to drugs all the time, and I'm not a  
16 pharmacologist. I don't exactly know what it does  
17 to help the drug in the body, but one of the  
18 references that I included there, there is a count  
19 of over 300 -- I think it was like over 360 --  
20 today on the market, drugs that include a fully  
21 fluorinated carbon. This one. Oh, I guess I  
22 should say one or more. It depends on how you  
23 define it. And that is part of the problem -- let  
24 me back up.

25 As actually even explained really

1 nicely by Dr. Hansen, drugs go through a really  
2 rigorous testing program, very, very tight  
3 toxicology/pharmacology regulations, so we  
4 understand the safe exposure. Right? Again, we  
5 recall everything may have some toxic properties,  
6 but we understand that if we are administering the  
7 exposure of these drugs to people at a certain  
8 frequency, duration, rate, that it will impart the  
9 intended consequence, not cause more adverse  
10 effects.

11           And so I think that's where the  
12 challenge is with using that definition is that  
13 you're bringing in a whole class of chemistries  
14 that do not have surfactant-like properties. They  
15 are not considered stable or persistent, and they  
16 have really robust toxicity information associated  
17 with them. The reality is that most people don't  
18 think of pharmaceuticals when you are thinking of  
19 PFAS. I'm sure that is not the intent but by  
20 using that as part of the chemical definition  
21 you're bringing that in.

22           We also know, increasing body of  
23 literature, that septic waste, individual septic  
24 waste is a potential contributor to PFAS in the  
25 environment. Now, do we care if it's a breakdown

1 product of Lipitor? Maybe not. But if you are  
2 detecting fluorines or gamma fluorines you might  
3 pick it up and then wrongly associate it with, you  
4 know, a release or something else. Right?

5 Does that help?

6 MR. RAZATOS: It did, because, you  
7 know, I actually appreciated our public comments  
8 this morning with our veteran who had about the  
9 fire retardant and how it has affected him.

10 THE WITNESS: Yes.

11 MR. RAZATOS: So we hear these things  
12 but then, you know, in your testimony you are  
13 saying that these pharmaceuticals have it as well.

14 THE WITNESS: Yes.

15 MR. RAZATOS: And so you can see the  
16 conundrum it causes for this Commission when we  
17 are looking at PFAS.

18 THE WITNESS: Let me clarify what I'm  
19 certain that gentleman was speaking to. When he  
20 was showing his blood results, those are the  
21 typical PFAS that we are concerned about. Those  
22 are specifically --

23 MR. RAZATOS: Sure.

24 THE WITNESS: -- PFOS, PFOA, most  
25 likely, right, because that's what is tested in

1 the blood.

2 MR. RAZATOS: Okay.

3 THE WITNESS: Especially associated  
4 with AFFF.

5 So the blood testing is not going to  
6 pick up the pharmaceuticals. They are degrading.  
7 They are probably not going to be in the body. So  
8 I don't want you to confuse his testimony with  
9 perhaps because he is on Lipitor. That's not at  
10 all --

11 MR. RAZATOS: I realized it was coming  
12 from --

13 THE WITNESS: Yes.

14 MR. RAZATOS: -- I got that. But what  
15 I'm trying to say is when we are looking at this  
16 in a broad sense, pharmaceuticals are in it as  
17 well --

18 THE WITNESS: That's right.

19 MR. RAZATOS: -- plus other daily  
20 items if you do a broad search on this.

21 THE WITNESS: That's right.

22 MR. RAZATOS: Now, if we look at, I  
23 believe you were here for most of the testimony  
24 that has gone on and I believe you heard that at  
25 the very basic the OECD definition for PFAS, which

1 is what the science and chemistry community has  
2 taken, so at the very basis, and again I realize  
3 you are not a chemist so I'm going to process  
4 that, but at the very basis from what you know of  
5 general chemistry plus your background in  
6 toxicology, even these pharmaceuticals fall under  
7 PFAS under that definition.

8 THE WITNESS: Using that broadest  
9 definition, yes.

10 MR. RAZATOS: Okay. Thank you.

11 MS. MULCAHY: If I may just interrupt  
12 for a moment, if there is more questions about  
13 what is in her testimony I have a copy of it here.  
14 I'm happy to provide it to the witness just so the  
15 Commissioners can ask her about it, if that's  
16 okay.

17 MR. RAZATOS: I think may be helpful,  
18 Madam Hearing Officer.

19 THE HEARING OFFICER: Thank you.  
20 Thank you.

21 MS. MULCAHY: I will represent on the  
22 record that there is no notes or anything else in  
23 this copy.

24 THE HEARING OFFICER: All right, thank  
25 you.

1 THE WITNESS: I appreciate it.

2 MR. RAZATOS: So, doctor, thank you.  
3 I appreciate it.

4 There was also the slides that you  
5 went through with Ms. Mulcahy earlier and you were  
6 talking about polymers and monomers, and just so I  
7 get it straight in my head -- it has been a while  
8 since I have done some chemistry so my apologies  
9 for that -- I believe you said that polymers are  
10 kind of big and bulky and you equated them to the  
11 football field, and monomers were the marbles, so  
12 when we are looking at the toxicological effects  
13 the concern is that monomers are the ones that  
14 tend to affect us more. These would be the ones  
15 that would be binding to proteins in humans and  
16 potentially causing adverse reactions.

17 THE WITNESS: Correct.

18 MR. RAZATOS: Okay. So and then I  
19 believe you stated that the PFOS and PFOAs are the  
20 ones that are small enough that could potentially  
21 cause us issues.

22 THE WITNESS: Correct.

23 MR. RAZATOS: Just so I know, and  
24 again for me, the methodologies that the -- that  
25 were presented as testing methodologies targeted

1 analyses for these compounds, would they be able  
2 to detect the PFOA and PFOS, do you know?

3 THE WITNESS: Yes, they do.

4 MR. RAZATOS: Okay. Okay.

5 THE WITNESS: Just to be clear, you  
6 are talking about the standardized EPA method.

7 MR. RAZATOS: Yes.

8 THE WITNESS: Yes.

9 MR. RAZATOS: Thank you, and I should  
10 have said that. Ms. Mulcahy I believe had said  
11 all the numbers to them and I believe the OCD also  
12 has it in their definition.

13 THE WITNESS: Correct. PFOA and PFAS  
14 are on all of the drinking water methods and  
15 groundwater methods.

16 MR. RAZATOS: Okay. Thank you for  
17 that.

18 You stated to everybody in the room  
19 and on the platform that the EPA released an  
20 update on their screening and increased it to 31  
21 PFAS.

22 THE WITNESS: I believe so.

23 MR. RAZATOS: Okay. Can you just  
24 again, because we have talked about targeted  
25 analysis and screenings and all of that, your

1 understanding of what this screening is.

2 THE WITNESS: Good question, and I  
3 apologize for not clarifying that better.

4 This is the EPA regional screening  
5 level table. You can Google it and find it. It's  
6 publicly available. It is what risk assessors and  
7 toxicologists across the country use to determine  
8 whether more evaluation at a given Superfund or  
9 contaminated site is necessary. So you will have  
10 a sample of, let's say, groundwater and it will  
11 have a concentration of chemical X. You look at  
12 the table and you find the lowest number, the most  
13 conservative, usually the residential will be it,  
14 and you see if that concentration in your sample  
15 is above or below.

16 MR. RAZATOS: Okay.

17 THE WITNESS: If it is below we have  
18 high confidence there is no concern, there is no  
19 increased concern for that chemical in that  
20 sample. If it is above, we need to do more  
21 evaluation. There might be risk. We might need  
22 more data. You might need to do a full risk  
23 assessment.

24 So it's a screening level to see if  
25 you are of no concern or do you need to do more

1 work to figure out what your concern is.

2 MR. RAZATOS: Okay.

3 THE WITNESS: And the screening levels  
4 are available for, gosh, I don't even know, maybe  
5 600 chemicals are on the full list. Groundwater,  
6 soil, surface water, air even, and for different  
7 receptors. These are human health based, so  
8 residential, construction worker, and I think like  
9 an indoor worker even for some reason.

10 MR. RAZATOS: Okay. Okay. Thank you  
11 for that clarification.

12 Also in, I believe it was the  
13 questioning that Ms. Mulcahy had for you, and you  
14 clarified that your concern with the specific  
15 statement that Dr. Hansen said, Dr. Hansen I guess  
16 said linked to one or several health effects, and  
17 you said it was better to say associated with.

18 Obviously it's a play on words, and I  
19 was trying to follow your line of reasoning, and I  
20 apologize, it was just a little bit of an overload  
21 on info. Could you clarify that for me as well,  
22 please?

23 THE WITNESS: It is just a more  
24 technically appropriate way that toxicologists and  
25 risk assessors refer to a body of literature

1 associating a given chemical's exposure to an  
2 adverse health effect, most commonly you see it  
3 associated with an impact HSDR, I don't know,  
4 everywhere, because again I don't know what her  
5 citation was, but usually is associated with.

6 MR. RAZATOS: Okay. Okay.

7 THE WITNESS: That's all.

8 MR. RAZATOS: It's just the way the  
9 lingo is used between the groups. Okay. I  
10 appreciate that. Thank you.

11 In your testimony, in your direct  
12 testimony you have a whole section -- let me find  
13 where it's at. I underlined it and now I can't  
14 find my underlines so please forgive me.

15 On Page 14 you start off with the  
16 chemophobia. And I guess I understand the premise  
17 of it, but again as a Commission, as a body that  
18 sits to make a rule or change these rules, I guess  
19 in your expertise as a toxicologist -- and you did  
20 mention it, but just clarify it in my head -- why  
21 would this cause chemophobia for the people of New  
22 Mexico if they knew what was in this whatever the  
23 substances are?

24 I guess, no offense, doctor, I know  
25 you're coming with your opinion and your

1 information, but it kind of sounds like you're  
2 saying the people of New Mexico can't make their  
3 own decisions on this. They will freak out and we  
4 will have hysteria here in the state.

5 THE WITNESS: Sure. That's not at all  
6 what I'm saying.

7 There is a whole body of literature on  
8 this. It's not just the one article. I think  
9 they are officially the ones that coined the term.  
10 But what it is pointing to is we need to consider  
11 the psychological distress, and again no judgment  
12 on whether it is valid or not. We are not  
13 invalidating --

14 MR. RAZATOS: Sure.

15 THE WITNESS: -- the feelings, but  
16 that needs to be taken into consideration. And we  
17 know from risk communication and social science  
18 that people perceive risk in a different way than  
19 we expect. It's not a facts-based perception of  
20 risk, and so the social science and the best  
21 practices around risk communication are really  
22 clear that you have to give people information  
23 about risk in context.

24 MR. RAZATOS: Okay.

25 THE WITNESS: And so we know that just

1 a list of chemicals -- there has even been studies  
2 where people, researchers went around and talked  
3 to people about dihydro-oxygen, and people freaked  
4 out. It's water, you know, but because they hear  
5 a chemical name.

6 Now, of course, probably quickly they  
7 are like, oh, it's just water, but the point is  
8 that people need to have the right information in  
9 the right context, and so disclosure of  
10 information -- and again to be clear, we are  
11 proposing full disclosure of information to OCD to  
12 allow them to work through the process, which as I  
13 understand it in normal cleanup programs, and so I  
14 would assume the same here, there is an  
15 opportunity to talk to the public, but you do it  
16 sort of in that process. Right?

17 MR. RAZATOS: Okay. Okay, I see the  
18 clarification. Thank you for that.

19 My last question to you is, as I said,  
20 you've been here for the majority. As you  
21 mentioned, you weren't here for the very first  
22 part on Tuesday, but you were also able to see the  
23 Oil Conservation Division's definition for PFAS.  
24 That does vary from the definition that NMOGA is  
25 proposing. Why is the NMOGA better?

1 THE WITNESS: Sure. Well, what I  
2 first want to say is that in practice, in reality  
3 for enforcement and sampling, the definitions are  
4 the same. We end up at the same place.

5 When considering a definition I think  
6 Dr. Richardson and I came at it assuming, of  
7 course, you are going to use the standard EPA  
8 methods. That's what we always use. It's  
9 helpful, I do agree, to have them enumerated so  
10 there is no ambiguity, and I especially appreciate  
11 the evergreen nature of it. I think that's  
12 actually pretty critical.

13 We have seen this analyte list grow,  
14 even just in recent history, and can assume that  
15 it will. Why is ours better? I think at the end  
16 of the day it comes down to the focus of the PFAS  
17 that, one, already adopted by EPA under the TSCA  
18 program. Two, as stated by EPA, and I personally  
19 professionally agree, encompasses the PFAS of most  
20 relevance and concern for this rulemaking. It is  
21 still a broad net, so our definition of two or  
22 more is thousands of PFAS. In practicality  
23 enforcing that, you use the limit.

24 So I think at the end of the day the  
25 analytical methods are what they are. It is not

1 within our ability to change them or make it go  
2 any faster. The definition just needs to ensure  
3 that it is protective of public health and, as I  
4 mentioned earlier, all of our definitions  
5 encompass the ones that really warrant the concern  
6 based on data we have today.

7 Secondly, it needs to be enforceable  
8 and tangible, something we all understand. I  
9 appreciate the added clarity of the methods that  
10 were laid out by the Oil and Gas Division.

11 MR. RAZATOS: I will ask also the  
12 question, because it's fair, we are looking at  
13 WildEarth Guardians's definition as well.  
14 WildEarth Guardians's definition, if I'm going to,  
15 you know, I'm going to play devil's advocate for  
16 lack of a better term, is going to stop all PFAS  
17 from ever being used. Why is it more prudent to  
18 look at the definition that NMOGA submitted in  
19 lieu of the definition that WildEarth Guardians  
20 submitted?

21 THE WITNESS: I think it comes down to  
22 the executable and enforceable question. So we  
23 heard a lot of conversation this week about the  
24 use of nontargeted analysis and use of  
25 nonstandardized labs. I'm not sure if that is

1 even an option under regulatory programs. It is  
2 very much of a research type of endeavor, so that  
3 I guess ambiguity would need to be clarified. And  
4 the reality is when you are in a site where there  
5 has been a release and you're trying to interpret  
6 the data, you want to make sure you are collecting  
7 reliable, repeatable, validated data that you can  
8 make sense of. And if you're, I guess -- at the  
9 end of the day we are all going to be collecting  
10 that same data using those methods, assuming that  
11 is the standardized method.

12 So, as I said earlier, there is really  
13 not at a practical level very much difference  
14 between the three definitions. It is where do you  
15 want the specificity documented and where do you  
16 want to draw the line about what matters to the  
17 environment and to the oil and gas as far as, you  
18 know, the requirement for the full ban.

19 MR. RAZATOS: Okay, excellent. Thank  
20 you.

21 No further questions for me. Thank  
22 you.

23 THE HEARING OFFICER: Thank you  
24 Mr. Chair.

25 Commissioner Bloom.

1 MR. BLOOM: All right, thank you.

2 Good afternoon, Dr. Anderson.

3 THE WITNESS: Good afternoon.

4 MR. BLOOM: My first question is  
5 Jerry's last question.

6 THE WITNESS: Perfect.

7 MR. BLOOM: It's all right. You may  
8 have said all you wanted to say on that but I will  
9 ask anyhow, how does NMOGA's PFAS definition help  
10 us more as regulators over OCD's or WildEarth  
11 Guardians'?

12 THE WITNESS: Again, I don't really  
13 think it is materially or practically any  
14 different at the end of the day. I really don't.

15 MR. BLOOM: And we have heard this  
16 throughout the past two days, but I think it was  
17 23 or 26 some states use this broader definition  
18 of PFAS that WildEarth Guardians is using. Did  
19 those states get it wrong?

20 THE WITNESS: No, but I do think the  
21 devil is in the details of those regulations, and  
22 so many of them are industry-specific, and also  
23 looking at industries that may also have single  
24 fluorinated carbons in them.

25 Also, I believe that every single one

1 of those definitions does narrow the scope to  
2 intentionally add it, and so by doing that they  
3 are also narrowing the scope to those PFAS that  
4 have the physical and chemical properties that  
5 would most likely be used. Right? The surfactant  
6 nature and stability, so again kind of getting to  
7 the same place.

8 MR. BLOOM: Dr. Anderson, you said the  
9 NMOGA definition gets it, quote, the PFAS of  
10 highest concern?

11 THE WITNESS: Yes, and that's EPA's  
12 conclusion first.

13 MR. BLOOM: When you say highest  
14 concern is that because of toxicity or because of  
15 the widespread use of those PFAS?

16 THE WITNESS: Both.

17 MR. BLOOM: Okay.

18 THE WITNESS: We need to have the  
19 exposure but these are the ones most likely to be  
20 in the environment. They have been used and then  
21 you have to have the potential for risk.

22 MR. BLOOM: Okay. Let's write that  
23 down.

24 You spent a good bit of time this  
25 morning saying that some PFAS and polymers are too

1 big to be toxic; is that correct?

2 THE WITNESS: They are too big to be  
3 even absorbed through a cell wall.

4 MR. BLOOM: Okay, and could they be  
5 toxic or dangerous to human health, do we know?

6 THE WITNESS: Highly unlikely and  
7 doubtful. For PTFE again we have decades and  
8 decades of use in the medical device industry with  
9 no data. We actually even have a rat study where  
10 they said PTFE powders up to 25 percent in the  
11 rat's diet. Again, it's not water soluble so it  
12 was a powder mixed in with their chow with no  
13 adverse effect in rats.

14 MR. BLOOM: And you said some are too  
15 small?

16 THE WITNESS: Some of the PFAS?

17 MR. BLOOM: Yes.

18 THE WITNESS: Too small for?

19 MR. BLOOM: For danger to human  
20 health.

21 THE WITNESS: Again, as a toxicologist  
22 unfortunately I have to be really accurate, but  
23 the size of the molecule dictates how it may move  
24 through our bodies, and so the smaller PFAS do not  
25 get taken back up to our, by our kidneys so they

1 are not biocumulative. They don't bind to the  
2 proteins the same way.

3 Now, if you have a sufficient enough  
4 exposure and a sufficient enough dose anything may  
5 cause problems. I just want to be very clear.

6 MR. BLOOM: I appreciate the caveats.

7 So then essentially what we are  
8 looking at are sort of the Goldilocks PFAS, not  
9 too big, not too small?

10 THE WITNESS: That's it exactly.

11 MR. BLOOM: Okay. And are there other  
12 PFAS in that Goldilocks territory, not too big,  
13 not too small, that we don't have an understanding  
14 yet of the potential health effects?

15 THE WITNESS: So size is not the only  
16 consideration when we are talking about, big and  
17 small. It's really how they bind to the receptors  
18 and what they are going to do. EPA has come up  
19 with 112 different categories for PFAS based on  
20 the chemical structure. I can only imagine that  
21 there are some of those 112 specific subcategories  
22 that may warrant additional testing or that they  
23 are working through the analysis, right, so they  
24 have, as I mentioned previously, they are doing  
25 rodent studies on over one hundred. They are

1 running thousands through in silico and in vitro  
2 testing, and they are actually initiating what is  
3 the new testing orders, which is one of the  
4 exhibits that I cite, where they are getting  
5 information on some of these subcategories on the  
6 surrogate. So they acknowledge that you can't  
7 extrapolate between different categories, but we  
8 need to fill some data gaps.

9 And so, unfortunately, I can't answer  
10 that question, but it is a very active area of  
11 research and is well-recognized that it is the  
12 subcategories, the groupings of these PFAS based  
13 on physical chemical characteristics to include  
14 size that really is going to dictate concern in  
15 addition to production volume and potential  
16 release to the environment.

17 MR. BLOOM: Are those 112 categories  
18 all covered by the NMOGA proposed definition?

19 THE WITNESS: I would doubt it but I  
20 would need to confirm. Oh, wait, I'm sorry. By  
21 the NMOGA definition. Yes, it would be because  
22 that's under the TSCA program. I apologize.

23 MR. BLOOM: Okay.

24 In my previous job I got to work on  
25 TSCA reauthorization. My understanding was that

1 we were seriously behind -- this was four or five  
2 years ago -- on PFAS health-related toxicology  
3 studies. Are those still forthcoming? Are we  
4 still behind?

5 THE WITNESS: What do you mean by  
6 behind?

7 MR. BLOOM: Behind to me means that we  
8 release potentially dangerous toxic chemicals into  
9 our supply chains and unleash them into the  
10 environment, they are being absorbed by our bodies  
11 and we don't know the health effects.

12 THE WITNESS: By my latest count TSCA  
13 had listed somewhere around 40,000 chemicals that  
14 are in commerce today. You know, we don't have  
15 toxic information on the vast majority,  
16 unfortunately. I just think it's the way the TSCA  
17 program is set up.

18 MR. BLOOM: I'm getting close to  
19 wrapping up here.

20 That's it. Thank you. Appreciate it.

21 THE WITNESS: You are very welcome.

22 THE HEARING OFFICER: Thank you.

23 Commissioner Ampomah.

24 DR. AMPOMAH: Thank you. I will make  
25 it very brief. You do have a copy of your direct

1 testimony. I'm going to walk through that a  
2 little bit.

3 On Page 3 of your direct testimony,  
4 Item Number 6, so in there you talk about where it  
5 states that PFAS, an exceptionally toxic group of  
6 chemicals now present very long-term and  
7 persistent public health. Now you're saying that  
8 this statement is factually inaccurate and  
9 misleading. So my question to you is that, is it  
10 NMOGA's position that the Commission should not  
11 ban all PFAS?

12 THE WITNESS: Could you repeat the  
13 question? Should not?

14 DR. AMPOMAH: Is it NMOGA's position  
15 that the Commission should not ban all PFAS.

16 THE WITNESS: Okay, no. It's my  
17 position that the definition for how you define  
18 PFAS in your ban needs to be something that can be  
19 enforced and attainable, has no ambiguity. But I  
20 agree with that caveat of banning PFAS for use in  
21 hydraulic fracking.

22 DR. AMPOMAH: So let's be more  
23 specific on that. So NMOGA's position is to more  
24 or less support the science-based ban of PFAS.

25 THE WITNESS: Correct, which is

1 personally why I also appreciate the evergreen  
2 nature of OCD's added because we understand that  
3 the science is going to evolve.

4 DR. AMPOMAH: Okay. I think I won't  
5 give you this one.

6 On Page 8, the earlier PFAS, Moreover  
7 of nearly 184,000 records of hydraulic fracking  
8 projects in FracFocus nationwide, only  
9 approximately 1600 reports of use of PFAS.

10 So do you know specifically how much  
11 of these are being used in New Mexico?

12 THE WITNESS: I do not, and I want to  
13 be clear I'm citing the GSI response paper, that  
14 is Connor, et al. I'm a co-author on that, but I  
15 wrote the toxicology migratory piece.

16 DR. AMPOMAH: And you didn't write the  
17 portion that reviewed the materials from  
18 FracFocus?

19 THE WITNESS: Correct. That's why  
20 they are cited.

21 DR. AMPOMAH: Okay. I'm pretty sure  
22 that NMOGA's next witness probably can help us on  
23 that one so I will save that. I will save that.

24 THE WITNESS: Yes.

25 DR. AMPOMAH: Now in that same paper,

1 so as we go down you're talking about 99 percent  
2 of the fraction projects were more without any  
3 such additives, but when you come down you talk  
4 about with many thousands of other fraction  
5 projects completed in the U.S. there is no  
6 evidence of already impact origins where hydraulic  
7 fracturing has impaired groundwater or surface  
8 water.

9 So you cited Connor 2021, and then you  
10 reference additional references to support this  
11 claim?

12 THE WITNESS: I haven't seen any  
13 references to support the contrary.

14 DR. AMPOMAH: Yes, and also based on  
15 the testimony we have gone through from Tuesday up  
16 to now, especially from WEG witnesses, you know,  
17 how about your personal issues that they pointed  
18 out? You know, looking at what happened in  
19 Pennsylvania and even West Virginia, do you still  
20 hold this statement to be true?

21 THE WITNESS: I didn't critically  
22 evaluate those studies so I think you will have to  
23 ask Dr. Richardson, but as quoted from that paper  
24 and from the analyses of my colleagues I would  
25 agree with it, yes.

1 DR. AMPOMAH: Okay, I will put that  
2 down to ask the next witness.

3 THE WITNESS: Sorry, Dr. Richardson.

4 DR. AMPOMAH: Now with regard to  
5 NMOGA's definition that proposing with regards to  
6 PFAS, how many compounds are we -- how many  
7 chemicals are we dealing with here?

8 THE WITNESS: Oh, I was really afraid  
9 someone was going to ask that question. I can't  
10 tell you. It is thousands. Our definition,  
11 that's what you are asking?

12 DR. AMPOMAH: Yes.

13 THE WITNESS: It's still thousands.  
14 There is no good database to filter and try to get  
15 that information out. I apologize.

16 DR. AMPOMAH: Okay. So this one, I'm  
17 looking at the proposed PFAS definition NMOGA  
18 Rebuttal Exhibit E30.

19 So I'm looking at the charts that you  
20 showed where you have the PFAS polymers and  
21 nonpolymers. So I'm going to focus on the  
22 definition. You said that the PTFE, those ones  
23 are big.

24 THE WITNESS: Correct.

25 DR. AMPOMAH: We have already talked

1 about that so I will not focus on that.

2 And also you talked about the PFOA and  
3 PFOS. Those are mostly the toxic ones; is that  
4 true? Is that correct?

5 THE WITNESS: Correct. They are the  
6 ones that have the very low regulatory value in  
7 this country.

8 DR. AMPOMAH: Okay, so the other one,  
9 that is a polyfluoroalkyl substances, that is one  
10 on the extreme right on the chart.

11 MS. MULCAHY: Dr. Ampomah?

12 DR. AMPOMAH: Yes.

13 MS. MULCAHY: If I may interrupt, if  
14 it would be helpful for you I'm happy to project  
15 that up on the screen.

16 DR. AMPOMAH: Yeah.

17 MS. MULCAHY: I'm sorry, I don't have  
18 a copy of that in paper for the witness. My  
19 apologies.

20 THE WITNESS: You can keep going. I  
21 know what you are referring to.

22 DR. AMPOMAH: So I'm focusing on the  
23 last part, the polyfluoroalkyl substances. And  
24 probably even though this witness can probably  
25 respond to this but I will ask anyway, this family

1 of PFAS, has it been used in the oil and gas  
2 industry?

3 THE WITNESS: I cannot answer that  
4 question.

5 DR. AMPOMAH: Okay.  
6 You talk about they can degrade.

7 THE WITNESS: The poly?

8 DR. AMPOMAH: Yes.

9 THE WITNESS: Yes, sir.

10 DR. AMPOMAH: The poly, they can  
11 degrade. Can it be toxic?

12 THE WITNESS: Which, the poly?

13 DR. AMPOMAH: Yes.

14 THE WITNESS: So that class of  
15 chemicals does include GenX already, so that is  
16 one of the ones that we do have an MCL for. The  
17 62:FTOH and a myriad of other compounds for which  
18 we do have toxicity information for and values,  
19 yes.

20 DR. AMPOMAH: And some of them are a  
21 little bit toxic, or highly toxic?

22 THE WITNESS: Some of them at certain  
23 exposure levels, and depending on how you are  
24 exposed, can be associated with adverse health  
25 effects.

1 DR. AMPOMAH: So does OCD's and  
2 NMOGA's definition include this type of PFAS?

3 THE WITNESS: Yes. Our definition  
4 includes everything that you would see on the  
5 screen.

6 DR. AMPOMAH: On this.

7 THE WITNESS: In that, yes.

8 DR. AMPOMAH: Okay, and what is not  
9 included in your definition that you can share  
10 with us?

11 THE WITNESS: Only the single  
12 fluorinated compounds. So the carbons -- only the  
13 compounds that have one carbon that has fluorines  
14 fully attached. That's it.

15 DR. AMPOMAH: And that is a  
16 fundamental of WEG's definition, too?

17 THE WITNESS: That is where they start  
18 their definition. We start ours at the next layer  
19 up, yeah.

20 DR. AMPOMAH: What about OCD's  
21 definition?

22 THE WITNESS: The first part of their  
23 definition -- they have two parts -- matches  
24 WEG's.

25 DR. AMPOMAH: Okay.

1 THE WITNESS: I'm sorry, do you prefer  
2 to be called Guardians?

3 MR. DAVIS: We call ourselves  
4 Guardians but I think people know what you are  
5 referring to when you say WEG.

6 THE WITNESS: Okay, thank you.

7 DR. AMPOMAH: Okay.

8 Now, does NMOGA's definition account  
9 for future growth of PFAS that could be added?

10 THE WITNESS: Yes, it does, because  
11 our definition does include thousands of  
12 chemicals -- right -- under the assumption that as  
13 executed and enforced in the environment those  
14 analytical methods will continue to grow.

15 DR. AMPOMAH: Okay.

16 Now let may ask you this, what is the  
17 impact of the potential burn on PFAS on NMOGA?

18 THE WITNESS: I cannot answer that  
19 question.

20 DR. AMPOMAH: Okay, definitely. I  
21 will save that.

22 You know there has been a lot of  
23 testimony presented to us throughout the whole  
24 week. I want to ask you, is there anything that  
25 you agree with with the other witnesses?

1 THE WITNESS: Is there an issue that  
2 I --

3 DR. AMPOMAH: Yes, that you agree with  
4 all the other witnesses, especially from  
5 Guardians.

6 THE WITNESS: Yes, of course. I mean  
7 I think we are all in agreement that we, it's  
8 prudent to ban by some definition, which is where  
9 we disagree, PFAS in hydraulic fracturing fluid.  
10 We are all in agreement that disclosure of all the  
11 chemicals used is prudent. To whom is where we  
12 disagree, and as we have heard multiple  
13 testimonies we are all in agreement that there are  
14 concerns for certain PFAS in the environment and  
15 that those concerns are extremely valid.

16 DR. AMPOMAH: Okay. There is one I  
17 think that sounds like nobody else talked about or  
18 asked about it. On Page 11, I also recommend that  
19 the revised language include intentionally audit  
20 as part of the definition of PFAS.

21 So based on all the testimony that we  
22 have listened to throughout the whole week do you  
23 still stand by that?

24 THE WITNESS: I do. I think in my  
25 mind that provides the specificity to the

1 industry. And I think that's just important.

2 DR. AMPOMAH: Is important. Now,  
3 NMOCD is striking that down. So how do you see  
4 this will impact NMOGA?

5 THE WITNESS: I can't answer for how  
6 that would impact NMOGA. It is my understanding  
7 from listening to the testimony, though, that they  
8 are going to clarify that this applies to the  
9 additives, and that's essentially the same thing.

10 DR. AMPOMAH: Okay, so you just are  
11 going to focus on the additives and not  
12 necessarily, let's say, the stream water or --

13 THE WITNESS: That's my understanding  
14 from listening to the testimony here this week,  
15 yes.

16 DR. AMPOMAH: And that satisfied the  
17 intentionality of the PFAS?

18 THE WITNESS: I believe it does.

19 DR. AMPOMAH: Okay.

20 Thank you. No further questions.

21 THE HEARING OFFICER: Thank you very  
22 much, Commissioner. Any reason not to excuse Dr.  
23 Anderson at this time?

24 Thank you very much for your  
25 testimony.

1 THE WITNESS: With pleasure. It has  
2 been an honor. Thank you.

3 THE HEARING OFFICER: Thank you.

4 (Witness excused.)

5 (Discussion off the record.)

6 MS. MULCAHY: May I have just a moment  
7 to get the giant binder for Dr. Richardson?

8 THE HEARING OFFICER: Yes. Yes.

9 MS. MULCAHY: Thank you.

10 Does the Commission have a copy of  
11 Dr. Richardson's --

12 THE HEARING OFFICER: There is a copy  
13 of it back there.

14 MS. MULCAHY: Okay. When every one  
15 has their giant binders, you just let me know.

16 MR. DAVIS: Madam Hearing Officer,  
17 before we start with the next witness I would like  
18 to move WildEarth Guardians Exhibit 1, which is  
19 the first submitted proposed rule, and WildEarth  
20 Guardian Exhibit 2, which is proposed legal notice  
21 into evidence.

22 THE HEARING OFFICER: All right, thank  
23 you.

24 Any objections to Guardians 1 and 2?

25 Okay, they are admitted. Thank you.

1 (WildEarth Guardians Exhibit  
2 Nos. 1 and 2, received in  
3 evidence.)

4 WHEREUPON,

5 STEPHEN RICHARDSON, Ph.D.,

6 A Witness called for examination, having  
7 been first duly sworn, was examined and testified  
8 as follows:

9 THE HEARING OFFICER: Thank you.

10 Go ahead, Ms. Mulcahy.

11 DIRECT EXAMINATION

12 BY MS. MULCAHY:

13 Q. Hi, Dr. Richardson.

14 A. Hello.

15 Q. Dr. Richardson, could you please spell  
16 your name for the record?

17 A. Last name is Richardson,  
18 R-i-c-h-a-r-d-s-o-n, and first name is Stephen  
19 S-t-e-p-h-e-n.

20 Q. Thank you.

21 Dr. Richardson, did you provide direct  
22 written testimony which is marked as Exhibit D as  
23 in dog and attached Exhibits D1 through D14 for  
24 this hearing?

25 A. I did.

1 Q. Do you have any changes or additions  
2 to your direct testimony and exhibits today?

3 A. I do not.

4 Q. Do you adopt your written testimony  
5 marked as Exhibit D as your sworn testimony today?

6 A. I do.

7 Q. Okay. Is your testimony true and  
8 accurate, to the best of your knowledge?

9 A. It is.

10 Q. Okay.

11 MS. MULCAHY: Madam Hearing Officer, I  
12 would move for the admission of NMOGA Exhibit D as  
13 in dog through D14.

14 THE HEARING OFFICER: All right, any  
15 objections to NMOGA Exhibits D through D14?

16 Okay, they are admitted. Thank you.

17 (NMOGA Exhibit Nos. D through  
18 D14, received in evidence.)

19 MS. MULCAHY: Thank you.

20 BY MS. MULCAHY:

21 Q. Dr. Richardson, could you please  
22 provide a brief summary of your testimony today?

23 A. Be happy to.

24 So, again, my name is Steve  
25 Richardson. I'm an environmental engineer with

1 GSI Environmental, and one of my charges in my  
2 work with NMOGA here -- there is three of them --  
3 one is to assist with the definition of PFAS as  
4 Dr. Anderson had mentioned. The second is to look  
5 at FracFocus disclosures, looking at the PSR, the  
6 Physicians for Social Responsibility report, and  
7 see, basically try to recreate their number, so to  
8 speak, and come up with my own review of those, of  
9 the disclosures.

10 And third, from a fate and transport  
11 standpoint of PFAS in the environment, so to  
12 provide that level of expertise as well. So how  
13 would PFAS move in the environment and then how  
14 does that tie in with what Dr. Anderson mentioned  
15 today. To that end, the takehome here is, again  
16 as Dr. Anderson mentioned, our proposed definition  
17 is one that mirrors or is very similar to the EPA  
18 TSCA definition, right, and so that has been  
19 already mentioned.

20 Second, in terms of the FracFocus  
21 disclosure we ended up with very similar results  
22 to what was in the PSR document in terms of the  
23 PFAS that had been disclosed, and that is PTFE,  
24 polytetrafluoroethylene, and the big one which we  
25 have shortened as pFEG, which is fluoroalkyl

1 alcohol-substituted polyethylene glycol. And I  
2 hope that's the only time have I to say that in  
3 this hearing. So that is pFEG.

4 Again, that is not a true acronym for  
5 it. It's something that we came up with to make  
6 it easier so that we didn't have an additional ten  
7 pages in our testimony.

8 And then last was to really discuss,  
9 you know, should there be PFAS in the environment  
10 how would they behave. And then in terms of, you  
11 know, how would a polymer behave that is clearly  
12 water soluble versus one that may be a smaller  
13 chain and more mobile, what does that look like,  
14 and so that is where my expertise came in.

15 Q. Thank you, Dr. Anderson.

16 MS. MULCAHY: I will pull up what has  
17 been labeled as Guardians Exhibit 8 if you can  
18 give me one moment.

19 Madam Hearing Officer, may I share my  
20 screen?

21 THE HEARING OFFICER: Yes.

22 Sheila, please give her permission.

23 MS. MULCAHY: Thank you.

24 BY MS. MULCAHY:

25 Q. Dr. Richardson, did you review

1 Guardians Exhibit 8?

2 A. I did.

3 Q. Is Guardians Exhibit 8 the statutes  
4 and regulations from other states that have banned  
5 PFAS?

6 A. That's correct.

7 Q. Did you in your review of Guardians  
8 Exhibit 8 notice anything in common about all of  
9 these examples from other states?

10 A. Yes. As has been previously stated,  
11 all of these use the one fully fluorinated carbon  
12 definition. Second, I believe, as already has  
13 been mentioned, they are also industry-specific as  
14 you can see in the parentheses that are going  
15 through. And then third, which was just briefly  
16 mentioned at the end, is that they all do include  
17 as part of their regulations intentionally added  
18 some component, whether it is intentionally added  
19 PFAS or just intentionally added as part of their  
20 rule.

21 Q. I'm going to pull up just one specific  
22 definition in this exhibit. I don't want to go  
23 through all of them, but -- sorry. I'm not trying  
24 to make anybody motion sick.

25 Dr. Anderson -- excuse me,

1 Dr. Richardson.

2 A. It could be challenging today at this  
3 point.

4 Q. Dr. Richardson, are we looking at the  
5 Maryland statute here that I have pulled up on the  
6 screen?

7 A. Yes, we are.

8 Q. I'm going to read from the yellow  
9 highlighted part. "Intentionally added means the  
10 act of deliberately using a chemical in the  
11 formation of a product where the chemical's  
12 continued presence is desired in the product to  
13 provide a specific characteristic."

14 Did I read that correctly?

15 A. You did.

16 Q. Is this Maryland definition that I  
17 just read out loud here on Guardians Exhibit 8  
18 similar to the definition of intentionally added  
19 in all of these other states?

20 A. They are all very similar, yes.

21 Q. Based on your extensive knowledge of  
22 PFAS, does it make sense to include intentionally  
23 added as a definition in this rulemaking?

24 A. In my opinion, yes. And really that's  
25 what it comes down to. PFAS, as we have discussed

1 already in this hearing, there are a variety of  
2 different sources. It's not -- the way I would  
3 look at it is in my career I have dealt with  
4 trillium hydrocarbons, chlorinated solvents. I  
5 spent a lot of time doing PFAS remediation,  
6 treatment and remediation. Chlorinated solvents  
7 in the environment are very easy to figure out  
8 what the source is. There is not going to be very  
9 many, right, so if it's a dry cleaner, well, there  
10 is your dry cleaner right there.

11 With PFAS it's very different because  
12 there can be a variety of sources and because of  
13 their ubiquitous nature, as we have discussed.  
14 They are in our consumer products. We consume  
15 them. They are in our wastewater. They are in  
16 our septic systems. Now they are in surface water  
17 and so on, so in this case when you are talking  
18 about adding, intentionally added, this is not a  
19 terminology that you would usually use with  
20 another contaminant, another class of contaminant.  
21 This is one that is really unique to PFAS because  
22 at the end of the day it is very hard at the end  
23 to determine where that PFAS came from. Right?  
24 Whether we are using source water -- in the case  
25 for hydraulic fracturing, that could be municipal

1 water, that could be private well water -- which  
2 could be already containing PFAS in it.

3 Q. Thank you, Dr. Richardson.

4 Did NMOGA include a definition of  
5 intentionally added in its proposed revision?

6 A. They did.

7 Q. And could you explain why NMOGA did  
8 include that?

9 A. For exactly that reason. Yeah, it's  
10 just the source water aspect. Again, water being,  
11 what, close to 99 percent? It's a very large  
12 component of a frack job, and so at the end of the  
13 day when you are dealing with the source water  
14 being, containing PFAS, that has to be taken into  
15 account.

16 Q. Would it be fair then to say,  
17 Dr. Richardson, that NMOGA's proposal is  
18 consistent with the states identified here in  
19 Guardians Exhibit 8?

20 A. It is consistent with respect to  
21 intentionally added, yes.

22 Q. Okay. And Dr. Richardson, did you  
23 hear the testimony from Mr. Powell this week?

24 A. I did.

25 Q. And did you hear the testimony that

1 the Oil Conservation Division has proposed a  
2 definition that doesn't necessarily say  
3 intentionally added but makes clear that the  
4 Division is focused on a chemical additive?

5 A. It did.

6 Q. Would you agree with that approach as  
7 well?

8 A. I certainly think that they do align.  
9 Yes, I do think that there is some similarities  
10 there that we could look at, yes.

11 Q. Dr. Richardson, did you review  
12 Guardians' definition of PFAS?

13 A. I did.

14 Q. Dr. Richardson, did you review  
15 Dr. Hansen's definition of PFAS?

16 A. I did.

17 Q. Were they similar?

18 A. Yes, they were similar. One fully  
19 fluorinated definition.

20 Q. Okay, thank you.

21 MS. MULCAHY: I'm going to pull up  
22 what is Guardians' Exhibit 1.

23 Q. Dr. Richardson, is this Guardians'  
24 definition of PFAS which I have displayed here on  
25 the screen in Guardians Exhibit 1?

1           A.       It is.

2           Q.       Do you agree with Guardians'  
3 definition of PFAS as displayed here?

4           A.       I do not.

5           Q.       Why not?

6           A.       For the reasons that Dr. Anderson  
7 mentioned before. Again, that we are focused on  
8 PFAS that are most relevant. And right now, as  
9 was mentioned before, our definition excludes the  
10 single fully -- the single fully fluorinated  
11 compounds, and there is reason for that, one  
12 reason being that in a hydraulic fracturing  
13 situation you are going to want to use -- in the  
14 cases where PFAS have been used and disclosed in  
15 FracFocus they were used mainly for friction  
16 reduction, and we know that hydraulic fracturing  
17 is a high temperature, high pressure situation,  
18 and so those types of compounds would not be  
19 useful in any way in a hydraulic fracturing job.

20                   So in terms of narrowing, I mean, it's  
21 still a pretty broad definition. I want to make  
22 sure that is clear. But the other part being in  
23 terms of the methods, right, we know that the  
24 single fully fluorinated are not covered by or are  
25 outside of the methods that were listed right

1 through OCD's definition.

2 Q. And so when you say outside the  
3 methods you mean outside the standardized method  
4 that the Division listed in its definition?

5 A. That's correct. They are not  
6 currently in those definitions or in those  
7 methods.

8 Q. And so when you say in those methods  
9 do you mean that those analytical methods cannot  
10 analyze for a single fully fluorinated carbon?

11 A. They cannot.

12 Q. So how would a method -- without a  
13 method -- sorry. Let me back up for a second  
14 here. I want to clarify something.

15 Would a single fluorinated carbon atom  
16 be of any use in hydraulic fractions?

17 A. In my understanding of how this works,  
18 no.

19 Q. And --

20 A. Let me just clarify. From a friction  
21 reduction standpoint, which is really where I  
22 focused.

23 Q. Without a method to test for a single  
24 fully fluorinated carbon atom, how would a  
25 regulator use this definition to regulate?

1 A. They wouldn't.

2 Q. Would a regulator be able to enforce a  
3 ban on PFAS under Guardians' and Dr. Hansen's  
4 definition of a single fully fluorinated carbon  
5 atom?

6 A. No.

7 Q. Why not?

8 A. Because there is no way to actually  
9 analyze for them. There is not an enforceable way  
10 to execute that rule.

11 Q. Thank you.

12 MS. MULCAHY: I'm going to now pull up  
13 New Energy Economy Exhibit A, which is  
14 Dr. Hansen's direct testimony. I'm just scrolling  
15 before I share so I don't make everybody motion  
16 sick.

17 Q. Dr. Richardson, did you review  
18 Dr. Hansen's direct testimony?

19 A. I did.

20 Q. Okay. I'm going to read from Page 8,  
21 Lines 18 through 20 of Dr. Hansen's direct  
22 testimony. Dr. Hansen states, "PFAS are mobile in  
23 the environment, e.g. via air, atmospheric  
24 deposition, groundwater, rain/snow, desorption  
25 from oil/sludge, surface water, sea foam, and thus

1 are not easily contained or controlled."

2 Did I read that correctly?

3 A. You did.

4 Q. Dr. Richardson, do you agree with this  
5 statement?

6 A. No, not entirely, no.

7 Q. Okay. Let's break it down. Are there  
8 any parts that you can agree with?

9 A. Well, I think it's fair to say that we  
10 do know that PFAS, there are papers out there that  
11 show that PFASes up in the Arctic, right, that is  
12 in snow, that it's in rain at certain locations,  
13 there are papers that do support that so I think  
14 from a not easily contained or controlled aspect I  
15 think I can say that I would agree.

16 However, from a PFAS or all mobile or  
17 mobile in the environment, that would be  
18 incorrect. We do have PFAS that are not mobile at  
19 all. And, again, we have gone through this with  
20 the large molecule versus the small molecule  
21 discussion, which we can go into again if you  
22 like.

23 Q. I don't want to go into the entire  
24 discussion again, but I am curious. From your  
25 perspective in the environmental remediation

1 world, we heard about it from Dr. Anderson in  
2 terms of toxicology --

3 A. Yes.

4 Q. -- but I'm asking you in terms of  
5 environmental remediation, does molecule size  
6 matter?

7 A. Molecular size does matter, yes.

8 Q. Why?

9 A. Well, again, if you are looking from a  
10 fate and transport standpoint -- and, again, I  
11 just need to maybe clarify to the Commission my  
12 specialty is groundwater. That's where I spend a  
13 lot of my time, my profession, so soil and  
14 groundwater. So a lot of my examples may come  
15 from that, there may be a lot of groundwater  
16 discussion so if you are an air fan I apologize.  
17 I will use a lot of groundwater analogies here.

18 But if you are talking about a large  
19 compound or large molecular size or molecular  
20 weight, those compounds are going to be likely  
21 more hydrophobic. So in the case of a PFAS  
22 molecule it will likely be that hydrophobic tail.  
23 As we tack on, you add those Lego blocks, they get  
24 bigger, you will have a larger hydrophobic tail  
25 that will end up in compounds that are more likely

1 to desorb to soil, or to organic material that is  
2 in the subsurface. They are also going to be less  
3 water soluble as a result, so as a result of being  
4 less water soluble, more hydrophobic, they won't  
5 move at all. In fact, some as large as those  
6 polymers likely won't go very far at all.

7 Q. Okay, thank you.

8 And I also heard you say that the PFAS  
9 weights are different. In terms of an  
10 environmental remediation process, why does that  
11 matter?

12 A. From cleanup it matters, and I think  
13 the simplest example would be very similar. Just  
14 like subsurface, if we are looking at a granular  
15 activated carbon filter, for example, which is  
16 what we use to treat water, it's a standard  
17 treatment system. Larger molecular weight  
18 compounds will get caught in that filter whereas  
19 smaller ones may pass through.

20 So molecular weight or molecular size  
21 plays a role -- it's not the only role, but plays  
22 a role when it comes to designing in this case a  
23 filter on any sort of treatment system.

24 Q. I heard you say it matters in terms of  
25 cleanup. We have also heard testimony from other

1 witnesses as well as members of the public that  
2 PFAS chemicals are forever. Are there ways to  
3 clean up PFAS?

4 A. Yes, there are.

5 Q. Could you sort of explain some of  
6 those ways?

7 A. I would be happy to, yes. And I would  
8 like to say I'm not here to make a sound bite or  
9 anything, but I do understand from a stability  
10 standpoint the reason why the term forever  
11 chemicals has come about.

12 From an environmental engineering  
13 standpoint they are not forever chemicals at all.  
14 There are ways to remove them from the environment  
15 and there are ways to destroy them and I do this  
16 on a routine basis.

17 So, for example, the only catch for  
18 PFAS, and again I think there has been a lot of  
19 discussion here, is that they do biodegrade. The  
20 polysides degrade, as we talked about. They move  
21 to those terminal end products, which are all the  
22 pers, but other than that that's one of the big  
23 factors that separates PFAS from maybe others.  
24 Chlorinated solvents can degrade into subsurface.  
25 We have aerobic bacteria that do a lot of work on

1 petroleum hydrocarbons on our behalf. So that  
2 component, that biodegradation component is  
3 limited when it comes to PFAS.

4 Now, like I said, I want to repeat,  
5 poly will degrade to per, but then you end up with  
6 those terminal products.

7 In terms of just treatment itself, it  
8 starts with some of the simplest things. Just  
9 like I mentioned, granular activated carbon works  
10 very well for compounds like PFOA and PFOS, quite  
11 frankly. And so in my world, you know, again, I  
12 do a lot of work in the nonpolymeric and those are  
13 the ones of focus, those are the regulated  
14 compounds. So when you look at the suite of  
15 nonpolymer compounds, you know, relatively PFOA  
16 and PFOS are considered longer chain compounds.

17 So I know it's a little confusing  
18 because we talk about polymers being super long.  
19 Imagine polymers being super, super long, and then  
20 we are talking about the smaller group, and of  
21 that smaller group there is some longer chains and  
22 some shorter chains. So if you look at granular  
23 activated carbon, for example, it is very  
24 effective for PFOS in particular for removal,  
25 somewhat effective for PFOA, PFHxS as well. And

1 then as you move down to the size of the molecular  
2 weight, you know, the weight gets smaller, maybe  
3 it becomes less effective.

4 And so you -- you know, we don't just  
5 throw our hands up in the air. We end up saying  
6 what are the other options. So there is ion  
7 exchange resins, which allow us to treat a broader  
8 suite of PFAS. You can go to reverse osmosis.  
9 These are technologies that we use to clean our  
10 water already. So reverse osmosis,  
11 nanofiltration.

12 But that only solves part of the  
13 problem. So we have now taken a very -- and again  
14 we all agree that PFAS, the concentrations in the  
15 environment can be very low, which makes it very  
16 difficult as an environmental engineer to clean --  
17 can be very difficult to clean them up. So one  
18 solution is you concentrate, so you in this case  
19 you would extract water, run it through a granular  
20 activated carbon system, we would run it through  
21 an ion exchange system. You then create a  
22 concentrate which then can be used for destructive  
23 technologies. And destructive technologies in  
24 general will involve adding energy to the system  
25 so things that I work on are plasma technologies,

1 supercritical water oxidation. There is a whole  
2 host, sonolysis.

3 So these are technologies that sound  
4 kind of farfetched but they actually are  
5 commercially available today. And so in general I  
6 don't want to get into each, I would be happy to  
7 talk more plasma and sonolysis and supercritical  
8 water oxidation, but the simple, you know,  
9 commonality between these technologies is that you  
10 are adding energy to the system. If you add  
11 energy you can break that carbon fluorine bond.  
12 Once you break that fluorine bond then you can  
13 start dealing with the per parts of the compounds.  
14 You break it up into little bits.

15 Q. Thank you, and we have heard a lot  
16 about terminal products and you mentioned terminal  
17 products just now. Can you treat terminal  
18 products of PFAS?

19 A. Yes, absolutely.

20 MS. NANASI: Madam Hearing Officer, I  
21 would object to any further testimony or questions  
22 about this issue. There is no -- there is nothing  
23 in Dr. Richardson's testimony about whether you  
24 can clean PFAS up or not. It's just irrelevant to  
25 this topic.

1 THE HEARING OFFICER: Actually my  
2 understanding is that she directed his attention  
3 to some testimony by Dr. Hansen and that that is  
4 what he is rebutting.

5 Am I correct?

6 MS. MULCAHY: That is exactly correct.  
7 I directed him to testimony from Dr. Hansen that  
8 these chemicals are persistent and forever, and  
9 I'm having him address that specific question.

10 THE HEARING OFFICER: Please keep  
11 going.

12 MS. MULCAHY: Thank you.

13 BY MS. MULCAHY:

14 Q. Dr. Richardson, did you -- did  
15 Dr. Hansen mention produced water in her direct  
16 and rebuttal testimony?

17 A. She did.

18 Q. Okay. I'm going to scroll to Page 12  
19 of Dr. Hansen's rebuttal -- excuse me, direct  
20 testimony. On Page 12, Lines 8 through 12  
21 Dr. Hansen states, "A peer-reviewed study (Jiang  
22 2022) documented levels of several PFAS in  
23 produced water samples in the Permian Basin.  
24 Additionally, this study underscores the need to  
25 establish a comprehensive chemical

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1 characterization of PW," which is produced water,  
2 "to better understand environmental and human risk  
3 as well as plan for effective treatment of the  
4 PW," produced water, "and associated wastes."

5 I read that correctly?

6 A. You did.

7 Q. This Jiang article, Jiang 2022, is  
8 that the same article that Dr. Hansen cited in her  
9 rebuttal testimony?

10 A. Yes, it is.

11 Q. Are you familiar with this article by  
12 the author Jiang?

13 A. I am.

14 Q. Have you reviewed this article by the  
15 author Jiang?

16 A. I have.

17 Q. Is this 2022 Jiang article the same  
18 article that Dr. Spear identified in his testimony  
19 as Guardian Exhibit 88 and called the Dr. Passoo  
20 (ph.) testimony?

21 A. It is.

22 Q. From here on out I'm going to call it  
23 the Jiang article if that's okay.

24 A. That's how I know it so thank you.

25 Q. Dr. Richardson, did the authors of the

1 Jiang article set out to examine PFAS?

2 A. They did not.

3 Q. Do you recall what were the authors of  
4 that article actually examining?

5 A. They were just looking at produced  
6 water quality and looking at ways again using that  
7 characterization information for a possible  
8 beneficial reuse that was listed in the first part  
9 of the paper.

10 Q. Do you agree with Dr. Hansen's  
11 conclusion here that I have displayed that the  
12 Jiang article supports a finding that there is  
13 PFAS in produced water?

14 A. I don't agree.

15 Q. If you will give me just one moment,  
16 please.

17 What I have pulled up here on the  
18 screen is New Energy Economy Exhibit KH-4, which  
19 is included in the rebuttal testimony of  
20 Dr. Hansen, and is the Jiang article.

21 Is this the Jiang article that you  
22 reviewed, Dr. Hansen -- excuse me, Dr. Richardson?

23 A. It is.

24 Q. Could you explain what it is that we  
25 are looking at here in Table 4?

1           A.       Sure. I do know that there has been a  
2 lot of attention on this paper so I would be happy  
3 to kind of walk through these results.

4           So what we are looking at on the  
5 left-hand side is the list of PFAS going from PFBS  
6 all the way down the list, and I would point out  
7 that this is from one sample, right, so this is  
8 from PW-NM-SWD, and I would also point out that  
9 the sample is taken not from a wellhead or any  
10 part of the actual well pad, it was taken from a  
11 saltwater disposal facility so the back end of the  
12 saltwater disposal facility, the back end of the  
13 back tank battery to be exact.

14           But, again, if it's a saltwater  
15 disposal facility it is likely that there are  
16 priess water going in there, so I do want to --  
17 but I want to point out that this is not a  
18 wellhead sample. The second part to point out is  
19 that they show two types of results. So the next  
20 column over is PW representing the produced water  
21 sample or in this case the saltwater disposal  
22 sample, and then the Pecos River sample that was  
23 taken as well.

24           The next column over is the method  
25 detection limit and then the reporting limit. And

1 that's for the priess water sample, and then the  
2 next column over is for the Pecos MDL and RL.

3           Before I kind of dive into the results  
4 I think it is probably worth just explaining  
5 method detection limit and reporting limit.  
6 Method detection limit is really a calculated  
7 value. It's the lowest statistically calculated  
8 value that you can get. It's above noise. So I  
9 think there is a lot of discussion about  
10 chromatograms at this hearing. There is always  
11 going to be this rumbling at the bottom of a  
12 chromatogram, and that's the noise, and so the  
13 method detection limit is going to be above that  
14 noise, sort of separate itself.

15           But then there is also a reporting  
16 limit, which is usually, it can be an order of  
17 magnitude higher, it can be three standard  
18 deviations. Essentially that is representing the  
19 uncertainty between the bottom end of the  
20 calibration range. So when we make a calibration  
21 curve we would get in this case, let's say, a  
22 standard for PFBS. We would make in this case  
23 maybe it would be a 1 PBT standard, a 5 PBT  
24 standard and so on. You would move up.

25           And so you generate your calibration

1 curve, that's your linear range, so anything  
2 within that linear range would be a result with no  
3 qualifier depending on whether there is -- there  
4 may be a qualifier but it wouldn't be one of these  
5 that we are listing here. Anything that is in  
6 between the method detection limit and the  
7 reporting limit, which again is that last data  
8 point on the linear range, has a J flag, and I  
9 will just go through this.

10 So the J flag is essentially an  
11 estimated value. It's a value that we see, again,  
12 time and time again in the environmental field.  
13 When you are getting close to your detection limit  
14 we have J flag values. These are values that we  
15 throw away. We don't toss them. Right? We  
16 simply say let's take them with a grain of salt.  
17 They are outside the linear calibration range for  
18 that method.

19 In this case they also have another  
20 qualifier which is a B, and that refers to the  
21 blank. So there is method blank that is run  
22 through the instrumentation, and in this case if  
23 there is a B it means that that compound was  
24 detected in the blank. When you have a situation  
25 where a compound is detected in the blank you do

1 throw that data out. That means that there is  
2 some interference. In this case if there had been  
3 a blank detected in the linear range, you actually  
4 would throw the whole data set out, but because  
5 this is in the uncertainty range a lot of the  
6 other data can stay.

7 The other part now -- so now that we  
8 have kind of talked about what all the components  
9 are we can kind of get into the results, and so I  
10 draw your attention to the first column. We see  
11 detections or results for PFBS, PFBA, PFHxS,  
12 NEtFOSE, and then PFTeA on the other side of the  
13 table. All of those results are J flag which  
14 means they are estimated so they are off the  
15 linear range, and two had blanks or that compound  
16 detected in the blank.

17 So the takehome here is that they are  
18 detecting estimated values for PFBS, NEtFOSE and  
19 then PFTeA at very, very low levels. I have to  
20 point out these are extremely low levels that we  
21 are dealing with in this paper. Mostly analytical  
22 labs that, commercial labs that we use the  
23 detection limits are not this low so this would be  
24 a university lab.

25 Q. So are there any results in this table

1 that reliably show PFAS in produced water?

2 A. I don't think so. I mean, at the end  
3 of the day they don't. If you're dealing with  
4 simply a bunch -- and again the other part we  
5 didn't make is that there are nondetects for the  
6 majority of the compounds so that means they are  
7 below the method detection limit. So at the end  
8 of the day, no, these are not reliable results  
9 because the only results that are left behind are  
10 these estimated, very small concentration results.

11 Q. Okay.

12 And then let me ask you this,  
13 Dr. Richardson. Would it be scientifically  
14 reasonable to rely on this data to demonstrate  
15 that there is PFAS in produced water?

16 A. It would not.

17 Q. Would most experts in your field rely  
18 on the statements in this table to conclude that  
19 there are PFAS in produced water?

20 MS. NANASI: Objection to that  
21 question. It calls for an answer he can't give.

22 THE HEARING OFFICER: Can you lay a  
23 foundation for it?

24 MS. MULCAHY: I believe I have laid a  
25 foundation for it. I have asked him about the

1 results. I have asked him to explain the results.  
2 I asked him to explain what the results mean. I  
3 have also asked him if there is a reasonable  
4 scientific basis to rely on these results, and as  
5 an expert in that field he can opine on whether  
6 experts in his field would rely on these results.

7 THE HEARING OFFICER: Okay, go ahead.

8 MS. NANASI: I would object again.  
9 These call for a hearsay answer. There is no way  
10 he can know what other experts think of this  
11 study.

12 MS. MULCAHY: I'm not asking what  
13 other experts think. I'm asking whether experts  
14 in his field would rely on this, which is one of  
15 the qualifications to have expert data in court,  
16 and would be admissible in court.

17 THE HEARING OFFICER: And how he would  
18 know that. Go ahead.

19 MS. MULCAHY: Thank you.

20 THE WITNESS: Would you mind repeating  
21 that one more time?

22 MS. MULCAHY: Sure, no problem.

23 BY MS. MULCAHY:

24 Q. Would experts in your field,  
25 Dr. Richardson, rely on the statement in this

1 table to conclude that there are PFAS in produced  
2 water?

3 A. They would not.

4 Q. Would you rely on these statements to  
5 conclude, the statements in this Table 4 to  
6 conclude that there is PFAS in produced water?

7 A. I would not.

8 Q. Thank you, Dr. Richardson. I am now  
9 going to switch topics a little bit and I want to  
10 talk about --

11 THE HEARING OFFICER: Hold on one  
12 second. Is this a good time for a break? It has  
13 been an hour 45.

14 MS. MULCAHY: Sure, that is fine with  
15 me.

16 THE HEARING OFFICER: Okay. Let's  
17 break then until 3, and we will come back and  
18 finish your questioning.

19 (Recess taken -- 2:43 p.m.)

20 (After recess -- 3:01 p.m.)

21 THE HEARING OFFICER: Let's come back  
22 from the break, please.

23 If you would resume your questioning  
24 of Dr. Richardson for his rebuttal testimony,  
25 Ms. Mulcahy.

1 MS. MULCAHY: Thank you, Madam Hearing  
2 Officer.

3 BY MS. MULCAHY:

4 Q. Dr. Richardson, just before we broke I  
5 had mentioned that I wanted to transition to  
6 speaking with you about FracFocus disclosures and  
7 the public access to those disclosures. There was  
8 much testimony this week about the FracFocus  
9 Chemical Registry. Dr. Richardson, did you hear  
10 that testimony this week about FracFocus?

11 A. I did. I was here Wednesday onwards.

12 Q. Thank you.

13 Dr. Richardson, are you familiar with  
14 the mandated FracFocus disclosures in New Mexico?

15 A. I am.

16 Q. Are the disclosures that operators  
17 submit to FracFocus available -- excuse me, for  
18 New Mexico. Are the disclosures that operators  
19 submit to FracFocus available to the public?

20 A. They are.

21 Q. Do you know if there is a charge for  
22 those disclosures to the public?

23 A. There is no charge.

24 Q. Okay.

25 Earlier this week Dr. Brown provided

1 rebuttal testimony on behalf of Guardians. In his  
2 testimony Dr. Brown testified that, to the effect  
3 that everything that goes down a well must come  
4 back up a well, and that if something like a  
5 chemical were to go down a well and be released  
6 that it's going to come back up the well and also  
7 be on the surface or be in the air.

8           Would you say, Dr. Richardson, is it  
9 accurate to state that everything that goes down a  
10 well comes back up a well?

11           A.       That's not accurate.

12           Q.       Why is it not accurate,  
13 Dr. Richardson?

14           A.       Well, when you are performing  
15 hydraulic fracturing you are obviously putting an  
16 immense amount of water down, and this is typical  
17 frack and it can be anywhere from a million to 10  
18 million gallons of water based on the, you know  
19 the frack disclosures I was looking at for New  
20 Mexico.

21                   In my experience with fracking in  
22 other states as well it depends on the geology, so  
23 there are certain areas where if you frack water  
24 will go down along with any additives, and in many  
25 cases the same amount of water does not come back

1 up. And some of that water is retained and of  
2 course matrix of the target zone, and often those  
3 target zones, some are very wet and some can  
4 actually be very dry, so you actually do get some  
5 retention of water and potentially additives as  
6 well in the subsurface.

7 Q. And so, again, talking about testimony  
8 from Dr. Brown, he had testified to the effect  
9 that one thing the general public might do with  
10 fully disclosed chemical lists is conduct their  
11 own baseline testing for private drinking water  
12 wells. Are you familiar with the process of  
13 testing residential or private drinking water  
14 wells for chemicals?

15 A. I am.

16 Q. How about for PFAS?

17 A. I am.

18 Q. Could you discuss any -- could you  
19 discuss your experiences with that?

20 A. Yes. I can just start with just the  
21 general chemicals.

22 So sampling a residential or private  
23 water well is actually pretty complicated. It's  
24 not as simple as just filling up a jar and then  
25 submitting to a lab. I did a fair amount of work

1 in Pennsylvania, just spent a lot of time in  
2 people's basements, some very nice people, and  
3 ended up sampling their residential water wells  
4 for a study funded by the Department of Energy,  
5 and we were looking at ways to sample for methane  
6 in shallow aquifers. So what is the best way to  
7 do that, and for residential water wells.

8 So just to make it clear, a  
9 residential water well is not designed for being a  
10 monitoring well, right, obviously. Its design is  
11 to collect as much water as you can for that  
12 resident. It's about quantity. So its screens  
13 are going to be very large, pretty long. It's  
14 going to be fairly wide. It is going to have a  
15 big pump in the center, and it's going to be  
16 attached to a whole host of equipment, pressure  
17 tank. Some people will have softeners and so on.

18 So in terms of trying to get a  
19 representative sample, it can be fairly  
20 complicated. And, again, it's not like sampling  
21 from a monitoring well, which what we do is we  
22 have low flow-sampling equipment. We sample from  
23 a particular interval in that screen. The screens  
24 for a monitoring well are very short, very tight,  
25 maybe no more than ten feet so that you can

1 actually get an environmental sample from the area  
2 that you are interested in.

3 And so just in terms of complicating  
4 factors, one is where do you take a sample that is  
5 representative that has the least impact, so to  
6 speak, or influence. You are also sampling from a  
7 pump, the pump that is designed to pull as much  
8 water as it can up to the resident. So you're not  
9 doing any low flow sampling. You are creating  
10 some turbulence in that water which can affect  
11 results as well.

12 So those are a couple of  
13 complications. Now you bring PFAS into the mix,  
14 and we know that PFAS are in our homes, they are  
15 in our apparel, you know, our food, pans, that  
16 type of thing. It's endless, right, the number of  
17 consumer products that are there and so you worry  
18 about cross-contamination.

19 So that is again an issue that we deal  
20 with in the environmental field just sampling  
21 water wells. We have very strict procedures for  
22 sampling for PFAS. You have to have certain  
23 containers to collect that water sample. You have  
24 to collect that water sample in a certain way.  
25 You have to wear the appropriate material that is

1 not going to cause any cross-contamination.

2 So those are a few of the issues that  
3 you run into, not only just sampling for PFAS but  
4 sampling from a residential water well or a  
5 private water well.

6 Q. Thank you.

7 Along those lines, earlier this week  
8 Mr. Horwitt on behalf of Guardians suggested that  
9 broader disclosures of chemicals, including PFAS,  
10 should be required by the Commission so that the  
11 public again can conduct its own sampling if it  
12 wanted to including on PFAS. In your experience,  
13 Dr. Richardson, would a member of the public know  
14 how to conduct its own groundwater sampling for  
15 PFAS?

16 A. I will say in general, no. Right?  
17 There always can be an environmental engineer like  
18 myself who potentially could do it, but by and  
19 large, no.

20 Q. Would the general public know how to  
21 do surface water sampling for PFAS?

22 A. Again, in general, no.

23 Q. When you say in general, no, why are  
24 you qualifying with that?

25 A. I'm only qualifying just because I'm a

1 homeowner and I could sample my well, so that's  
2 really the qualifying statement.

3 Q. Okay.

4 Mr. Horwitt in his rebuttal testimony  
5 also stated that PFAS has useful properties.  
6 That's why they have been used historically. Do  
7 you agree with that statement?

8 A. PFAS do have useful properties, yes.

9 Q. What might some of those useful  
10 properties be?

11 A. Well, we discussed them, you know, a  
12 little bit at the hearing. I mean, again, they  
13 are thermally stable compounds. They have some  
14 surfactant properties, depending on the particular  
15 PFAS you are interested in, so those are domain  
16 properties that really have driven the use of PFAS  
17 in whether it be industry or whether it be our  
18 commercial applications and so on. So again,  
19 thermal stability would be one, and then  
20 surfactant properties as well.

21 Q. Dr. Richardson, you heard  
22 Dr. Anderson's testimony earlier today, correct?

23 A. I did.

24 Q. And we were talking about the  
25 different PFAS out there, and she said it was her

1 opinion that not all PFAS are toxic. Would you  
2 agree with that opinion?

3 A. I would agree.

4 Q. Why might have these certain PFAS that  
5 you mentioned have been previously used in  
6 hydraulic fracturing?

7 A. So the two that I mentioned from the  
8 FracFocus database, and again I'm caveating I'm  
9 not the manufacturer of these chemicals, but again  
10 based on the information we have got on FracFocus  
11 they are typically used for friction reduction.  
12 And so what I do know from hydraulic fracturing is  
13 that you are dealing with high pressures and you  
14 are looking to create reduced friction when you  
15 are basically putting fluids in the subsurface.  
16 By reducing friction you are increasing or  
17 reducing the strain on pumps and you can also  
18 increase basically recovery, so there are some  
19 efficiencies there by adding these types of  
20 additives as friction reducers.

21 Q. Dr. Richardson, did you review the  
22 Position for Social Responsibility report for New  
23 Mexico that Mr. Horwitt co-authored?

24 A. I did.

25 Q. And what was your -- what did your

1 review -- in your review what did you find in that  
2 report?

3 A. They had various -- again, we didn't  
4 have exact results. I put my results in my direct  
5 testimony, but with respect to PTFE and pFEG we  
6 did see very similar results, and in fact we tried  
7 very hard to match what PSR had done in their  
8 report. They were very good about putting out how  
9 they laid out and how they did the data analysis.

10 Q. And you said that you largely agreed  
11 with those results. Could you explain what those  
12 results were?

13 A. Again, it would be helpful to have my  
14 direct testimony out, but again in terms of I  
15 think it was around 9,000 records we looked at  
16 between the time frame of 2013 to 2022, which we  
17 tried to match again with the -- well, with the  
18 PSR report, and it ended up somewhere in the  
19 neighborhood of about 2 percent of those records  
20 had PTFE reported, and then the other take on it  
21 that came from the PTFE side was that it was not  
22 reported in FracFocus after 2020, if I'm not  
23 mistaken.

24 MS. NANASI: Madam Hearing Officer, I  
25 don't believe this is rebuttal. This is just what

1 is in Dr. Richardson's direct testimony, and so I  
2 have let it go for a little while and I just think  
3 that we are running out of time. It's 3:15, and I  
4 just, out of respect for all of us I would like to  
5 ask that you would instruct NMOGA's counsel to not  
6 repeat his -- Dr. Richardson's direct.

7 THE HEARING OFFICER: Thank you,  
8 Ms. Nanasi.

9 So yes, absolutely Ms. Mulcahy. It is  
10 3:15. We do have to stop at 4:30. We already  
11 have a dozen people signed up for public comment  
12 and the Commissioners are just not available after  
13 5 today. We are going to have to shoot into the  
14 future for another hearing day if we don't finish.  
15 So if you could draw that line, that would be  
16 great.

17 MS. MULCAHY: Sure. Absolutely no  
18 problem.

19 BY MS. MULCAHY:

20 Q. Mr. Horwitt and Dr. Brown were, in  
21 their testimony this week, were unable to provide  
22 any examples of direct evidence in New Mexico that  
23 PFAS associated with oil and gas operations  
24 resulted in environmental contamination. Are you  
25 aware of any such evidence?

1 A. I am not.

2 Q. Did you review Dr. Spear's testimony?

3 A. I did.

4 Q. I am going to share this. I have  
5 pulled up Dr. Spear's testimony. What I have  
6 pulled up here on the screen is Dr. Spear's  
7 testimony, which is Guardians Exhibit 79. Page 3,  
8 Line 19 he says, "Because PFOS and PFOA come in so  
9 many different chemical forms."

10 Do you agree with Dr. Spear that PFOS  
11 and PFOA come in many different forms?

12 MR. DAVIS: I would have to object to  
13 that. I know we had a chemistry lesson this  
14 morning, but I have not objected yet to  
15 nonchemists testifying on chemistry, so I'm going  
16 to finally object.

17 THE HEARING OFFICER: Thank you.

18 Ms. Mulcahy?

19 MS. MULCAHY: I would say a few things  
20 in response to that. Dr. Richardson is not a  
21 chemist but he is an expert in the field of  
22 environmental engineering. He has already  
23 testified that he regularly works with PFAS  
24 remediation, and in order to remediate PFAS you  
25 have to understand the chemistry of it.

1           And second of all, he worked with  
2 experts, and as an expert he is able to  
3 independently identify whether or not this is  
4 reliable information because he works with  
5 chemists.

6           THE HEARING OFFICER: Okay. That  
7 seems a little attenuated. Perhaps explore with  
8 him what he needs to know in order to do the  
9 remediation. I know he has already mentioned that  
10 he does.

11           MS. MULCAHY: Sure.

12 BY MS. MULCAHY:

13           Q. Dr. Richardson, have you ever worked  
14 on remediation of PFOS or PFOA?

15           A. I have.

16           Q. Would you say you are familiar with  
17 the various different chemical aspects of PFOS or  
18 PFOA?

19           A. I am.

20           Q. Okay. Dr. Richardson, how many  
21 different forms does PFOS and PFOA come in?

22           A. There is one form for each.

23           Q. I'm sorry, could you say that again?  
24 I missed that.

25           A. There is one form, so there is a PFOA,

1 a P-F-O-A is one molecule and PFOS is another  
2 molecule.

3 Q. Are you aware if PFOS has ever been  
4 used in hydraulic fracturing operations?

5 A. I'm not aware of that.

6 Q. Are you aware if PFOA has ever been  
7 used in hydraulic fracturing operations?

8 A. I am not aware.

9 MR. RAZATOS: Ms. Mulcahy, I'm just  
10 going to interrupt.

11 Madam Hearing Officer, the pounding  
12 that we hear is art that is being installed in the  
13 building, so we apologize.

14 MS. MULCAHY: Thank you.

15 THE HEARING OFFICER: Thank you.

16 BY MS. MULCAHY:

17 Q. You just moments ago, and also  
18 previously, talked about your experience in  
19 environmental remediation related to PFAS in soil,  
20 water and wastewater, and you testified that you  
21 are aware that the Division has -- actually,  
22 strike that. Strike that.

23 Okay. Earlier this week Dr. Brown  
24 testified that there was no way to test for PFOA  
25 and PFOS compounds in the environment; is that

1 correct?

2 MR. DAVIS: I'm going to object. I do  
3 not recall that being Dr. Brown's testimony.

4 THE HEARING OFFICER: Ms. Mulcahy?

5 Q. If that was Dr. Brown's testimony, Dr.  
6 Richardson, would that be correct?

7 A. We can test for PFOA and PFOS.

8 Q. Thank you. I'm going to move on to  
9 Page 4 of Dr. Brown's -- excuse me, Dr. Spear's  
10 testimony, excuse me, Lines 1 through 7 here where  
11 Dr. Spear is talking about the subsurface, and he  
12 calls it, quote, a whole of the unknown.

13 Do you agree with that statement,  
14 Dr. Richardson?

15 A. I don't.

16 Q. Why don't you agree with it?

17 A. I certainly agree that there is a lot  
18 we don't know at the subsurface, particularly at  
19 10,000 feet. I agree with that. However, we do  
20 know a lot as well. We know a lot about the type  
21 of geology. We know a lot about the porous  
22 matrix. We know about the wettability, and I know  
23 that Dr. Spear's expertise is more in the  
24 microbiology so I would leave that to him. He is  
25 probably right, that there is not a lot known

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1 about the bacteria that live down in that  
2 environment, but in terms of the actual geology,  
3 lithology, and all the layers as we go down from  
4 surface to that type of depth we have a very good  
5 handle on, we actually can pull samples out from  
6 the subsurface and understand the geology, the  
7 lithology, grain size, moisture content, a lot of  
8 good important things.

9 Q. Is it important for environmental  
10 remediation to understand those things?

11 A. Absolutely.

12 Q. I'm going to stay on Page 4 but just  
13 scroll down to Line 8 through 19. In this portion  
14 of his testimony here Dr. Spear says, "Subsurface  
15 separation of aquifers is near impossible in the  
16 oil and gas industry over longer time frames."

17 Do you agree with Dr. Spear?

18 A. I don't agree.

19 Q. Why don't you agree?

20 A. I think we have -- again, what I think  
21 he is referring to is either natural or seismic  
22 connections between fracks on the surface. I  
23 don't know of any documentation of a fracture  
24 reaching, extending from fracture tirezone to  
25 michael aquifer, so if that is what he is

1 referring to I'm not aware of those types of  
2 things. So in terms of the connection I don't see  
3 that.

4 Q. In your experience have you ever seen  
5 that?

6 A. No.

7 Q. Okay.

8 In this same portion of his testimony  
9 Dr. Spear states, "We do not know what is really  
10 happening in the deep subsurface with the metric  
11 ton amounts of mass of PTSE or other trade-  
12 secreted compounds being deposited by O&G  
13 operations in New Mexico."

14 Do you agree with that statement?

15 A. Would you mind just scrolling it?

16 Q. Sorry. I'm sorry.

17 A. That's okay.

18 I disagree.

19 Q. Why do you disagree?

20 A. Same deal. Going back to we don't  
21 know what is happening in the deep subsurface. We  
22 have a very good handle of what is happening. We  
23 know a fair amount about the properties of the  
24 subsurface. We know the volumes that are coming  
25 back up from hydraulic fracturing, so there is a

1 lot of information that we do if he is referring  
2 to hydraulic fracturing itself.

3 Q. Staying on this page and then  
4 scrolling on to the next page, Dr. Spear states,  
5 "The O&G industry would also have you believe that  
6 a mere surface aquifer for drinking water is not  
7 impacted by deeper O&G operations and  
8 contamination. The O&G industry is making a deep  
9 subsurface minestrone of compounds that could  
10 become more dilute and still dangerous minestrone  
11 across a wider area when and if subsurface  
12 connections happen, and they do happen."

13 Do you agree with this statement,  
14 Dr. Richardson?

15 A. No. I mean, I will say that there are  
16 instances of well integrity events so we do have  
17 to put that out there. There is well casing  
18 issues or typically cementing issues. They are  
19 fairly rare, as we had Mr. Powell discuss, but in  
20 terms of the overarching understanding of the  
21 subsurface we have a pretty good handle on that.

22 Q. Dr. Richardson, what happens if a  
23 chemical constituent becomes more dilute as  
24 Dr. Spear mentions?

25 A. I mean, if something becomes more

1 dilute -- and, again, this is again in relation  
2 with my colleague Dr. Anderson, but typically a  
3 more dilute compound will be less toxic.

4 Q. Are well integrity events regular  
5 events?

6 A. They are not.

7 Q. In your professional experience how  
8 frequent are well integrity events?

9 A. I would defer to Mr. Powell's  
10 testimony yesterday which I believe he said the  
11 max was one a year. In some research that I have  
12 I think it is even smaller, but I would defer to  
13 Mr. Powell who is deputy director of OCD.

14 Q. Thank you.

15 I will scroll to Page 8, Line 22.  
16 Dr. Spear states, "The fate and transport can  
17 happen within a specific compartment of the earth  
18 or mixed between compartments such as air and  
19 water. Because there is a huge variety of kinds  
20 of PFAS molecules, migration within/between  
21 compartments is wide-ranging, dependent upon the  
22 different physical and chemical characteristics  
23 that affect a particular molecule's behavior and  
24 thus ultimate fate."

25 Do you agree with that statement,

1 Dr. Richardson?

2 A. I mean, there are components. There  
3 is a huge variety of kinds of PFAS, I would agree  
4 with, and then different physical and chemical  
5 characteristics that affect the molecule's  
6 behavior and thus ultimate fate, so I mean that is  
7 the majority of the sentence.

8 The migration between compartments is  
9 wide-ranging. I'm not quite sure what he is  
10 referring to, but if he is talking about the  
11 mobility in the subsurface with respect to the  
12 PFAS, the variety of different PFAS, then, yes,  
13 the mobility would be very different between  
14 compartments in the subsurface.

15 Q. From the environmental remediation  
16 perspective why does mobility matter in this  
17 context?

18 A. Mobility matters again because we can  
19 figure out where, and Dr. Anderson mentioned this  
20 as well, the exposure pathway and understanding  
21 how a contaminant goes from A to B and so if a  
22 compound is mobile then you would look at ways to  
23 clean up and basically break that exposure  
24 pathway. So you would look for technologies that  
25 you could use to basically prevent that

1 contaminant moving from A to B or to that  
2 receptor. And when I say a receptor I mean like a  
3 homeowner or residential, not Dr. Anderson's  
4 receptor which is within a human body.

5 Q. I'm going to scroll to Page 13 on  
6 Dr. Spear's testimony, and I apologize, again, as  
7 to making anybody in the room motion sick.

8 On Page 13 through 14, Line 20 on  
9 Page 13 through Line 3 on Page 14, Dr. Spear says,  
10 "There are hundreds to thousands of different PFAS  
11 compounds and generally they," and then he goes on  
12 to 14 to say, "Can move through soils and  
13 contaminate water resources, bioaccumulate and  
14 biomagnify across food webs."

15 Do you agree with Dr. Spear that  
16 hundreds and thousands of PFAS move through soils  
17 and contaminate water sources?

18 A. I do not.

19 Q. Why don't you agree with that?

20 A. Again, various sizes of PFAS  
21 molecules. Again, they come in all shapes and  
22 sizes and have different chemical features, and as  
23 a result will behave very differently in the  
24 subsurface. Some will actually sorb to organic  
25 material in the subsurface and be retained, and

1 others will be more mobile, more water soluble.

2 MR. DAVIS: Madam Hearing Officer,  
3 sorry to interrupt. I'm seeing the clock now, and  
4 of course NMOGA should be able to make their case,  
5 but I want to point out that we have limited time  
6 and I do want to make sure that if we are going to  
7 conclude today that WildEarth Guardians has an  
8 opportunity to cross-examine this witness. We  
9 prefiled our rebuttal to try to avoid any excess  
10 time going through the testimony, and so, you  
11 know, I point that out only to say that it's --  
12 you know, in the interest of fairness I just want  
13 to make sure we have some time with this witness.

14 THE HEARING OFFICER: Will you  
15 estimate the remainder of your questions?

16 MS. MULCAHY: I have two questions  
17 left.

18 THE HEARING OFFICER: All right,  
19 terrific. Go ahead.

20 BY MS. MULCAHY:

21 Q. I'm looking here on Dr. Spear's  
22 testimony, Page 14, Lines 12 through 14, where he  
23 says, "PFAS compounds also likely sorb to  
24 subsurface minerals and stay in the subsurface,  
25 making them hard if not impossible to remove via

1 chemical and/or pump and treat schemes."

2 Do you agree with this statement,  
3 Dr. Richardson?

4 A. I do not.

5 Q. Why not?

6 A. PFAS compounds do sorb, that part of  
7 the statement is true, and can stay in the  
8 subsurface. As I mentioned, certain compounds,  
9 PFOS being one that is more likely to sorb to the  
10 subsurface to organic material.

11 Q. When say PFOS, are you saying P-F-O-S?

12 A. P-F-O-S, thank you.

13 But saying making it hard, if not  
14 possible, to remove by chemical or pump treating  
15 systems is incorrect. Pumping treat systems can  
16 remove compounds by changing the concentration  
17 grading in the subsurface, and then there are  
18 chemicals that can be added to remove PFAS or  
19 strip PFAS from soil.

20 So in general pump and treat systems  
21 can pull, you know, some compounds off of organic  
22 material, and again as you change the  
23 concentration gradient.

24 Q. Thank you, Dr. Richardson.

25 After listening to this week's

1 testimony and reading various different direct or  
2 rebuttal testimonies is there anything that you  
3 think would be beneficial for you to rebut here  
4 that I have not asked you about?

5 A. No.

6 Q. Thank you, Dr. Richardson.

7 A. Thank you.

8 MS. MULCAHY: I yield the witness for  
9 cross.

10 THE HEARING OFFICER: Thank you,  
11 Ms. Mulcahy.

12 Mr. Davis.

13 MR. DAVIS: Thank you, Madam Hearing  
14 Officer.

15 CROSS EXAMINATION

16 BY MR. DAVIS:

17 Q. Hello, Mr. Richardson.

18 Dr. Richardson. I'm sorry. My name is Tim Davis.  
19 I represent the Petitioner, WildEarth Guardians.

20 You spoke at length about cleanup just  
21 now on rebuttal. Do you agree that prior to  
22 cleanup PFAS poses a threat to human health in the  
23 environment?

24 A. Not all PFAS would cause a risk to  
25 health in humans, what you said the health -- the

1 environment and human health. Excuse me, thank  
2 you.

3 Q. Do you agree that for the six PFAS  
4 compounds for which we have toxicological data,  
5 the ones that have been regulated by the EPA in  
6 the drinking water standards, that prior to  
7 cleanup that those six PFAS in the environment  
8 pose a threat to public health and the  
9 environment?

10 A. I would say potentially. When you say  
11 risk you end up talking about exposure pathways.  
12 So there is a toxicity but there is also exposure.  
13 But in the end they are regulated compounds and  
14 from an environmental engineering standpoint my  
15 goal is to treat regulated compounds.

16 Q. Is it fair to call them contaminants?

17 A. They are contaminants.

18 Q. Prior to cleanup do you agree that  
19 they could contaminate the environment?

20 A. To varying degrees because they are  
21 different compounds.

22 Q. Is that a yes?

23 A. Yes. It's a yes.

24 Q. Did you hear Dr. Brown suggest that  
25 members of the public would put their own well

1 water in a jar for the purposes of testing?

2 A. I did not hear that.

3 Q. Did Dr. Brown say how water well  
4 testing should be conducted?

5 A. I don't recall him saying that either.

6 Q. Does the proposed rule prohibit  
7 members of the public from hiring someone with  
8 your qualifications to conduct water well testing?

9 A. It doesn't, and I would just say that  
10 would be -- I would like for them to call me, as  
11 an environmental engineer. I mean absolutely  
12 would like them to call the right people.

13 Q. Do you believe that whether  
14 intentionally added or not we should prevent the  
15 injection of PFAS into the subsurface?

16 A. That's very broad. I mean, from an  
17 environmental standpoint I am here again, as we  
18 mentioned, that the whole point of this hearing is  
19 to remove PFAS from the environment or ban PFAS,  
20 and so based on whatever definition you are  
21 picking, whatever party you are in this hearing,  
22 that's what we are achieving. So as an  
23 environmental engineer I'm trying to remove PFAS  
24 from the environment, so yes.

25 Q. Do you agree that continued use of

1 PFAS in any industry would increase the likelihood  
2 that that PFAS could contaminate the environment?

3 A. I can't speak for all industries, but  
4 at the end of the day the majority of industries  
5 are moving away from PFAS that were once using  
6 them. I mean you can't even -- for the regulated  
7 compounds you can't -- they are not even being  
8 manufactured so in the order of trying to go ahead  
9 and continue to do what you are doing, it's just  
10 not going to work. So, you know, I see what you  
11 are saying, Mr. Davis. You're asking -- can you  
12 repeat that one more time to make sure I got it  
13 right?

14 Q. Sure.

15 Do you believe that whether  
16 intentionally added or not we should prevent the  
17 injection of PFAS compounds into the subsurface?

18 A. I think in this respect I think  
19 intentionally added doesn't matter for this  
20 particular hearing, but if you talk about PFAS as  
21 whole I mean my goal is to remove PFAS from the  
22 environment.

23 Q. Would it be easier to just ban it in  
24 the first place?

25 A. That is the goal of this hearing. We

1 currently are banning PFAS.

2 Q. If you ban it in the first place you  
3 presumably wouldn't have to remove it from the  
4 environment?

5 A. If you ban it, I will -- I mean I will  
6 still be cleaning -- there is still going to be  
7 residual PFAS to deal with. But yes, if you ban a  
8 compound, it is no longer used, then you will not  
9 see it -- it's use in the environment will be  
10 less, that's correct.

11 Q. Are you aware that the New Mexico Oil  
12 Conservation Division does not verify its trade  
13 secret claims?

14 A. I don't know anything about trade  
15 secrets. I don't know anything about trade  
16 secrets, Mr. Davis.

17 Q. Did you hear testimony to that effect  
18 this week?

19 A. I did, but I can't say that I really  
20 understand the trade secret laws in New Mexico.

21 Q. I want to look at your direct  
22 testimony on Page 3, and I'm going to read part of  
23 that testimony. You can tell me if it's accurate.  
24 "Despite some limited historical use of PFAS in  
25 hydraulic fracturing operations, the oil and gas

1 industry has since transitioned away from these  
2 compounds in favor of other nonPFAS containing  
3 chemistries as evident by the data provided in  
4 FracFocus."

5 Is that accurate?

6 A. Based on my discussions with NMOGA  
7 representatives, it is. And also again from the  
8 data that we see in FracFocus that not being  
9 disclosed beyond, PTFE for example, beyond 2020 we  
10 don't see it in the database.

11 Q. NMOGA told you that the oil and gas  
12 industry has transitioned away from PFAS use?

13 A. Individual, not NMOGA the  
14 organization, individual organizations themselves  
15 I have had side conversations with.

16 Q. And you are basing your testimony on  
17 what someone from NMOGA told you?

18 MS. MULCAHY: I think I'm going to  
19 object to that. He just clarified that he had  
20 individual conversations with organizations and  
21 not that he was basing it on.

22 THE HEARING OFFICER: He can state  
23 that then if that -- because it was not clear. It  
24 was ambiguous.

25 Go ahead, Dr. Richardson.

1           A.       Mr. Davis, would you like me to repeat  
2 that again? I had individual conversations with  
3 organizations.

4           Q.       So my question was whether the  
5 statement in your testimony that the oil and gas  
6 industry has since transitioned away from these  
7 compounds in favor of other nonPFAS containing  
8 chemistries was based on a conversation that you  
9 had with a representative from NMOGA.

10          A.       It's not entirely. I said by data  
11 provided in FracFocus.

12          Q.       So you independently verified that  
13 statement from your testimony by researching  
14 FracFocus?

15          A.       I looked at FracFocus and looked at  
16 the absence of these compounds that were  
17 previously disclosed.

18          Q.       And based on the absence of disclosure  
19 of these compounds you state that the oil and gas  
20 industry has transitioned away from those  
21 compounds?

22          A.       It's a component of that argument,  
23 yes.

24          Q.       Can you guarantee that there are no  
25 companies using PFAS-containing chemistries?

1 A. I cannot.

2 Q. Why can you not do that?

3 A. I don't have that information in front  
4 of me.

5 Q. You don't have that information in  
6 front of you or you don't have that information  
7 available to you at FracFocus?

8 A. I mean, you could say that I don't  
9 have that available in front -- excuse me, I don't  
10 have that available in FracFocus or any other  
11 documentation.

12 Q. And the reason that it's not available  
13 in FracFocus is because there is no requirement  
14 for full chemical disclosure in New Mexico?

15 A. Again, when you start moving into  
16 trade secrets, I don't have a whole lot to comment  
17 on that.

18 Q. So you have looked at FracFocus  
19 disclosures?

20 A. I have looked at the FracFocus  
21 disclosures.

22 Q. Are you familiar with the column in  
23 FracFocus disclosures for the CAS numbers?

24 A. I am.

25 Q. Are you familiar that sometimes in

1 that column a chemical is listed as, quote,  
2 proprietary?

3 A. Correct.

4 Q. Therefore, there is no CAS number for  
5 some of the entries in FracFocus?

6 A. That is correct.

7 Q. So then it is impossible to know all  
8 of the chemicals that are being used downhole in  
9 New Mexico?

10 A. You would not know. Yes, that's  
11 correct. Those are trade secreted. You would not  
12 know.

13 Q. So how do you know that oil and gas  
14 companies have since transitioned away from using  
15 PFAS compounds in New Mexico?

16 A. Again, based on FracFocus and based on  
17 conversations with organizations, part of NMOGA.

18 Q. So you cannot guarantee --

19 MS. MULCAHY: Objection. Asked and  
20 answered. He already said no.

21 MR. DAVIS: I will leave it there.  
22 Thank you, Dr. Richardson.

23 THE WITNESS: Thank you, Mr. Davis.

24 THE HEARING OFFICER: Thank you,  
25 Mr. Davis.

1 Ms. Nanasi?

2 MS. NANASI: Thank you.

3 CROSS EXAMINATION

4 BY MS. NANASI:

5 Q. Good afternoon, Dr. Richardson.

6 A. Good afternoon, Ms. Nanasi.

7 Q. I wanted to pick up just where  
8 Mr. Davis left off.

9 A. Okay.

10 Q. What are the organizations, who are  
11 the organizations that you spoke with?

12 A. I don't think I'm at liberty to say.

13 Q. Why not?

14 A. These were all conversations that I  
15 had as part of discussions with, in NMOGA  
16 meetings.

17 Q. With individual oil and gas companies?

18 A. Individuals from oil and gas  
19 companies.

20 Q. And you are refusing to reveal who  
21 those are?

22 A. I don't think I'm at liberty to reveal  
23 that.

24 MS. MULCAHY: I am going to object on  
25 the grounds of attorney/client privilege.

1 THE HEARING OFFICER: Right.

2 Ms. Nanasi, I don't know of any  
3 disclosure rule that would require the witness to  
4 disclose the names of the representatives or the  
5 NMOGA member identities from those meetings.

6 MS. NANASI: Madam Hearing Officer,  
7 are you saying that I can't probe who he has  
8 spoken with that led him to say that the oil and  
9 gas industry has since transitioned away from  
10 using PFAS compounds? We have no idea who was  
11 there, and if there was anybody who was not a  
12 lawyer present in that room then it's not  
13 attorney/client so what is the basis for not being  
14 able to probe that?

15 THE HEARING OFFICER: Again, there is  
16 no rule that requires him to disclose it. The  
17 Commission can give whatever weight they would  
18 like to his statement without further disclosure.  
19 He has said, I believe, it was members of NMOGA or  
20 in NMOGA meetings. That is as much information as  
21 we have. Please move on.

22 BY MS. NANASI:

23 Q. Are you a vice president of GSI  
24 Environmental?

25 A. I am.

1 Q. How long have you been with GSI  
2 Environmental?

3 A. It has been about 13 years.

4 Q. As a vice president for GSI  
5 Environmental you were responsible for the work  
6 product of GSI Environmental; is that correct?

7 A. I am.

8 Q. How many vice presidents are there at  
9 GSI Environmental?

10 A. I don't know that number off the top  
11 of my head but it's greater than ten.

12 Q. Is John Connor the president of GSI  
13 Environmental?

14 A. He is not.

15 Q. Were you at GSI Environmental when  
16 John Connor was president?

17 MS. MULCAHY: Objection.

18 THE HEARING OFFICER: Hold on, what  
19 was the question?

20 MS. NANASI: Were you at GSI  
21 Environmental when John Connor was the president  
22 of GSI Environmental.

23 THE HEARING OFFICER: And your  
24 objection is?

25 MS. MULCAHY: I'm objecting on a few

1 things. First of all, it is outside the scope of  
2 either his direct or rebuttal testimonies. Second  
3 of all, I don't see anything in Dr. Richardson's  
4 CV, which is NMOGA Exhibit 1, that mentions  
5 anything about this individual, that he worked  
6 with him anywhere. I'm not sure what this line of  
7 questioning is even relevant to.

8 THE HEARING OFFICER: Are you heading  
9 for impeachment or something?

10 MS. NANASI: This is a foundational  
11 question to a document that I would like to show  
12 him.

13 THE HEARING OFFICER: Okay. Let's  
14 just go a little ways then. Go ahead.

15 THE WITNESS: Please repeat the  
16 question, Ms. Nanasi.

17 MS. NANASI: Thank you for saying the  
18 name --

19 THE WITNESS: Am I saying it right?

20 MS. NANASI: You did.

21 THE WITNESS: Thank you.

22 BY MS. NANASI:

23 Q. Were you at GSI Environmental when  
24 John Connor was the president of GSI  
25 Environmental?

1 A. Yes.

2 Q. Yes?

3 A. When he was the president, yes.

4 Q. Okay.

5 GSI Environmental was hired by  
6 California Central Valley Regional Water Quality  
7 Control Board to study the potential health  
8 effects of irrigating food crops with oil and gas  
9 wastewater, correct?

10 MS. MULCAHY: Objection.

11 THE HEARING OFFICER: Where are you  
12 going, Ms. Nanasi?

13 MS. NANASI: That is again another  
14 foundational question. I want to know if he was a  
15 part of the study. I want to show him an article  
16 about that.

17 MS. MULCAHY: Madam Hearing Officer,  
18 all of Dr. Richardson's publications are listed in  
19 his CV. This is not one of them listed anywhere  
20 in his CV. This is not even mentioned within --

21 MS. NANASI: This is for impeachment.

22 MS. MULCAHY: -- direct or rebuttal,  
23 so I fail to see what it could impeach about his  
24 direct or rebuttal or anything in this exhibit.

25 THE HEARING OFFICER: All right, let's

1 see if he was part of this article.

2 MS. NANASI: Not this article. I  
3 asked about a study.

4 THE HEARING OFFICER: The study.  
5 Thank you.

6 MS. NANASI: And if I could repeat the  
7 question, it was GSI Environmental was hired by  
8 California Central Valley Regional Water Quality  
9 Control Board to study the potential health  
10 effects of irrigating food crops with oil and gas  
11 wastewater, correct? That's what I asked.

12 MS. MULCAHY: He does not represent  
13 GSI Environmental. He is not here to answer  
14 everything on behalf of anything GSI Environmental  
15 has ever done.

16 THE HEARING OFFICER: I understand. I  
17 understand. Let's see if he was part of the  
18 study.

19 A. Ms. Nanasi, was that your question?  
20 Was I part of that study?

21 Q. No.

22 A. Sorry. Again, I apologize.

23 Q. GSI Environmental was hired by  
24 California Central Valley Regional Water Quality  
25 Control Board to study the potential health

1 effects of irrigating food crops with oil and gas  
2 wastewater, correct?

3 A. I do not know that.

4 Q. Do you know that after GSI was  
5 hired --

6 MS. MULCAHY: Objection.

7 THE HEARING OFFICER: He has closed  
8 the door there, Ms. Nanasi. Please move on.

9 Q. Did GSI once list on their website  
10 that Chevron, ExxonMobil and Occidental --

11 MS. MULCAHY: Objection.

12 THE HEARING OFFICER: I haven't heard  
13 the rest of the question. Hold on.

14 Q. Did GSI once list on its website  
15 Chevron, ExxonMobil and Occidental Petroleum as  
16 clients, quote, we answer to?

17 MS. MULCAHY: Objection.

18 THE HEARING OFFICER: Yes. The  
19 objection is sustained.

20 Ms. Nanasi, I'm not sure I understand  
21 exactly why exploring all these things that GSI  
22 might have done or said or had on their web page  
23 is an impeachment of Dr. Richardson, or even a  
24 potential impeachment of Dr. Richardson.

25 MS. NANASI: Well, if I could answer

1 that, one of the issues here is who they answer  
2 to. Is it to the truth or is it to the oil and  
3 gas industry. Why is that not impeachment?

4 THE HEARING OFFICER: Because  
5 Dr. Richardson is not here in this hearing to  
6 answer for that company.

7 MS. NANASI: He said he was, though.  
8 He said that he is a vice president of GSI  
9 Environmental. He also said that he is  
10 responsible as the vice president for the work  
11 product of GSI Environmental.

12 MS. MULCAHY: He did not say that he  
13 is responsible for the work product --

14 MS. NANASI: I asked him that very  
15 question and he said he was.

16 MS. MULCAHY: He did say that he works  
17 for GSI Environmental. That is certainly true,  
18 and all of his involvements are listed in NMOGA  
19 Exhibit D1. If she wants to ask anything in that  
20 exhibit, that is fair game.

21 THE HEARING OFFICER: All right.

22 So Dr. Richardson, do you understand  
23 the line we are trying to draw here? Certainly I  
24 think testimony pertinent to this hearing and the  
25 decision before this Commission on this rulemaking

1 petition by the Guardians, there may be something  
2 pertinent in there. At the same time not  
3 everything that GSI has done or might do or might  
4 have as a client, for example, is going to be  
5 pertinent. So if you can answer with an eye to  
6 that line that we are trying to walk, I would like  
7 to move on.

8 BY MS. NANASI:

9 Q. You are not a licensed professional  
10 engineer in New Mexico, are you?

11 A. I am not.

12 Q. How much are you getting paid for your  
13 testimony in this case?

14 A. Standard rate 350 an hour.

15 Q. You are aware that PFAS and the  
16 diverse class of thousands of fluorinated  
17 substances have been used in New Mexico in oil and  
18 gas operations, correct?

19 A. No. That's not correct.

20 Q. Isn't it your testimony that you  
21 searched FracFocus and found that PFAS compounds  
22 have been used in New Mexico?

23 MS. MULCAHY: Objection. She is  
24 mischaracterizing his testimony. He testified  
25 that two PFAS compounds have been found in New

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1 Mexico, not thousands or many.

2 THE HEARING OFFICER: Would you  
3 rephrase, please, Ms. Nanasi.

4 Q. Do you know that PFAS and their  
5 diverse class of thousands of fluorinated  
6 substances have been used in New Mexico oil and  
7 gas operations?

8 A. I do not know that.

9 Q. Have you spoken with or interviewed or  
10 reviewed documentation from any toxicologist,  
11 chemist or engineer or any professional at EOG  
12 Resources about the PFAS or the diverse class of  
13 thousands of fluorinated substances EOG Resources  
14 has used in hydraulic fracturing in the Permian  
15 Basin?

16 A. I have not.

17 Q. Have you spoken with or interviewed or  
18 reviewed documentation from any toxicologist,  
19 chemist, or engineer or any other professional at  
20 WPX --

21 MS. MULCAHY: Okay. I'm going to  
22 object to this line of questioning. This wasn't  
23 in direct or rebuttal. I am not sure how it is  
24 even relevant.

25 THE HEARING OFFICER: Where are you

1 going, Ms. Nanasi?

2 MS. NANASI: Madam Hearing Officer,  
3 Dr. Richardson is testifying that he doesn't know  
4 now that there has been any PFAS that has been  
5 used in hydraulic fracturing so I'm testing his  
6 knowledge. Who did he speak to to find out about  
7 this?

8 THE HEARING OFFICER: Okay, instead of  
9 walking through a list of potential companies --  
10 oh, I see, because when you asked who did he speak  
11 to, that was the meeting, right, with NMOGA  
12 members. Are you doing something else?

13 MS. NANASI: I'm just asking in  
14 general.

15 THE HEARING OFFICER: Okay.

16 MS. NANASI: If he says that he  
17 doesn't know that the PFAS -- now he is saying  
18 that he doesn't know that PFAS has been used in  
19 oil and gas in the Permian Basin, I'm asking did  
20 you talk to the major players in oil and gas in  
21 the Permian Basin.

22 THE HEARING OFFICER: Let's start with  
23 that question.

24 MS. MULCAHY: I'm sorry, I have to  
25 object here because he did not testify that none

1 has been used. In fact, his testimony was that in  
2 his review of FracFocus he found that two had been  
3 used.

4 MS. NANASI: That's not what his  
5 testimony was. His testimony was he doesn't know.  
6 That is what he just said.

7 MS. MULCAHY: He testified to PTSE  
8 being used, and what I'm going to, I'm not going  
9 to say the full name out loud but I will call it  
10 pFEG. Right?

11 THE HEARING OFFICER: And so I think,  
12 Ms. Nanasi, some of the confusion might be that  
13 your question didn't exactly track his earlier  
14 testimony about the two he found. You added  
15 something about hundreds or thousands of other  
16 PFAS substances, so I think that might be the  
17 cause of the confusion here.

18 In any event, if we could just cut to  
19 the chase. You can ask him if he talked with the  
20 major players here in the state.

21 BY MS. NANASI:

22 Q. Have you spoken with anyone from  
23 Chevron, ConocoPhillips, Simarex, Matador  
24 Production Company, Marathon Oil, Mewbourne, Oxy  
25 XTOWPX about their use of PFAS in hydraulic

1 fracturing in the Permian Basin?

2 A. No.

3 Q. Have you conducted any independent  
4 analysis, review, documentation about the use of  
5 PFAS in the Permian Basin in New Mexico or  
6 anywhere in New Mexico?

7 A. No.

8 Q. In Colorado do operators report the  
9 composition of the hydraulic fracturing fluid used  
10 during hydraulic fracturing operations to  
11 FracFocus, to state oil and gas regulators, or  
12 both?

13 MS. MULCAHY: Objection.

14 THE HEARING OFFICER: What is your  
15 objection?

16 MS. MULCAHY: Foundation. Foundation,  
17 but also it is outside the scope of both direct  
18 and rebuttal, and there is nothing in any of his  
19 testimonies about disclosures in Colorado.

20 THE HEARING OFFICER: Right.

21 I think you do have to ask him how he  
22 knows that or whether he knows that first.

23 BY MS. NANASI:

24 Q. Do you know if in Colorado operators  
25 report the composition of the hydraulic fracturing

1 fluid used during hydraulic fracturing operations  
2 to FracFocus, to state and oil and gas regulators,  
3 or both?

4 A. I don't.

5 Q. And the same question for California.  
6 Do you know if in California operators report the  
7 composition of the hydraulic fracturing fluid used  
8 during hydraulic fracturing operations to  
9 FracFocus, to state and oil and gas regulators, or  
10 both?

11 A. I do not.

12 Q. You don't know?

13 A. I don't know.

14 Q. Please tell the Commission how many  
15 pounds of PFAS constitute 2.2 percent of hydraulic  
16 fracturing fluids?

17 A. See where that is. Would you mind if  
18 I took a look at my, if I have that in my written  
19 testimony? Is that there?

20 Q. Well, it's on Page 3. You say that  
21 the use of PFAS in hydraulic fracturing operations  
22 in New Mexico is very limited, only 2.2 percent  
23 and .38 percent of the over 9,000 FracFocus  
24 records between 2013 and 2023 reference PTFE or  
25 fPEG, and I'm asking you how many pounds of PFAS

1 constitutes 2.2 percent of hydraulic fracturing  
2 fluids?

3 A. I believe my number was similar to  
4 what came out of the Positions for Social  
5 Responsibility report. I think that was -- I  
6 think it was 2,000 pounds, if I'm not mistaken,  
7 Ms. Nanasi. That's for PTFE.

8 Q. Is it true that according to EPA one  
9 tablespoon of PFOA would be enough to contaminate  
10 1.75 trillion gallons of water, which is more than  
11 twice the total storage capacity of Elephant Butte  
12 Reservoir at 720 billion gallons which forms New  
13 Mexico's largest lake on the Rio Grande River in  
14 the southwestern part of the state?

15 MS. MULCAHY: Objection. First of  
16 all, it is a compound question. Second of all, if  
17 Ms. Nanasi wants to break that up that might be an  
18 okay question. I also object to the fact that I  
19 don't believe that Dr. Richardson mentioned  
20 anything about Elephant Butte irrigation district  
21 or what she requested of him in his direct or  
22 rebuttal so there is also no foundation for this.

23 THE HEARING OFFICER: Okay. I  
24 think -- I don't know that it was a compound  
25 question. She was asking whether a tablespoon

1 would contaminate something the size of Elephant  
2 Butte, I think. That was, I thought that was the  
3 question.

4 MS. MULCAHY: I think there is a  
5 foundational issue, too, that Dr. Richardson  
6 didn't testify anything about Elephant Butte. I  
7 don't know if he knows anything about Elephant  
8 Butte, what it is or how big it is.

9 THE HEARING OFFICER: I think she  
10 referred to someone else's testimony.

11 If you would repeat the question,  
12 Ms. Nanasi.

13 And Dr. Richardson, if you don't know  
14 the answer you can say so.

15 BY MS. NANASI:

16 Q. Is it true according to EPA that one  
17 tablespoon of PFOA would be enough to contaminate  
18 1.75 trillion gallons of water?

19 A. I don't know what reference you are  
20 referring to. I have not heard that.

21 Q. Two thousand pounds of PFAS that you  
22 said you believe is the equivalent of 2.2 percent  
23 of hydraulic fracturing fluids that have been  
24 released into New Mexico, correct?

25 A. That is over the time period of 2013

1 to 2022, and also from the respect of in my  
2 experience, my focus on concentration, so, yes, we  
3 are talking about 2,000 pounds. We are also  
4 talking about, you know, billions and billions of  
5 gallons of water that were used, so if you look at  
6 a concentration side it's a lot smaller. But if  
7 the question is how much was used over that time  
8 period, according to FracFocus what was  
9 disclosed -- if that is what it is -- 2,000  
10 pounds, I believe, that's what it was.

11 Q. Has fPEG been voluntarily phased out  
12 of commerce?

13 A. I'm not one hundred percent sure about  
14 that. I know that there is a Zonyl. I believe  
15 its trade name has been voluntarily removed from  
16 commerce.

17 Q. And was it removed from commerce  
18 because it was too toxic?

19 A. I don't know the reason why.

20 Q. Has PTFE been voluntarily phased out  
21 of commerce?

22 A. Not that I'm aware of.

23 Q. On Page 7 of your testimony you said  
24 that you are basically pushing back against the  
25 implication that PFAS are currently not being used

1 in hydraulic fracturing operations in New Mexico;  
2 is that right?

3 A. Point me to where it says that. I'm  
4 sorry, Ms. Nanasi. Is that toward the bottom of  
5 the --

6 Q. Yes, I believe the third line of the  
7 last bullet. It says PFAS are currently -- you  
8 are talking about the PSR report and you are  
9 saying it's misleading because it implies that  
10 PFAS are currently being used in hydraulic  
11 fracturing operations, right?

12 A. I'm still trying to find it. My  
13 apologies. You said Page 7?

14 Q. Yes, the last bullet.

15 A. Last bullet. Oh, okay.

16 Yes. So, again, can you -- sorry,  
17 Ms. Nanasi, can you repeat it one more time?

18 Q. So I'm just trying to first reference  
19 your testimony. So here you are pushing back  
20 against the implication that PFAS are not  
21 currently being used in hydraulic fracturing  
22 operations in New Mexico, correct?

23 A. I'm saying that it implies that PFAS  
24 are currently being used in hydraulic fracturing  
25 operations in New Mexico. According to FracFocus.

1 That is not what I was able to see.

2 Q. Okay, so that statement is based on  
3 what you reviewed in FracFocus; is that correct?

4 A. That's correct.

5 Q. Okay, and you have already admitted  
6 that there are certain proprietary chemicals that  
7 are not revealed in FracFocus and could be PFAS,  
8 right, or other surfactants?

9 MS. MULCAHY: Objection. I think that  
10 mischaracterizes what he said about the FracFocus  
11 disclosures.

12 THE HEARING OFFICER: Dr. Richardson,  
13 if it wasn't stated correctly, your testimony  
14 wasn't stated correctly, please correct it.

15 THE WITNESS: I'm sorry, I'm having  
16 trouble following here what --

17 Please, can you repeat one more time,  
18 Ms. Nanasi?

19 BY MS. NANASI:

20 Q. The basis for your statement about  
21 that it's not currently being used, PFAS is not  
22 currently being used is solely based on your  
23 review of FracFocus, right?

24 A. It is based on my review of FracFocus,  
25 correct.

1 Q. And you have already admitted that  
2 some of the -- some of the substances have been  
3 listed as proprietary, right?

4 A. Some of the substances are  
5 proprietary, correct.

6 Q. And those substances could be PFAS or  
7 other surfactants, correct?

8 A. It is possible that they could be  
9 PFAS.

10 Q. If PFAS are not being used by the oil  
11 and gas industry, why is NMOGA opposing a  
12 comprehensive PFAS ban?

13 MS. MULCAHY: Objection. That  
14 completely misstates NMOGA's position here. NMOGA  
15 is not comprehensively against a PFAS ban.

16 MS. NANASI: That wasn't my question  
17 and that's not what I stated. I said why is NMOGA  
18 opposing a comprehensive PFAS ban, is what I said.

19 MS. MULCAHY: Right, and I object to  
20 that characterization. NMOGA has agreed that PFAS  
21 should be banned. It's merely a difference in  
22 definition, which Dr. Anderson explained those  
23 minute differences, so it's a mischaracterization  
24 of what is happening here.

25 THE HEARING OFFICER: So I think

1 Ms. Nanasi is using the word comprehensive to  
2 refer to the broader definition that is in the  
3 petition.

4 Is that correct, Ms. Nanasi?

5 MS. NANASI: It is.

6 THE HEARING OFFICER: All right,  
7 Dr. Richardson, do you understand the question?

8 MR. RUBIN: Hold on one second,  
9 please. We lost our quorum.

10 THE HEARING OFFICER: We don't need a  
11 quorum during a hearing I didn't think.

12 MR. RUBIN: This is part of an open --  
13 I do have a concern without a quorum here. This  
14 was noticed as an open meeting.

15 THE HEARING OFFICER: But they  
16 appointed me to do the hearing and they all have  
17 committed to reviewing whatever part of the  
18 transcript --

19 MR. RUBIN: That is true.

20 THE HEARING OFFICER: -- they miss.

21 MR. RUBIN: He's back.

22 THE HEARING OFFICER: He is back  
23 anyway.

24 MR. RUBIN: Okay.

25 THE HEARING OFFICER: All right, I'm

1       sorry.

2                       Dr. Richardson, did you follow  
3       Ms. Nanasi's question about resisting a  
4       comprehensive ban by which we understand to mean  
5       PFAS as defined more broadly in the petition than  
6       by NMOGA?

7                       THE WITNESS: I would appreciate it if  
8       she repeated it just one more time.

9       BY MS. NANASI:

10              Q.       If PFAS are not being used in New  
11       Mexico why is NMOGA opposing a comprehensive PFAS  
12       ban?

13              A.       It is my understanding that this is a  
14       comprehensive ban based on the definition that is  
15       proposed.

16              Q.       Is it NMOGA's position that trade  
17       secrets should trump public safety, public health  
18       and the environment?

19                      MS. MULCAHY: Objection.  
20       Dr. Richardson has stated multiple times that he  
21       is not here to testify about trade secrets.

22                      THE HEARING OFFICER: That is correct.

23                      Ms. Nanasi, would you move on?

24              Q.       NMOGA doesn't dispute the OCD  
25       information contained in Guardians Exhibit

1 Number 92 which is the Oil Conservation Division  
2 incident database, does it?

3 A. I don't know anything about that.

4 Q. Did you review Melissa Troutman's  
5 testimony in this case?

6 A. I did not.

7 Q. If OCD's rule is adopted is it your  
8 understanding that operators would not be required  
9 to disclose all the chemical constituents used  
10 during downhole operations to FracFocus or to  
11 state to oil and gas regulators -- or to state oil  
12 and gas regulators except in the circumstance  
13 where there is what has been referred to here as a  
14 well integrity issue and the OCD determines to use  
15 its enforcement power and require full chemical  
16 disclosure?

17 MS. MULCAHY: Object on the compound  
18 question.

19 THE HEARING OFFICER: I'm not sure it  
20 was a compound question.

21 Would you restate it, please?

22 Q. If OCD's rule is adopted is it your  
23 understanding that operators would not be required  
24 to disclose all the chemical constituents used  
25 during downhole operations to FracFocus or to New

1 Mexico oil and gas regulators except in the  
2 circumstance where there is what has been referred  
3 to here as a well integrity issue and the OCD  
4 determines to use its enforcement power and  
5 require full chemical disclosure?

6 A. Ms. Nanasi, I'm going to respond with  
7 what my understanding is, that it's full  
8 disclosure to the OCD in the event of a well  
9 integrity event.

10 Q. And that's only in the circumstance  
11 that OCD determines to use its enforcement power,  
12 correct?

13 A. I can't speak to that.

14 Q. Okay, so you don't know; is that your  
15 testimony?

16 A. I don't know.

17 Q. Okay.

18 But under no circumstance if OCD's  
19 rule is adopted will OCD be able to require full  
20 chemical disclosure for the thousands of oil and  
21 gas fluid related spill incidents or oil and gas  
22 produced water spill incidents, would they?

23 A. I can't, I don't know about spills  
24 and -- again, could you repeat one more time? I  
25 want to be sure I understand you correctly,

1 Ms. Nanasi.

2 MS. NANASI: Yes.

3 MS. MULCAHY: I object. I have to  
4 object here.

5 Ms. Nanasi is asking Dr. Richardson  
6 about OCD's position which is inappropriate.

7 Ms. Nanasi asked questions about OCD's position.  
8 The best person to ask is OCD. And additionally,  
9 Dr. Richardson has nothing in any of his testimony  
10 about the OCD's position.

11 THE HEARING OFFICER: Right.

12 So Ms. Nanasi, he did not speak about  
13 OCD's alternative rule amendments and requiring  
14 him at this point to have an opinion about them  
15 I'm not going to go there.

16 Would you estimate the remainder of  
17 your cross?

18 MS. NANASI: I don't have that many  
19 more questions, but I do want to ask him not about  
20 OCD's position, I'm asking about the OCD rule. He  
21 has in detail talked about the definitions, I mean  
22 from of the different -- of the rules and  
23 explained why, and so I think I can ask him well,  
24 would it cover, would OCD's rule cover chemical,  
25 full chemical disclosure in the instance of

1 thousands of oil and gas related spills.

2 THE HEARING OFFICER: Okay.

3 MS. MULCAHY: He didn't testify at all  
4 about spills. This is not a rulemaking about  
5 spills. In addition to what he did testify to  
6 regarding OCD, it was about how the OCD definition  
7 specifically of PFAS aligns with or is just  
8 slightly expanded on NMOGA's definition. He  
9 didn't talk about every other aspect of the OCD  
10 rule and what that might imply. It is just  
11 completely out of the scope.

12 THE HEARING OFFICER: Right.

13 If you would, Ms. Nanasi, focus on the  
14 definition.

15 BY MS. NANASI:

16 Q. Did you talk about the OCD well  
17 integrity event and what would happen under this  
18 rule?

19 MS. MULCAHY: He did not talk about  
20 what would happen under a well integrity rule. He  
21 specifically testified about in the event of a  
22 well integrity event. He mentioned nothing else  
23 about well integrity events other than that.

24 THE HEARING OFFICER: Let's have him  
25 say that. It might shortcut this a little if we

1 just allow him to answer.

2 Q. Your understanding of the OCD rule, if  
3 it were adopted OCD would not be able to require a  
4 full chemical disclosure in the circumstance of a  
5 oil and gas related spill incident, would it?

6 A. I do not know that.

7 Q. Have you ever provided expert  
8 testimony for a public health organization or a  
9 nonprofit environmental organization?

10 A. I have not.

11 MS. NANASI: No further questions.

12 THE HEARING OFFICER: All right, thank  
13 you.

14 Mr. Tremaine, do you have questions of  
15 Dr. Richardson?

16 MR. TREMAINE: I have just a couple of  
17 questions.

18 CROSS EXAMINATION

19 BY MR. TREMAINE:

20 Q. I want to jump back to Table 4, not  
21 actually to it, just reference it. Do you recall  
22 the content of Table 4 generally?

23 A. Is that the Jiang paper that you are  
24 referring to?

25 Q. Yes.

1 A. Yes.

2 Q. And you talked in some detail about  
3 the testing and the noise and the testing levels.  
4 I just want to ask you, the compounds listed in  
5 Table 4, if someone were to test for PFAS using  
6 any of these standardized methods that we have  
7 discussed that are included in OCD's proposed  
8 definition, would it detect the compounds in this  
9 table?

10 A. The answer is most. I will say that  
11 the F53B major and F53B minor, I'm not sure what  
12 those are, but all the rest would be detected.

13 Q. Thank you, Dr. Richardson.

14 Quick question about your review of  
15 FracFocus. Are you able to identify PFOS or  
16 potential PFOS if you apply either NMOGA's  
17 proposed definition or OCD's proposed definition  
18 based on the content currently available to the  
19 public on the FracFocus website?

20 A. You can search for individual  
21 compounds, yes.

22 Q. Okay. So if you -- if you see a  
23 chemical listed as a proprietary chemical on the  
24 FracFocus website are you able to make an informed  
25 determination as to whether that may be a PFOS

1 compound?

2 A. Not necessarily the trade secret.  
3 What you can do is you know the use. I think the  
4 use is provided.

5 Q. Thank you.

6 I want to ask you just a couple  
7 clarifying questions because you spoke with  
8 Ms. Mulcahy about hydraulic fracturing generally.  
9 Dr. Richardson, are you generally familiar with  
10 the hydraulic fracturing process?

11 A. I am.

12 Q. Okay. And do you know when an  
13 operator, a well operator fracks a well, first  
14 time, do you know who does it?

15 A. I don't.

16 Q. Okay.  
17 We have talked about chemical  
18 additives throughout the course of the hearing.  
19 If an operator or a contractor of an operator were  
20 to frack a well using a chemical additive, do you  
21 have any understanding or knowledge of how that  
22 operator would have obtained the chemical  
23 additive?

24 A. The additive typically comes from the  
25 manufacturer, as far as I understand it.

1 Q. Okay.

2 MR. TREMAINE: No further questions.

3 THE HEARING OFFICER: Thank you,  
4 Mr. Tremaine.

5 EOG doesn't have questions.

6 Mr. Maxwell, do you have questions of  
7 Dr. Richardson?

8 MR. MAXWELL: I do not have questions.  
9 Thank you.

10 THE HEARING OFFICER: Thank you.  
11 Any redirect before I go to the  
12 Commission?

13 MS. MULCAHY: I just have two quick  
14 ones. I will be quick.

15 REDIRECT EXAMINATION

16 BY MS. MULCAHY:

17 Q. Dr. Richardson, you just stated to  
18 Mr. Tremaine that based on the Use column, so we  
19 are talking about FracFocus, based on the Use  
20 column in FracFocus you could determine if the  
21 proprietary chemical is PFAS or not?

22 A. No, that is not correct.

23 Q. Okay.

24 A. You know that -- you can determine  
25 what the use of the additive was, so whether it

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1 was a friction reducer or surfactant or some other  
2 term.

3 Q. Okay, and just because a chemical is  
4 proprietary in FracFocus, does that mean it's a  
5 PFAS?

6 A. No.

7 Q. And lastly, does NMOGA support a ban  
8 on PFAS in oil and gas operations?

9 A. They do.

10 Q. Thank you.

11 THE HEARING OFFICER: Okay, thank you,  
12 Ms. Mulcahy.

13 Commissioner Bloom, do you have  
14 questions of Dr. Richardson?

15 MR. BLOOM: Dr. Richardson, thank you  
16 for your time today. No questions.

17 THE WITNESS: Thank you.

18 THE HEARING OFFICER: Commissioner  
19 Ampomah? Oh. So it's 4:17. If you will ask your  
20 questions that would be great. If we have a few  
21 minutes we will take just a very short break  
22 before public comments, because public comments  
23 are at 4:30, but we can push it a little bit if  
24 you have a lot of questions. Go ahead.

25 DR. AMPOMAH: Okay, thank you.

1           Okay. Thank you, Dr. Richardson, for  
2 your testimony. And I do appreciate you talking  
3 about the treatment options for PFAS. I really  
4 appreciated that.

5           Now, I want to know what is the  
6 current risk in determining the source of PFAS in  
7 an underground source of drinking water.

8           THE WITNESS: Would you mind repeating  
9 that again, Commissioner? My apologies.

10          DR. AMPOMAH: Okay. What is the  
11 current research status, yes, in determining the  
12 source of PFAS in, lets say, shallow or surface  
13 water?

14          THE WITNESS: That's a good question  
15 and very difficult to determine. So the way that  
16 it can be done is you can look at signatures so  
17 ratios of different PFAS. So, for example, let's  
18 just say an AFFF source, for example, whether it  
19 be a particular product, will have a certain PFAS  
20 character, right, PFAS signature, and so you can  
21 look for that in the environment and perhaps it  
22 gives you a little bit more information about the  
23 source. So it's looking at the ratios. All those  
24 compounds that we looked at in Table 4, you would  
25 be looking at certain ratios of those compounds in

1 the environment so that you can kind of tie that  
2 back. Again, it's not definitive but it certainly  
3 gives you clues.

4 The other would be looking at  
5 variation in concentrations or variations in types  
6 of PFAS so you see a lot of shorter chain versus  
7 longer chain, or the ratio of longer chain to  
8 shorter chain can give you clues on the types of  
9 PFAS sources there might be because there can be  
10 variations in PFAS signatures, whether it be a  
11 consumer product source or whether it be a AFFF.

12 DR. AMPOMAH: So then as research was  
13 there is still a possibility to more or less be  
14 able to know the source of PFAS and more or less  
15 negating the obligation with regards to  
16 intentional PFAS?

17 THE WITNESS: Well, I would like to  
18 say we are moving in that direction but I would  
19 like to kind of bring our, temper our expectations  
20 a bit because of the number of sources and because  
21 the concentrations are generally so low in the  
22 environment it makes it very difficult then to  
23 pinpoint a source.

24 DR. AMPOMAH: Okay.

25 So in your direct testimony you talk

1 about oil and gas companies have used PFAS as a  
2 friction reducer. Now, my question is are there  
3 no better substitutes for that?

4 THE WITNESS: Well, they use, the  
5 common compounds that are used is polyacrylamide  
6 is what is typically used. It's a different  
7 compound all together, it's not a PFAS. I don't  
8 know the reason that that particular PTFE and pFEG  
9 were used, but based on the description in  
10 FracFocus, that's where that information came  
11 from, was that it was a friction reducer.

12 DR. AMPOMAH: Okay.

13 So you testified as to ban the use of  
14 PFAS. What impact, in your opinion, is going to  
15 be on NMOGA?

16 THE WITNESS: I can't speak for NMOGA  
17 but I mean they are in favor of this ban. You  
18 know, again based on our definition, which is very  
19 similar to OCD's, and as we talked before, all  
20 groups, the definitions are actually very similar.  
21 I don't know the impact on NMOGA, but I don't  
22 think it would have any impact at all, to be  
23 honest. But I can't speak fully to that,  
24 Commissioner.

25 DR. AMPOMAH: Now, with regards to the

1 additive issues and then also the intentionally  
2 added, what about if, let's say, NMOGA or the oil  
3 and gas industry is to know more about the  
4 composition of the source of water that they are  
5 using for the downhole operations, would that be a  
6 big ask?

7 THE WITNESS: I can't speak to --  
8 again, you would have to -- there would be some  
9 sampling involved, a fair amount of sampling to  
10 get representative numbers. You know, PFAS  
11 analyses are typically I think 300 to 400 bucks a  
12 sample typically for us so it's not a huge ask.  
13 But in terms of getting the data density to get a  
14 good understanding of your source water would  
15 require a fair amount of sampling.

16 DR. AMPOMAH: So based on your  
17 analysis of FracFocus do you believe that it is  
18 enough, you know, with regards to disclosures?

19 THE WITNESS: I can't -- again, I'm  
20 not a trade secret expert on that, Commissioner,  
21 so in terms of -- are you suggesting what is my  
22 opinion on whether it should be full disclosure or  
23 not?

24 DR. AMPOMAH: No. So right now what  
25 is actually disclosed, you know, from your, based

1 on your expertise and your review of that, is it  
2 accurate or is it sufficient? Let me put it that  
3 way.

4 THE WITNESS: I mean, there are a fair  
5 amount of ingredients that are provided in  
6 disclosure, so if you looked at one of the  
7 exhibits there is a fair amount of -- I don't have  
8 the disclosure in my exhibits, but I believe some  
9 of the other experts did. So a lot of ingredients  
10 are provided in FracFocus. Of course, there are  
11 trade secrets as well.

12 DR. AMPOMAH: So you make mention of  
13 some PFAS that might have been used in oil and gas  
14 operations that more or less you got to know about  
15 that from FracFocus.

16 THE WITNESS: Are you referring to the  
17 single chain, single fully fluorinated, or are --

18 DR. AMPOMAH: The PTFE.

19 THE WITNESS: Sorry. The actual  
20 disclosure was how we were able to identify that.

21 DR. AMPOMAH: So specifically on  
22 Page 3, Item Number 7 of your direct testimony.  
23 Now I want to ask, were these chemicals that you  
24 found in FracFocus, were they marked confidential  
25 or it was just directly there, that you can see.

1 THE WITNESS: It was directly there.

2 DR. AMPOMAH: Okay.

3 I think we have talked about this but  
4 I just want to be sure, that do you have any  
5 evidence or any knowledge that the realization of  
6 the 2.2 percent or let's say the 0.38 percent of  
7 the over 9,000 FracFocus records contributed to  
8 any UAEW contamination?

9 THE WITNESS: I'm not aware of that.

10 DR. AMPOMAH: Okay.

11 Now, you work a lot with oil and gas  
12 companies. Let me ask this. Is there any recent  
13 data going on that you are aware of within NMOGA  
14 or, let's say, the oil and gas industry to fully  
15 understand the chemicals that they are actually  
16 utilizing in operations, in downhole operations?

17 THE WITNESS: I'm not aware of that.

18 DR. AMPOMAH: If not then why should  
19 the Commission not take extreme action to ban more  
20 or less to protect the public?

21 THE WITNESS: I believe that no matter  
22 what definition you choose, Commissioner, that you  
23 are protecting the public. This is a huge list of  
24 PFAS that are in those -- again, and just to make  
25 clear, we are excluding the single fully

1 fluorinated PFAS because those are not consistent  
2 with the EPA TSCA definitions as well as those  
3 would not be the types of compounds that you would  
4 expect to see in hydraulic fracturing.

5 DR. AMPOMAH: Are you familiar with  
6 the oil and gas industry voluntarily suspending  
7 utilizing any chemical?

8 THE WITNESS: I'm not aware of that.

9 DR. AMPOMAH: So then I will follow up  
10 and say that based on your knowledge, is it that  
11 the oil and gas industry more or less widely  
12 depends on the government to act before phasing  
13 out any toxic chemical?

14 THE WITNESS: I can't speak to that  
15 either, Commissioner.

16 DR. AMPOMAH: Okay.

17 So based on your testimony I thought  
18 we were going to talk about, I will be asked by  
19 NMOGA to address Amendments 15 -- 19.15.2, 19.15.7  
20 it goes on and on so I just want to be clear on  
21 that.

22 THE WITNESS: My involvement was to  
23 help with the terminology on those sections. So I  
24 did not write those sections, I helped with the  
25 terminology. I made that clear in my direct

1 testimony, these were the certain sections that I  
2 recommended changes that were made.

3 DR. AMPOMAH: Okay, let's talk about a  
4 definition. So based on the hearing as of now all  
5 OCD is considering excluding is OTM45 and OTM50  
6 from the methods.

7 THE WITNESS: Correct.

8 DR. AMPOMAH: Do you have any comment  
9 on that?

10 THE WITNESS: That is the correct  
11 thing to do, that's right.

12 DR. AMPOMAH: Why is that?

13 THE WITNESS: So the focus here is on  
14 water.

15 DR. AMPOMAH: Okay. I'm going to  
16 pause here. Thank you.

17 MR. RUBIN: Madam Hearing Officer?

18 THE HEARING OFFICER: Yes.

19 MR. RUBIN: If I may, I don't mean to  
20 get out of my lane as counsel. I did discuss this  
21 with the Chair before he left, but there was one  
22 question that he thought would be pertinent to ask  
23 if I may on his behalf.

24 THE HEARING OFFICER: Yes. Actually I  
25 just checked with Ms. Apodaca via text and she

1 said the Chair is on the platform. She is about  
2 to unmute him so we will let him ask the question.

3 Mr. Chair. Mr. Chair.

4 MR. RAZATOS: Madam Hearing Officer,  
5 my apologies.

6 Mr. Rubin was asking and we were  
7 talking about aquifers and we were talking a lot  
8 about shallow aquifers, but we were wondering, at  
9 one point there was conversation about the  
10 formation. We know what is going on downhole as  
11 far as I believe the quote was a black hole or  
12 something to that extent. I apologize. I don't  
13 have my notes in front of me. So there was a lot  
14 of focus on shallower aquifers.

15 Does the doctor have any concerns  
16 about or any comments he would like to tell us  
17 about what is happening with deeper fresh water  
18 aquifers?

19 MR. RUBIN: If I could add, I believe  
20 the testimony of Dr. Spear just said aquifers, and  
21 in Dr. Richardson's rebuttal he said he disagreed  
22 with that, and he said shallow aquifers. I wanted  
23 to be sure it was not a slight of hand and that  
24 you meant to disagree, not just shallow but let's  
25 say artesian aquifers.

1 THE WITNESS: Oh, I'm not disagreeing  
2 with aquifers. From an environmental standpoint,  
3 again I can only speak from being an environmental  
4 engineer, is that we focus mainly on the shallow  
5 drinking water aquifers, and again that would  
6 include in my mind deeper ones, anything that is  
7 being used as a water source, a drinking water  
8 source.

9 MR. RUBIN: So you're saying it's the  
10 same analysis whether it's a shallow or an  
11 artesian aquifer with respect to potential  
12 contamination?

13 THE WITNESS: If you are referring to  
14 PFAS analysis --

15 MR. RUBIN: Yes. Yes.

16 THE WITNESS: Yes, it is.

17 MR. RUBIN: Thank you.

18 THE HEARING OFFICER: Anything  
19 further, Mr. Chair?

20 MR. RAZATOS: No, that's the only  
21 question. Thank you, doctor. We appreciate your  
22 testimony.

23 THE WITNESS: Thank you, Commissioner.

24 THE HEARING OFFICER: Is there any  
25 reason not to excuse Dr. Richardson at this time?

1 MS. MULCAHY: No, Madam Hearing  
2 Officer. I just have one other matter after we  
3 excuse Dr. Richardson.

4 THE HEARING OFFICER: All right, thank  
5 you very much for your testimony, Dr. Richardson.

6 THE WITNESS: Thank you, Madam Chair.  
7 (Witness excused.)

8 THE HEARING OFFICER: Ms. Mulcahy.

9 MS. MULCAHY: I would just like to  
10 also move for admission into the record NMOGA  
11 Exhibit A, which is the red line strikeout of  
12 Guardians proposed rules; NMOGA Exhibit B, which  
13 is the Colorado rule -- excuse me, the Colorado  
14 Bill 22-1345, which is identified in the  
15 prehearing statement; NMOGA Exhibit C, which is  
16 Colorado Bill 22-1348 also identified in the  
17 prehearing statement.

18 THE HEARING OFFICER: Okay, any  
19 objections to NMOGA A, B and C?

20 No? All right, they are admitted.  
21 Thank you very much.

22 (NMOGA Exhibits A, B and C  
23 were received in evidence.)

24 THE HEARING OFFICER: To every one in  
25 the room and on the platform, it is 4:31 and we

1 will take as much public comment as there is to be  
2 given. I need to do one very brief thing, though,  
3 before we accept public comment.

4 Ms. Apodaca, will you come back to the  
5 stand, please?

6 MR. RUBIN: Might we have a  
7 five-minute break before we take public comment,  
8 please?

9 THE HEARING OFFICER: Yes, we will do  
10 that, too.

11 Ms. Apodaca, did you revise the  
12 Certificate of Compliance in conjunction with the  
13 Commission counsel?

14 THE WITNESS: Yes I did.

15 THE HEARING OFFICER: All right. I  
16 would like to make that the Substitute Hearing  
17 Officer Exhibit 1. Are there any -- and admit it  
18 again to show compliance with all public notice  
19 requirements.

20 Is there any objection to that?

21 (Substitute Hearing Officer  
22 Exhibit No. 1 was marked for  
23 identification and received in  
24 evidence.)

25 THE HEARING OFFICER: All right.

1 Thank you very much. That is what we will do, and  
2 thank you, Ms. Apodaca.

3 MS. NANASI: Madam Hearing Officer,  
4 are we going to be able to talk about when our  
5 briefs are going to be due?

6 THE HEARING OFFICER: Yes, not right  
7 now, and it may, in fact, be a conversation that  
8 we have over e-mail. And I will tell you why we  
9 can't have it right now, because we don't know  
10 exactly when the transcripts will come in and I  
11 want to make sure counsel has access to the  
12 transcripts before they make a commitment to  
13 posthearing submittals.

14 MS. NANASI: So we will do that via  
15 e-mail.

16 THE HEARING OFFICER: All right.  
17 Let's take a five-minute break and then we will  
18 come back for public comment.

19 To those on the platform we have been  
20 going for more than an hour and a half.

21 (Recess taken -- 4:33 p.m.)

22 (After recess -- 4:39 p.m.)

23 THE HEARING OFFICER: We are back  
24 after a short break and we will take whatever  
25 public comment there is to be given. I will take

1 some folks online first, and then I will come into  
2 the room, and go back online in the event anyone  
3 else joins us.

4 Just a few things. My name is Felicia  
5 Orth, the hearing officer for this matter. Public  
6 comment can only be given once. If you have more  
7 to say than can be said in three minutes, or if  
8 you have already offered comment on a previous day  
9 I would invite you to submit written public  
10 comment which can be taken until this evening.

11 And I will ask you to state, spell  
12 your name, and swear to affirm to tell the truth,  
13 and then start a stopwatch for three minutes. So  
14 if you are on the platform use the hand raise  
15 function and, again, I will take some comment  
16 online and then I will come to the folks in the  
17 room with us.

18 I see Mandy Sackett. Ms. Sackett, if  
19 you would unmute yourself.

20 MS. SACKETT: Hello, my name is Mandy  
21 Sackett and I am a resident of Taos County.

22 THE HEARING OFFICER: All right, would  
23 you spell your last name, please?

24 MS. SACKETT: S-a-c-k-e-t-t.

25 THE HEARING OFFICER: Do you swear or

1 affirm to tell the truth?

2 MS. SACKETT: I do.

3 THE HEARING OFFICER: I will start  
4 your three minutes.

5 MS. SACKETT: I'm here as a concerned  
6 resident and someone managing autoimmune health  
7 issues which makes me especially aware of the  
8 importance of clean air, water and land. The  
9 state's consideration of PFAS, of a PFAS ban in  
10 fracking is crucial, not just for individual  
11 health but for environmental justice and our  
12 collective fight against climate change.

13 PFAS or forever chemicals are linked  
14 to serious health problems including immune system  
15 disruption and autoimmune diseases. For  
16 communities living near fracking sites, exposure  
17 to these chemicals could mean contaminated water  
18 and soil for generations. The health impacts  
19 disproportionately affect low income and rural  
20 communities that often lack the resources to fight  
21 back or relocate. That makes this an  
22 environmental justice issue.

23 Fracking is already a major  
24 contributor to climate change. Adding PFAS to the  
25 equation only deepens the harm. It is

1 unacceptable to double down on extraction  
2 practices that pollute our land and worsen  
3 greenhouse gas emissions altering the health of  
4 vulnerable communities including the indigenous  
5 and rural populations.

6 As a resident of Taos I see the  
7 interconnectedness of our natural environment and  
8 public health. I think that clean water and  
9 health ecosystems and a safe climate are  
10 non-negotiable for our state's future and even  
11 mandated by our state's constitution.

12 Banning PFAS and fracking is a  
13 necessary --

14 SYSTEM VOICE: You are not allowed to  
15 unmute. To raise your hand press star 5.

16 MS. SACKETT: -- and prioritizing  
17 renewable energy for all New Mexicans so I urge  
18 you to please pass the ban and continue working  
19 toward a just transition that will center health  
20 and --

21 SYSTEM VOICE: You are allowed to  
22 unmute. To unmute yourself press star 6.

23 MS. SACKETT: -- fracking leave  
24 behind.

25 Thank you.

1 THE HEARING OFFICER: Thank you very  
2 much, Ms. Sackett.

3 Let's see, Caitlyn Bizzell.

4 MS. BIZZELL: Yes, that's right.

5 THE HEARING OFFICER: Hello. If you  
6 would state and spell your first and last name,  
7 please.

8 MS. BIZZELL: Caitlyn, C-a-i-t-l-y-n,  
9 Bizzell, B-i-z-z-e-l-l.

10 THE HEARING OFFICER: Do you swear or  
11 affirm to tell the truth?

12 MS. BIZZELL: Yes, I do.

13 THE HEARING OFFICER: I will start  
14 your three minutes.

15 MS. BIZZELL: Good evening, Madam  
16 Hearing Officer and members of the Commission.  
17 Thank you for hearing my comments today. My name  
18 is Caitlyn Bizzell, and I'm a New Mexico resident  
19 currently studying environmental communications  
20 and sustainability at the University of New  
21 Mexico.

22 As a young person involved in  
23 environmental justice I feel compelled to comment  
24 on the risk of PFAS chemicals to the state water  
25 supply and subsequently the risk to the health of

1 myself, my loved ones, and my peers. PFAS  
2 chemicals are a threat to the health of all of the  
3 New Mexico people by contaminating our most  
4 precious resource, the groundwater. The  
5 groundwater of New Mexico is like most water used  
6 in our daily lives. It means even a small amount  
7 of PFAS chemicals in our water can, will, and do  
8 affect a large portion of the population.

9 New Mexico is a beautiful and  
10 resilient state, home to our diverse population of  
11 cultures and identities. Our state must be  
12 protected from oil and gas pollution to preserve  
13 the beauty of both its land and the people who  
14 have called it home for generations. These  
15 chemicals have the potential to inflict  
16 irreversible damage on all New Mexicans. The Oil  
17 Conservation Commission should take immediate  
18 action to ban PFAS from oil and gas operations. I  
19 urge you to put the health and well-being of New  
20 Mexicans first. Please protect us from unjust  
21 harm due to unregulated chemical pollution of  
22 PFAS.

23 Thank you.

24 THE HEARING OFFICER: Thank you,  
25 Ms. Bizzell.

1                   This is Kayley Shoup. Ms. Shoup?

2                   MS. SHOUP: Yup, I'm here.

3                   THE HEARING OFFICER: Oh, hello.

4 Spell your first and last name, please.

5                   MS. SHOUP: K-a-y-l-e-y, S-h-o-u-p.

6                   THE HEARING OFFICER: Do you swear or  
7 affirm to tell the truth?

8                   MS. SHOUP: I do.

9                   THE HEARING OFFICER: I will start  
10 your three minutes.

11                   MS. SHOUP: Hello, my name is Kayley  
12 Shoup, and I'm a community organizer with the  
13 Citizens Caring for the Future in Southeastern New  
14 Mexico. I live in Carlsbad in Eddy County where  
15 many of the produced water spills you hear of  
16 happen. The air, land, water and health of the  
17 community here in Southeastern New Mexico have  
18 been sacrificed for years now as we have seen the  
19 Permian oil boom take over the world.

20                   At a time when the impact of climate  
21 change is being felt more than ever, extreme heat  
22 and drought touch our lives daily. Water is  
23 precious here, and instead of our groundwater  
24 being protected it is being put at risk  
25 constantly. Banning PFAS in oil and gas is one

1 way we can buffer my community from the climate  
2 impact and the environmental impact we are sure to  
3 see in the next four years and beyond as we  
4 continue to deal with this sacrifice. And we,  
5 like everyone else here, will need resources we  
6 can rely on in an uncertain future.

7 Also, oil fields in southeast New  
8 Mexico is filled with immigrant workers that will  
9 have more than their fair share of worries moving  
10 forward. One way we can lighten their load at  
11 this date is by ensuring that they have their  
12 health to carry them forward. This is by ensuring  
13 that they are not exposed to unnecessary and  
14 incredibly toxic chemicals on the job.

15 Lastly, when people are empowered with  
16 information things change. Just this year  
17 researchers came out with a study saying that PFAS  
18 levels in the blood of Californians were lower  
19 than the rest of the country. This is because of  
20 regulations such as the regulations you are  
21 weighing today. They stabilize. They ensure that  
22 children have healthy parents, that parents won't  
23 have to mourn their own children, and that we have  
24 young people that become elders in our future.

25 Passing a ban on PFAS in oil and gas

1 and increasing chemical disclosure really does  
2 keep the world spinning round in its very own  
3 small way. Please understand that and act with  
4 that knowledge.

5 Thank you for your time.

6 THE HEARING OFFICER: Thank you,  
7 Ms. Shoup.

8 Next we have Krystal, Krystal ...

9 MS. CURLEY: Hi.

10 THE HEARING OFFICER: Hi. Would you  
11 state and spell your first and last names?

12 MS. CURLEY: Yes. My name is Krystal  
13 Curley, K-r-y-s-t-a-l, and Curley, C-u-r-l-e-y.

14 THE HEARING OFFICER: Do you swear or  
15 affirm to tell the truth?

16 MS. CURLEY: Yes.

17 THE HEARING OFFICER: I will start  
18 your three minutes.

19 MS. CURLEY: Thank you.

20 Good evening, Oil Conversation  
21 Commissioners. My name is Krystal Curley.  
22 (Speaking in native language.)

23 I'm a Navajo mother of three  
24 daughters. I'm also the executive director of a  
25 nonprofit named Indigenous Lifeways based in

1 McKinley County. We live in a state that  
2 celebrates access to abortion health care, but yet  
3 we have toxic extractive industries that expose  
4 our pregnant people to toxic forever chemicals  
5 like PFAS.

6 In a nine-year period from 2013 to  
7 2022 over 240 million pounds of trade secret  
8 chemicals were injected into wells by the oil and  
9 gas industry. The irreversible implications of  
10 these monstrous acts will forever harm the unborn  
11 and future generations. What will our future  
12 generations have left if we don't safeguard our  
13 health, our water, our bodies and our land? How  
14 are, why we are complicit in this issue? Is this  
15 what we have become as humanity?

16 Oil and gas industry has poisoned us,  
17 poisoned our bodies, poisoned our land, and most  
18 of all you have knowingly withheld information  
19 from the public about these toxic chemicals. By  
20 hiding behind trade secret protocol this  
21 Commission knowingly exposed New Mexico citizens  
22 and oil and gas workers to dangerous chemical  
23 compounds. Commissioners, you have an obligation  
24 to regulate, enforce and monitor the oil and gas  
25 industry in the best interest of New Mexico

1 taxpayers. Oil Conservation Commissioners must  
2 hold the oil and gas industry accountable for  
3 these incompetent actions.

4 As a future grandmother I am here to  
5 speak for my future grandchildren, and I'm asking  
6 the Oil Conversation Commissioners to think of  
7 their daughters, their children, their future  
8 generations, and your legacy, and ask yourself  
9 what can I do to make a difference to ensure a  
10 healthy and liveable future for all New Mexico  
11 citizens.

12 Thank you.

13 THE HEARING OFFICER: Thank you,  
14 Ms. Curley.

15 Next we have Deirdra Velasquez, I  
16 think?

17 MS. VELASQUEZ: Yes, hello.

18 THE HEARING OFFICER: Hello. Would  
19 you please spell your first and last name?

20 MS. VELASQUEZ: Deirdra D-e-i-r-d-r-a,  
21 Velasquez V-e-l-a-s-q-u-e-z.

22 THE HEARING OFFICER: Thank you.

23 Do you swear or affirm to tell the  
24 truth?

25 MS. VELASQUEZ: Yes.

1 THE HEARING OFFICER: I will start  
2 your three minutes.

3 MS. VELASQUEZ: Commissioners, you  
4 have undoubtedly heard dozens of comments  
5 describing what PFAS are, how dangerous the  
6 chemicals are, and how important it is to regulate  
7 them. I will try not to repeat much of what has  
8 already been said.

9 I am a member of Valencia Water  
10 Watchers. We are based in Valencia County just  
11 south. In 2022 we launched a campaign against an  
12 ordinance that would allow use of access for oil  
13 and gas drilling in Valencia County. During the  
14 seven and a half hours of testimony given by other  
15 organizations, community members, and climate  
16 justice groups to persuade the Commission to vote  
17 against the ordinance, I learned about PFAS and  
18 how dangerous those chemicals are for all life,  
19 how they leach into the groundwater and poison the  
20 land, how they are carcinogenic and can cause  
21 birth defects. The Valencia County Commission  
22 passed the ordinance despite the overwhelming  
23 opposition of more than 200 people.

24 While oil and gas drilling hasn't  
25 happened yet, the incoming Trump Administration

1 has promised there will be increased domestic oil  
2 and gas extraction. I expect that it will come up  
3 right to my back door, and even if it doesn't oil  
4 and gas drilling occurs in other parts of the  
5 state already and will increase in those areas.  
6 Regardless of how you personally feel about that  
7 increase, it only makes sense that if it is to  
8 continue then we must make efforts to protect  
9 ourselves.

10 If there is any hope of controlling  
11 these forever chemicals, New Mexico regulators  
12 need to be fully informed about the risk to our  
13 water and what those chemicals exactly are.  
14 Michelle Lujan Grisham promised as governor she  
15 would require mandatory disclosure of what  
16 chemicals are used in fracking to better protect  
17 groundwater. We need her to follow through. We  
18 need you to follow through now more than ever.

19 I would also beg the Commission to  
20 take the first steps in forming a community and a  
21 culture of resistance that should echo from the  
22 very bottom levels of our government elected  
23 officials to the top. Please, I implore you.

24 Thank you.

25 THE HEARING OFFICER: Thank you,

1 Ms. Velasquez.

2 Next we have Sandra Stulberg?

3 MS. STULBERG: Yes.

4 THE HEARING OFFICER: Hello. If you  
5 would please spell your last name.

6 MS. STULBERG: Stulberg  
7 S-t-U-l-b-e-r-g.

8 THE HEARING OFFICER: Do you swear or  
9 affirm to tell the truth?

10 MS. STULBERG: I do.

11 THE HEARING OFFICER: I will start  
12 your three minutes.

13 MS. STULBERG: Thank you, and I want  
14 to just take a moment to uplift the voices that  
15 have come before me. They speak so eloquently of  
16 just how dire this situation is.

17 So my thing is I do my best to make  
18 healthy decisions around what my family and I eat,  
19 what we drink, the chemicals we are exposed to  
20 through the products that we use. I read the  
21 labels and I make decisions based on what is  
22 disclosed on those labels.

23 When I learned about the dangers of  
24 PFAS I did a little bit of research and we made  
25 some changes. We have different dishes,

1 furniture, cookware, food storage, and floss of  
2 all things, but I realize that no amount of  
3 education or vigilance will be enough to protect  
4 us from the harm of these dangerous chemicals if  
5 we allow them to get into our water supply and the  
6 food chain. I have to wonder why these dangerous  
7 chemicals are being allowed to be used at all.

8 I'm not an expert, and I certainly  
9 don't have the privilege of access to the  
10 disclosures that the NMOGA experts do, so the  
11 public must rely on this Commission to do the job,  
12 to make the decision of what is safe for human  
13 consumption and exposure. We need you to make  
14 sure that our environment, our food chain, and our  
15 water supply are not poisoned by industry. We  
16 need you to make sure that our children grow up to  
17 be healthy. We need you to be on PFAS before the  
18 damage is beyond our ability to clean up and  
19 repair. It seems pretty simple: If we ban these  
20 compounds they will stop being spilled into our  
21 environment.

22 Thank you.

23 THE HEARING OFFICER: Thank you,  
24 Ms. Stulberg.

25 Next we have Hazel James. Let's see.

1 MS. JAMES: Hello.

2 THE HEARING OFFICER: Yes, hello.

3 Ms. James, do you swear or affirm to  
4 tell the truth?

5 MS. JAMES: Hello?

6 THE HEARING OFFICER: Yes, hello. Can  
7 you hear me?

8 MS. JAMES: Yes.

9 THE HEARING OFFICER: Great. Do you  
10 swear or affirm --

11 MS. JAMES: I can hear you.

12 THE HEARING OFFICER: Great.

13 MS. JAMES: Yes.

14 THE HEARING OFFICER: I will start  
15 your three minutes.

16 MS. JAMES: Thank you.

17 My name is Hazel James. Tohe,  
18 T-o-h-e. I am a Denra (ph.) woman. I'm a  
19 Bazoonie (ph.) clan, Zuni Edge Water Clan, and the  
20 Black Streaked Wood Clan, and my grandfathers are  
21 Ashehans (ph.) and Twitzelsee (ph.) of the Big  
22 Water Clan and Salt Clan. I am here on a northern  
23 New Mexico area on the Navajo reservation in a  
24 place called Mexican Springs. And I'm a mother of  
25 four and a grandmother of five grandsons, each of

1 whom honors the Nav values and principles and the  
2 Nav wisdom. I work as a coordinator for San Juan  
3 Collaborative for Health Equity and Diné Centered  
4 Research and Evaluation. And we focus on  
5 environmental stresses and health equities for  
6 indigenous communities here in northern New  
7 Mexico.

8 I come before you today on behalf of  
9 my family and my relatives and to speak for the  
10 land, our water, our air, and our fire which is  
11 the center of earth and the center of the  
12 universe. And so today I come before you to urge  
13 the Oil Conservation Commissioners to ban PFAS  
14 chemicals and require full disclosure of all  
15 chemicals used in the oil and gas operations.

16 For us as indigenous people water is  
17 life, (speaking native language). It is central  
18 to our culture, our survival and our future  
19 generations. Yet today we face the grave threat  
20 of PFAS contaminations from oil and gas  
21 operations, chemicals so toxic that even a tiny  
22 amount of contamination can contaminate entire  
23 water sources.

24 On Navajo nation 40 percent of our  
25 people lack access to running water relying on

1 local springs or community wells, which we barely  
2 even have those community wells. It's mainly on a  
3 domestic system, but we still, it still comes from  
4 our groundwater. Our water comes from the  
5 groundwater. Allowing PFAS to be injected into  
6 our land threatens our very survival and violates  
7 our sacred responsibility to protect our  
8 ecosystem.

9 As a health advocate, mother and  
10 grandmother, I am deeply concerned about the  
11 health impacts of PFAS. Scientific research has  
12 linked exposure to PFAS with cancer, thyroid  
13 disease, high cholesterol and reproductive  
14 issues --

15 THE HEARING OFFICER: Ms. James,  
16 please finish up.

17 MS. JAMES: -- our families are  
18 already suffering disproportionately with health  
19 issues like cancer. The sickness is embedded in  
20 our land and water and food affecting those who  
21 are here.

22 Thank you.

23 THE HEARING OFFICER: Thank you.

24 Next we have Antoinette Reyes, I  
25 think.

1 MS. REYES: Hi. Can you hear me?

2 THE HEARING OFFICER: Yes, I can. If  
3 you would spell your last name, please.

4 MS. REYES: R-e-y-e-s.

5 THE HEARING OFFICER: Thank you. Do  
6 you swear or affirm to tell the truth?

7 MS. REYES: Yes, I do.

8 THE HEARING OFFICER: I will start  
9 your three minutes.

10 MS. REYES: Thank you.

11 My name is Antoinette Reyes. I'm  
12 speaking today on behalf of the Sierra Club, Rio  
13 Grande Chapter, and our 35,000 members and  
14 supporters in New Mexico. Thank you for holding  
15 this hearing to strengthen chemical disclosure  
16 requirements and to end the use of per and  
17 polyfluorinated substances, aka PFAS, from oil and  
18 gas operations.

19 With an average of four spills per  
20 day, New Mexico must reduce the amount of produced  
21 water spilled and short of that reduce the  
22 toxicity of produced water even if that means  
23 tackling the issue constituent by constituent.  
24 Annually dozens of fracking constituents,  
25 including thousands of gallons of PFAS, commonly

1 known as forever chemicals, are used in New Mexico  
2 oil and gas operations. And to make matters  
3 worse, oil and gas hides the full list of  
4 pollutants from those that stand to be harmed by  
5 them. These contaminants have already been  
6 detected in New Mexico surface waters in oil and  
7 gas areas around the state according to government  
8 and public university tests. The risks posed to  
9 our groundwater and surface waters cannot be  
10 understated as PFAS are highly toxic at miniscule  
11 levels. Numerous readily available, economically  
12 feasible surfactants alternatives are already on  
13 the market and accessible to industry, those that  
14 do not include PFAS.

15 Banning PFAS better protects public  
16 health and reduces the future contamination of our  
17 state soil, land and dwindling fresh water  
18 resources. PFAS is known to affect every system  
19 in the human body including the immune system. It  
20 is linked to kidney and testicular cancers,  
21 thyroid disease, birth defects and reproductive  
22 problems. Updating chemical disclosure  
23 requirements increases transparency with community  
24 and decision makers in regards to where and when  
25 dangerous chemicals have been used, transported,

1 disposed of and spilled across the state. This  
2 critical safety data would aid state and local  
3 officials in their decisionmaking capabilities by  
4 gaining informed information useful in  
5 accomplishing their duty to protect public health  
6 and the environment.

7 Please, I guess, approve both of the  
8 items in this petition.

9 Thank you.

10 THE HEARING OFFICER: Thank you,  
11 Ms. Reyes.

12 Next we have Senator Jeff Steinborn.  
13 Senator Steinborn?

14 SENATOR STEINBORN: Yes, hello.

15 THE HEARING OFFICER: Hello.

16 Do you swear or affirm to tell the  
17 truth?

18 SENATOR STEINBORN: I do.

19 THE HEARING OFFICER: I will start  
20 your three minutes.

21 SENATOR STEINBORN: Okay. Thank you  
22 so much for the opportunity to address you today.  
23 I'm Senator Jeff Steinborn, the vice chair of the  
24 state's legislative Radioactive and Hazardous  
25 Materials Interim Committee. I call in to

1 wholeheartedly support these items in banning PFAS  
2 and undisclosed chemicals.

3           We are dealing with so much  
4 contamination in the state of New Mexico,  
5 including from PFAS that is now showing up, as you  
6 I'm sure have heard, in the Pecos River and  
7 wildlife outside of Holloman Air Force Base.  
8 These are chemicals that encase the oil field  
9 according to the New Mexico Oil and Gas  
10 Association they don't use anyway. Now we are  
11 finding that it still shows up. The fact is that  
12 this is a prudent step for the Commission to take  
13 to protect New Mexico.

14           The fact that we would allow these  
15 forever harmful substances to be polluted in our  
16 land and our water and our environment while  
17 spending millions of dollars to try to figure out  
18 what it is that is polluting the land is just  
19 crazy, and we need to start being proactive in  
20 protecting New Mexicans from these chemicals. And  
21 so your step today or your consideration is a very  
22 prudent step, and I applaud you for considering it  
23 and urge you to take action and remind you that  
24 our Radioactive and Hazardous Materials Committee  
25 did send a letter endorsing this action today.

1                   So thank you very much.

2                   THE HEARING OFFICER: Thank you,  
3                   Senator Steinborn.

4                   All right, I will move into the room  
5                   here for the next public commenters. If you would  
6                   please come up one at a time to that stand right  
7                   there. Make sure there is a green light on the  
8                   microphone.

9                   And would you state and spell your  
10                  first and last name?

11                  MS. AHOIDO: My name is Aria A-r-i-a,  
12                  last name A-h-o-i-d-o.

13                  THE HEARING OFFICER: Thank you.

14                  Do you swear or affirm to tell the  
15                  truth?

16                  MS. AHOIDO: Yes.

17                  THE HEARING OFFICER: I will start  
18                  your three minutes.

19                  MS. AHOIDO: I was born in New Mexico  
20                  in Taos and my family has only been here for, you  
21                  know, one generation. But New Mexico has a long  
22                  history of being used for resources at the expense  
23                  of its land and water and the people who live  
24                  here, from uranium mining to the atomic bomb  
25                  manufacture and testing. Generations of New

1 Mexicans have seen the dangerous and unending  
2 effects of industries taking advantage of this  
3 area. It's time to stop that.

4 PFAS are known to be dangerous  
5 carcinogens that cause cancer and other health  
6 issues. We must remove them from our water. The  
7 oil and gas industry must be held accountable for  
8 the damage they have done and continue to do to  
9 the environment and people. We are in an  
10 extremely important moment, a climate crisis where  
11 we must do all we can to build a sustainable  
12 future for our planet and generations of people to  
13 come.

14 We have to start with protecting our  
15 own state and the people who live here, not the  
16 industries who are trying to make a profit. We  
17 must protect our water from contaminants.  
18 Transparency is a no brainer. Please stop siding  
19 with big industries and side with New Mexicans and  
20 our natural resources.

21 Thank you.

22 THE HEARING OFFICER: Thank you very  
23 much.

24 Is there anyone else in the room who  
25 would like to offer public comment?

1 Hello. Please state and spell your  
2 first and last name.

3 MS. BUNGUM: My name is Polly  
4 P-o-l-l-y, Bungum B-u-n-g-u-m.

5 THE HEARING OFFICER: Do you swear or  
6 affirm to tell the truth?

7 MS. BUNGUM: I do.

8 THE HEARING OFFICER: I will start  
9 your three minutes.

10 MS. BUNGUM: As a young person  
11 inheriting this earth, it's really important to me  
12 that our land, our water and our air is not  
13 contaminated with dangerous chemicals that never  
14 break down in natural conditions because they are  
15 practically impossible to clean up. I would like  
16 to express my wholehearted support for these  
17 amendments and to ask that in the future less  
18 subsidies are given to oil and gas industry.

19 Last year New Mexico taxpayers paid  
20 86.2 billion in subsidies to the massive oil and  
21 gas industry. NRDC, the Natural Resources Defense  
22 Council, recommended all public giveaways to oil  
23 and gas and redirecting money to public  
24 priorities. These priorities include establishing  
25 just transition programs for industry workers and

1 supporting clean energy as we should be less  
2 concerned with extracting fossil fuels and more  
3 concerned with the well-being of our earth. I  
4 guess that's a future problem, but for now the  
5 least you can do is ban PFAS and require chemical  
6 disclosure to protect the systems of a life we  
7 rely on and are a part of.

8 Thank you.

9 THE HEARING OFFICER: Thank you,  
10 Ms. Bungum.

11 Anyone else?

12 MR. NORINE: I would like to make a  
13 public comment. Sorry, I can't raise my hand  
14 because I'm having to call in. My Microsoft Teams  
15 isn't working.

16 THE HEARING OFFICER: Okay, give me  
17 one minute. I already have someone at the stand.  
18 I will call on you momentarily.

19 MR. NORINE: No worries. Thank you.

20 THE HEARING OFFICER: State and spell  
21 your first and last name, please.

22 MS. BACA-LUCERO: Frankie Baca-Lucero,  
23 B-a-c-a hyphen L-u-c-e-r-o.

24 THE HEARING OFFICER: Thank you.

25 Do you swear or affirm to tell the

1 truth?

2 MS. BACA-LUCERO: Yes.

3 THE HEARING OFFICER: I will start  
4 your three minutes.

5 MS. BACA-LUCERO: Dear Commission, we  
6 the people have declared in Principle 1 of the Rio  
7 Declaration on Environment and Development from  
8 the United Nations are entitled to a healthy and  
9 productive life in harmony with nature. For this  
10 to be a reality we need a functioning ecosystem  
11 with living soil, clean water and breathable air.  
12 The usage of forever chemicals, PFAS, in the oil  
13 and gas operations completely disregard this  
14 principle.

15 Fracking in New Mexico needs to stop,  
16 period. This profit-driven exploitation must  
17 stop. Give land back to those who know how to be  
18 in relationship with the more than human world,  
19 the indigenous peoples, the original nurturers.

20 The people who care bring you today  
21 two simple requests, quoted from the petition,  
22 Case Number 23580. Number one, that the  
23 Commission adopt a rule prohibiting the use of  
24 PFAS in oil and gas drilling, development and  
25 production in order to prevent the generation of

1 PFAS-contaminated produced water and nondomestic  
2 waste. Number two, that the Commission adopt a  
3 rule prohibiting the use of undisclosed chemicals  
4 in downhole operations to ensure reasonable  
5 transparency around substances used by the oil and  
6 gas industry and to ensure industry compliance  
7 with the prohibition of the use of PFAS. This  
8 will not only allow for the rise and restoration  
9 of ecological health of our beloved and generous  
10 home, New Mexico, it will also pursue the overall  
11 western United States regeneration.

12           Instead of giving millions of dollars  
13 to the oil and gas industry, we could be  
14 subsidizing hyper local solutions. For example,  
15 we could be making methane digesters for more  
16 affordable and accessible to use the inputs of  
17 sewage sludge, agricultural and food residues  
18 employing inevitable waste to create a closed loop  
19 system. Another viable solution could be solar in  
20 New Mexico where we can empower a high index of UV  
21 rays that can be used for household services,  
22 shade for crops and vehicle charging stations.

23           Another solution could be building  
24 small scale winter vines made from upcycle  
25 materials lessening our waste. We are simply

1 asking for public funds to be redirected towards  
2 local projects that actually benefit the people on  
3 the planet and maybe, just maybe, we as humans can  
4 come together to acknowledge and help uphold our  
5 responsibilities to this interdependent and  
6 interconnected universe. Learn to live with less  
7 and not less is more, and to consciously care for  
8 oneself, letting that care bleed out to the land  
9 and those within it.

10 Thank you.

11 THE HEARING OFFICER: Thank you, very  
12 much.

13 Sir, thank you on the platform for  
14 speaking up. I will take your comment now. Can  
15 you unmute yourself again?

16 It was the one with the blue -- yes,  
17 that one. I thought. No? Can you unmute  
18 yourself?

19 MR. NORINE: Were you referring to me?  
20 I'm sorry.

21 THE HEARING OFFICER: Yes. I believe  
22 you were the one that spoke up a moment ago to say  
23 you wanted to offer a comment?

24 MR. NORINE: Yes.

25 THE HEARING OFFICER: All right, if

1 you would give us your first and last name,  
2 please.

3 MR. NORINE: My name is Randon  
4 R-a-n-d-o-n, Norine N-o-r-i-n-e.

5 THE HEARING OFFICER: Thank you.  
6 Do swear or affirm to tell the truth?

7 MR. NORINE: Yes, I do.

8 THE HEARING OFFICER: I will start  
9 your three minutes.

10 MR. NORINE: Awesome.

11 So I'm calling in from Valencia County  
12 on behalf of my fellow community members and  
13 organizers that I share my communities with, as  
14 well as the projects that I have started called A  
15 Better New Mexico Is Possible.

16 And I don't have the education and the  
17 research to speak on the issue as well as folks  
18 such as our Senator and the NMOGA, all of these  
19 other incredibly informed and magnificent folks,  
20 but I can say that as somebody who has experienced  
21 so much of the United States leaving me and the  
22 people I love behind, the last couple of years  
23 especially, we have an obligation to just start  
24 taking care of each other.

25 Many things have failed many of our

1 community members for years and years. The  
2 nuclear waste tests damaged Navajo nation land and  
3 water for years, and as another speaker had  
4 mentioned causes higher cancer rates than almost  
5 any other American nation or American national --  
6 sorry about that -- and then outside of the state  
7 of New Mexico we see things such as the Flint  
8 water crisis and we see so many of these things  
9 that are basic necessities that are necessary for  
10 not only us to survive but for our environment to  
11 survive, for our species to survive.

12 Living down in Valencia County, if we  
13 don't have clean water and our soil is  
14 contaminated with these forever chemicals we can't  
15 farm here. Our animals can't graze. We lose an  
16 incredibly important aspect of what makes our  
17 community not only functional but allows us to  
18 support each other. Even local businesses such as  
19 Bomvida Farms would be severely affected by this  
20 kind of chemical leaching into our natural  
21 communities.

22 So as somebody who doesn't necessarily  
23 come from the greatest background in science and  
24 all of these different things, I, too, implore you  
25 as a community member and an organizer to take

1 into consideration my comments and everyone else's  
2 and help us to just have some faith in our  
3 government officials again. Help us to take care  
4 of each other and show that there can be  
5 successes. There does not only have to be  
6 failures.

7 Thank you.

8 THE HEARING OFFICER: Thank you,  
9 Mr. Norine.

10 Is there anyone else on the platform  
11 who would like to offer public comment at this  
12 time? Please raise your hand. I see Seneca  
13 Johnson. There we go.

14 MS. JOHNSON: Hello, can you hear me?

15 THE HEARING OFFICER: Yes. If you  
16 would please spell your first name.

17 MS. JOHNSON: Hi. My name is Seneca,  
18 S-e-n-e-c-a, and yeah. I --

19 THE HEARING OFFICER: Hold on. Do you  
20 swear or affirm to tell the truth?

21 MS. JOHNSON: Yes.

22 THE HEARING OFFICER: I will start  
23 your three minutes.

24 MS. JOHNSON: Thank you.

25 Good afternoon. My name is Seneca

1 Johnson. I live in Santa Fe. I am currently a  
2 student at Yale University pursuing a degree in  
3 environmental studies, and I'm also a member of  
4 GECA.

5 I am here because I am really  
6 concerned about the future of New Mexico's water  
7 supply and water quality if we continue to use the  
8 PFAS and undisclosed chemicals in fracking  
9 operations. PFAS chemicals are dubbed forever  
10 chemicals for a really clear reason. PFAS can  
11 remain in the body for years after exposure and  
12 can remain in the environment for hundreds to  
13 thousands of years. PFAS accumulates with  
14 continuous or repeated exposure within the body  
15 and the environment such as through water  
16 contamination and has been linked to increased  
17 cancers, immune system depression, and problems  
18 with fetal development.

19 Earlier this year the EPA set a  
20 maximum contaminant level of PFAS in drinking  
21 water at four parts per trillion, which  
22 essentially means that there is functionally no  
23 healthy amount of exposure to PFAS. We know that  
24 PFAS have already been used in some of New  
25 Mexico's fracking operations but we don't know to

1 what extent because these companies are not  
2 required to disclose chemicals used nor are they  
3 subject to the hazardous use regulations. So  
4 without further protections from the law we must  
5 essentially trust that oil and gas companies in  
6 New Mexico will not poison our drinking water and  
7 will not allow PFAS chemicals to be spilled, but  
8 with the current record this trust has not been  
9 earned.

10 It is clear that the mitigation  
11 strategies already in place to protect our land  
12 and water are not effective with intervening  
13 spills of these toxic chemicals which happen like  
14 four times a day. About 80 percent of New Mexico  
15 drinking water comes from groundwater which makes  
16 us especially vulnerable to the effects of  
17 groundwater contaminants, and to allow for unknown  
18 chemical blends to spill this regularly is a  
19 direct line for permanent degradation of our water  
20 supply and guaranteed negative health effects for  
21 our communities.

22 Requiring disclosure of chemicals used  
23 is not unheard of. Several other states' oil and  
24 gas companies operate under chemical disclosure  
25 laws without harm to their industry. In fact, our

1 own governor Michelle Lujan Grisham proposed it  
2 six years ago under the 2018 water plan. Chemical  
3 disclosure allows for both the public and for  
4 regulators to better understand health and  
5 environmental risks associated with the chemicals,  
6 allows for more effective monitoring for  
7 contamination, and holds companies accountable for  
8 future spills. I think medical professionals  
9 should not have to make guesswork for patients'  
10 illnesses when this information could directly  
11 help, and I think, you know, we need to make sure  
12 that people are able to make informed decisions  
13 about their personal and family health.

14 At the end of the day, you know, we  
15 want to keep ourselves, our community, our  
16 environment and future generations safe from toxic  
17 forever chemicals. It seems the climate crisis is  
18 only going to become worse, the effects are going  
19 to become more severe in coming decades, and I  
20 think it is going to be really crucial that we  
21 continue to do everything that we can to protect  
22 our water for ourselves and for our future  
23 generations as well.

24 So I ask that you all support the  
25 measures proposed for required chemical disclosure

1 and for prohibition of PFAS chemicals in fracking  
2 operations.

3 Thank you.

4 THE HEARING OFFICER: Thank you,  
5 Ms. Johnson.

6 Anyone else on the platform here to  
7 offer public comments? I don't see any hands.

8 Is there anyone else in the room here  
9 to offer public comment, anyone else at all?

10 No. All right -- let's see.

11 Ms. Nanasi?

12 MS. NANASI: I just wanted to say  
13 thank you to the Commissioners and to you, Madam  
14 Hearing Officer, and to my colleagues. I had to  
15 leave the actual room but I have been online and I  
16 just want to thank you for this hearing. And have  
17 a good weekend.

18 THE HEARING OFFICER: Thank you very  
19 much, Ms. Nanasi. And everyone on the platform  
20 and in the room, I know our Commission chair had  
21 to leave the room but he has been on the platform  
22 ever since. There are other Commissioners. Thank  
23 you all for just being so professional and putting  
24 on a good evidentiary record.

25 Please drive safely home.

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(Off the record at 5:19 p.m.)

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I, CAPPY HALLOCK, the reporter before whom the foregoing proceedings were taken, do hereby certify that the foregoing transcript is a true record of the proceedings.

I further certify that I am neither counsel for, related to, nor employed by any of the parties to the action in which these proceedings were taken; and further that I am not a relative or employee of any attorney or counsel employed by the parties hereto, or financially or otherwise interested in the outcome of this action.

December 10, 2024



Cappy Hallock, RPR, CRR

My Commission expires January 19, 2025

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[amendments - antoinette]

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[anybody - asking]

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[asking - aware]

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[aware - beauchamp]

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[beauchamp - bioavailability]

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[biocumulative - breakdown]

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[breakdown - cancer]

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[considering - conversation]

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[indigo - instances]

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[okay - ordinance]

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[please - potential]

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[proposed - public]

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[right - rule]

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[sickness - snow]

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[sobel - speaking]

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[speaking - standards]

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[standards - staying]

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[talked - testifies]

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[water - wildearth]

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