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17	Baton Rouge, Louisiana	14		
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1	APPEARANCES (Continued):	1	MR. BRYANT: Good morning. Mitchell Bryant
2		2	on behalf of Chevron USA.
3	REPRESENTING CHEVRON U.S.A. INC., ET AL.: TRACIE RENFROE, ESQUIRE	3	JUDGE PERRAULT: All right. And for Henning
4	Email: trenfroe@kslaw.com	4	Management.
5	Phone: (225) 389-3770	5	MR. CARMOUCHE: Good morning. John Carmouche
	KING & SPALDING LLP	6	on behalf of Henning Management.
6	1100 Louisiana, Suite 4100 Houston, TX 77002	7	MR. WIMBERLEY: Good morning. Todd Wimberley
7	110uston, 17 77002	8	on behalf of Henning Management.
8	- and -	9	MR. KEATING: Good morning. Matt Keating on
9	JOHNNY CARTER, ESQUIRE Phone: (713) 651-9366	10	behalf of Henning Management LLC.
10	SUSMAN GODFREY	11	JUDGE PERRAULT: And like the panel of
	1000 Louisiana	12	experts who are going to hear the case to
11	Suite 5100	13	make their appearance on the record. And
12	Houston, TX 77002-5096	14	we'll start here. Just give your name, your
	PANELISTS:	15	agency, and your area of expertise, please.
14	STEPHEN OLIVIER	16	PANELIST LITTLETON: Jessica Littleton,
15	JESSICA LITTLETON	17	petroleum scientist with the environmental
16 17	GAVIN BROUSSARD CHRISTOPHER DELMAR	18	division of the Department of Natural
18		19	Resources.
19		20	PANELIST DELMAR: Chris Delmar, petroleum
20 21		21 22	scientist supervisor. I'm a geologist with
22		22	the environmental division of the Department of Natural Resources.
23		23 24	PANELIST OLIVIER: Stephen Olivier, petroleum
24 25		24 25	scientist manager with the Office of
25		25	selentist manager with the Office of
	Page 6		Page 8
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	Page 9		Page 11
1	plan to address the environmental media and	1	feasible plan in this case after hearing the
2	constituents at the Henning property.	2	testimony and evidence submitted within the
3	We know that your job is a challenging	3	next couple of weeks that is commensurate and
4	one, yet it's a very significant one in that	4	consistent with the methodology that this
5	competing most feasible plans have been	5	agency has applied on numerous occasions,
6	submitted by both parties; that is, Chevron	6	including under the most feasible plans that
7	and the landowner, Henning Management. And	7	I mentioned to you earlier.
8	you have been tasked by the Louisiana	8	We are aware of Judge Cain's ruling in
9	legislature and presiding court to review the	9	this case, and we're not here to argue about
10	sampling data and to provide your technical	10	that ruling or its scope. The ruling is
11	expertise in arriving at a most feasible plan	11	there, and I'm sure you have reviewed it and
12	to address environmental constituents at the	12	know what the ruling provides. That ruling
13	property, particularly in the soil and	13	is the subject of legal filings in the
14	groundwater.	14	federal court proceeding. But as I mentioned
15	We are here, as you know, because the	15	to you, we ask that you, the panel, use your
16	Louisiana legislature adopted a procedure	16	technical expertise and your knowledge of the
17	that we all know is commonly referred to as	17	applicable regulations to arrive at that plan
18	Act 312. It allows an oil and gas company to	18	that is the most feasible, which is defined
19	admit responsibility for environmental	19	in statute as the most reasonable and
20	damage, which is defined as actual or	20	that's important: The most reasonable to
21	potential impact under the statute at oil	21	protect human health and the environment. We
22	field properties which are under the	22	just ask for consistency in approach in your
23	jurisdiction of the Office of Conservation.	23	methodology that you've used in prior Act 312
24	Chevron admitted potential impact to	24	proceedings and most feasible plans.
25	environmental media. It filed a limited	25	Chevron's experts, as you are aware,
	Page 10		Page 12
1			-
1	admission as to discrete areas of soil and		
		1	have provided you with a most feasible plan
2	groundwater in this property. So this issue	2	that addresses the soil and groundwater at
3	has been referred to you for adjudication and	2 3	that addresses the soil and groundwater at this property. And those experts have
3 4	has been referred to you for adjudication and to arrive at a most feasible plan for the	2 3 4	that addresses the soil and groundwater at this property. And those experts have arrived at conclusions as to what the
3 4 5	has been referred to you for adjudication and to arrive at a most feasible plan for the property.	2 3 4 5	that addresses the soil and groundwater at this property. And those experts have arrived at conclusions as to what the proposed feasible plan, which is the most
3 4 5 6	has been referred to you for adjudication and to arrive at a most feasible plan for the property. The legislature has delegated to you,	2 3 4 5 6	that addresses the soil and groundwater at this property. And those experts have arrived at conclusions as to what the proposed feasible plan, which is the most reasonable plan, should be by implementing
3 4 5 6 7	has been referred to you for adjudication and to arrive at a most feasible plan for the property. The legislature has delegated to you, the Office of Conservation, as the regulatory	2 3 4 5 6 7	that addresses the soil and groundwater at this property. And those experts have arrived at conclusions as to what the proposed feasible plan, which is the most reasonable plan, should be by implementing the very methodology, the same or similar
3 4 5 6 7 8	has been referred to you for adjudication and to arrive at a most feasible plan for the property. The legislature has delegated to you, the Office of Conservation, as the regulatory body with the technical expertise to review	2 3 4 5 6 7 8	that addresses the soil and groundwater at this property. And those experts have arrived at conclusions as to what the proposed feasible plan, which is the most reasonable plan, should be by implementing the very methodology, the same or similar methodology that some of you panel members
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	Page 13		Page 15
1	most reasonable in protecting the human	1	Contamination. This is what you have to
2	health, public safety, and environment.	2	follow as to what they admitted this property
3	We will present those witnesses to you	3	is. "The introduction of substances or
4	throughout the week; and the plaintiff, the	4	contaminants into a useable groundwater
5	landowner, will submit its witnesses to you	5	aquifer, an underground source of drinking
6	as well. We encourage you to ask questions	6	water."
7	as we present our witnesses and the testimony	7	Okay. So the first thing they admit is
8	that they have.	8	that there's presence of substances or
9	We thank you again for your time and we	9	contaminants in the drinking water aquifer.
10	look forward to working with you this week	10	It doesn't say that I'm admitting
11	and next.	11	introduction or presence of substance or
12	JUDGE PERRAULT: Would Henning like to make	12	contaminants into a nonusable aquifer. It
13	an opening statement?	13	doesn't say that. It doesn't say that the
14	MR. CARMOUCHE: Good morning. John Carmouche	14	water can't be used. It says: I, Chevron,
15	on behalf of Henning Management. I'll try to	15	am admitting that there are contaminants in a
16	be a little less formal and just talk to you	16	drinking water aquifer.
17	as scientists.	17	"Or soil in such quantities as to render
18	Unfortunately, we're here to apply	18	them unsuitable for their reasonable intended
19	rules. And there were rules that were set by	19	purposes." So they recognize and admit to
20	the legislature, 2006 and on. And that is	20	you that there are substances and
21	what those rules is what you have to	21	contaminants and that the soil is unsuitable
22	follow today. And the judge in this case has	22	for its intended use. That's what they
23	told us what those rules are. We have, as	23	admitted, and that's what you have to assume
24	lawyers and as Chevron, agreed to an EMO,	24	today because that's what they admitted to
25	which do not you weren't a part of. We	25	you and to the judge.

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1	agreed with the judge, a federal judge in	1	Environmental damage. Mr. Gregoire went
2	Lake Charles, that we would take time and	2	over it. He just left out a little part:
3	spend the money to sample this property, soil	3	"Shall mean any actual or potential damage or
4	and groundwater, for months, spend hundreds	4	injury to environmental media caused by
5	and hundreds of thousands of dollars on	5	contamination."
6	sampling and then, at that point, when	6	So first we start with contamination,
7	everybody knew what the data said and if you	7	and then you can have potential impact from
8	need more time to actually know what's on the	8	that contamination. But first, it has to be
9	property, soil and groundwater, then ask for	9	caused by contamination and then you go back
10	more time to sample so when we got here, you	10	to the definition of "contamination."
11	would know what is on the property. There	11	So right now, we stand here in front of
12	should be no question. That's what they	12	you today knowing this: We have a drinking
13	agreed to.	13	water aquifer that has contaminants in it and
14	So we did all of the sampling. We	14	we have soil that can't be used.
15	didn't choose. You didn't choose to be here.	15	So just to be sure, we asked the judge
16	They chose to be here today. They chose	16	that sits over this case to interpret what
17	under the statute to admit that the property	17	they admitted to make sure that you, us, and
18	was contaminated, is contaminated, and that	18	them knew what rules we were playing with.
19	there is environmental damage. And when they	19	So go to the next page, please.
20	did that, there was consequences because the	20	And this is what the court said. So we
21	rules we have to follow tell us what they	21	gave that argument that I just gave you to
22	need to follow. They need to follow the	22	the judge, and he says, "The court agrees
23	rules.	23	with Henning's interpretation and finds that
24	Can you put it up, please?	24	the property subject of this suit is not
25	This is what they admitted.	25	suitable for its intended use, as Chevron

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1	admitted to the court in its limited	1	Mr. Purdam will use today. It's also going
2	admitted to the court in its innited	2	to be broadcast on the network for your
2	Next, please.	3	convenience and the panel members.
4	This is the judge's ruling which applies	4	JUDGE PERRAULT: Mr. Purdam, would you please
5	to you. "After the public hearing, LDNR	5	state your name for the record.
6	shall approve or structure a feasible plan	6	THE WITNESS: Michael T. Purdam.
7	incorporating the court's finding that, as a	7	JUDGE PERRAULT: And spell your last name.
8	result of Chevron's limited admission,	8	THE WITNESS: PURDOM.
9	Henning's property contains contamination and	9	MIKE PURDOM,
10	is not suitable for its intended use.	10	having been first duly sworn, was examined and
11	Ultimately, based on the court's finding of	11	testified as follows:
12	contamination, the public hearing and the	12	DIRECT EXAMINATION
12	parties submitted plans, LDNR shall, within	13	BY MR. GREGOIRE:
13	the time frame permitted under Act 312,	14	Q. Good morning. Can you state your name
15	submit to a court a feasible plan to" and		for the record?
16	it quotes the statute. It says doesn't	16	A. Yeah. Mike T. Purdom.
17	say "evaluate." Feasible plan definition	17	Q. And Mr. Purdom, what is your occupation?
18	says: "To remediate contamination from oil	18	A. I'm a geologist.
19	field and exploration and production	19	Q. And where do you work?
20	operations or waste."	20	A. At Environmental Resources Management,
21	To remediate contamination. Go back to	21	also ERM.
22	the definition of "contamination." Drinking	22	Q. And tell us a little bit about what ERM
23	water aquifer and soil that can't be used.	23	Management is and what your responsibilities are
24	So today, I ask that when they put up	24	at ERM Management.
25	witnesses today or tomorrow and they say the	25	A. ERM is an environmental consulting firm.
	Page 18		Page 20
1	water's not a drinking water aquifer and they		I am based here in Baton Rouge, and I am a partner
2	say the soil can be used for its intended	2	within the Gulf business unit. I'm the area
3	purpose, remember what the judge says. But	3	manager for the Gulf Coast area.
4	you can read the statute. You can read the	4	Q. And how long have you been employed by
5	definition of "contamination." These are	5	ERM?
6	rules we have to follow. These are rules	6	A. Four years.
7	that were set by the legislature.		
8		7	Q. Tell us a little bit about what you do
_	This you can't just throw away the rules	8	at ERM.
9	that we have to act under. And the State of	8 9	at ERM. A. So I have kind of dual responsibilities.
10	that we have to act under. And the State of Louisiana asks that you, as panel members,	8 9 10	<ul><li>at ERM.</li><li>A. So I have kind of dual responsibilities.</li><li>One, with my area manager role, I have some</li></ul>
10 11	that we have to act under. And the State of Louisiana asks that you, as panel members, follow the rules set even if you don't like	8 9 10 11	at ERM. A. So I have kind of dual responsibilities. One, with my area manager role, I have some operational responsibilities for our Gulf Coast
10 11 12	that we have to act under. And the State of Louisiana asks that you, as panel members, follow the rules set even if you don't like them. You might not like them. You might	8 9 10 11 12	at ERM. A. So I have kind of dual responsibilities. One, with my area manager role, I have some operational responsibilities for our Gulf Coast area; and then, secondly, I do soil and
10 11 12 13	that we have to act under. And the State of Louisiana asks that you, as panel members, follow the rules set even if you don't like them. You might not like them. You might not agree with the definition of	8 9 10 11 12 13	at ERM. A. So I have kind of dual responsibilities. One, with my area manager role, I have some operational responsibilities for our Gulf Coast area; and then, secondly, I do soil and groundwater investigations through our what we
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10 11 12 13 14 15 16 17 18 19	that we have to act under. And the State of Louisiana asks that you, as panel members, follow the rules set even if you don't like them. You might not like them. You might not agree with the definition of "contamination." You might not agree with what the legislature says. But those are the rules that we follow. And all I ask you today is, at the end of this hearing, is to follow the rules. That's all we ask for you from you and thank you.	8 9 10 11 12 13 14 15 16 17 18 19	<ul> <li>at ERM.</li> <li>A. So I have kind of dual responsibilities.</li> <li>One, with my area manager role, I have some operational responsibilities for our Gulf Coast area; and then, secondly, I do soil and groundwater investigations through our what we call our LPMR group. It's the Liability Portfolio Management &amp; Remediation.</li> <li>Q. And how long have you been doing that type of site assessment, evaluation and remediation work at ERM or others?</li> <li>A. Coming up on 30 years. I believe it's</li> </ul>
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1	Page 21		Page 23
1 th	at fall under the jurisdiction of LDEQ and LDNR?	1	A. Yes.
2	A. That's correct.	2	Q. They included heavy metals?
3	Q. And that would include application of	3	A. Yes.
4 R	ECAP and 29-B?	4	Q. Petroleum hydrocarbons?
5	A. Yes.	5	A. Yes.
6	Q. By whom were you hired in this matter?	6	Q. Radium?
7	A. Through Kean Miller on behalf of	7	A. Yes.
8 C	hevron.	8	Q. Have they also included naturally
9	Q. And talk a little bit about the areas of	9	occurring constituents such as iron, manganese and
10 ex	xpertise; and that is, the areas that you	10	sulfate?
11 co	onsider yourself to have sufficient training and	11	A. Yes, they have.
12 ec	ducation and knowledge to be an expert in	12	Q. Have you worked with all environmental
13 co	onnection with what you have done throughout your	13	media; that is, soil, sediment and groundwater?
14 ca	areer.	14	A. Yes, I've worked with all three of
15	A. Yeah. So over the 30 years, I've my	15	those.
	reas of expertise include site assessment, you	16	Q. Have you represented clients before the
	now, characterizing the subsurface geological	17	Louisiana Department of Natural Resources?
	onditions that are at a site, looking at	18	A. I have prepared worked with the
-	roundwater aquifers to characterize them and	19	Department of Natural Resources on documents.
	nderstand the groundwater characteristics,	20	I've not been a part of a panel like this before.
	cluding subsurface geology, also done site	21	Q. You hadn't been a part of the hearing,
	emediation across the state and the application	22	but you've represented clients before the
	f the regulatory standards and procedures.	23	Louisiana Department of Natural Resources outside
24	Q. And before we move on with your career	24	of the hearing context; right?
25 ar	nd what you have done as a scientist, a geologist	25	A. That's correct.
	Page 22		Page 24
1 a	nd hydrogeologist, where did you go to school?	1	Q. Have you represented clients before the
2	A. LSU here in Baton Rouge.	2	Louisiana Department of Environmental Quality?
3	Q. And what degree or degrees did you	3	A. Yes.
4 0	btain?	4	Q. Let's talk a little bit about your
5	A. Bachelor of Science in geology.	5	1.
6	Q. So have you rendered expert analysis in	5	licensure.
1	- • •	6	A. Sure. So I obtained my professional
, .	onnection with the evaluation or remediation of	6 7	A. Sure. So I obtained my professional geologist license with the state of Texas in 2003
8 th	ne environmental media at onshore properties in	6 7 8	A. Sure. So I obtained my professional geologist license with the state of Texas in 2003 upon the initial offering of the state of Texas
8 th 9 L	ne environmental media at onshore properties in ouisiana?	6 7 8 9	A. Sure. So I obtained my professional geologist license with the state of Texas in 2003 upon the initial offering of the state of Texas opening that up for licensure. Then in 2010, I
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1	Page 25		Page 27
1	first investigations in Louisiana sites.	1	risk assessment?
2	As Mr. Gregoire we talked about	2	A. I'm not an expert in human health risk
3	earlier, over 250 oil and gas-related sites, many	3	assessment.
4	of these being midstream: Pipelines, compressor	4	Q. You didn't calculate the background at
5	stations, metering stations, but as well as some	5	this property in the soil or groundwater; correct?
6	oil field E&P production sites.	6	A. We we, ERM
7	I've worked on two Louisiana Superfund	7	Q. You personally.
8	sites and then kind of a broad range of experience	8	A. I did not personally.
9	across EPA brownfield sites. I've done quite a	9	MR. WIMBERLEY: I think that's all I have.
10	few of those, specifically here in the Baton Rouge	10	JUDGE PERRAULT: Redirect?
11	area and across Louisiana. Petrochemical, pulp	11	VOIR DIRE EXAMINATION
12	and paper, power, power sites across Louisiana and	12	BY MR. GREGOIRE:
12	the Gulf Coast.	12	Q. Mr. Purdom, on how many occasions have
13	Again, 28, I believe coming up on 29	13	you applied 29-B in connection with your site
		14	characterization, evaluation, and remediation of
15	years now, of Louisiana experience. And throughout that time, I've worked closely with the	15 16	various onshore sites in Louisiana?
16		10	A. Of 29-B specifically? I know of at
17	Louisiana regulators in evaluating and remediating	17	least 20 sites that I've done 29-B.
18 19	properties at these sites. MR. GREGOIRE: So at this point, I'll file	18 19	Q. And you don't purport to be a human
	and offer Mr. Purdom's curriculum vitae which	19 20	health risk assessor; correct?
20	is identified as Exhibit 147 of Chevron's	20	A. Correct.
21	exhibits.	21	Q. But you're aware of the regulatory
22		22	framework as embodied in RECAP; correct?
23	JUDGE PERRAULT: Exhibit 1.7? MR. GREGOIRE: Yes, sir.	23 24	A. Absolutely.
24	And I'd also tender Mr. Purdom as an	24 25	Q. How many times have you used RECAP in
25	And I'd also tender MI. Furdoin as an	25	Q. How many times have you used RECAT in
	Page 26		Page 28
1	expert in geology, hydrogeology, site	1	connection with site characterization, evaluation,
2	characterization, soil and ground water	2	and remediation?
3	investigation and remediation, and the use of	3	A. It's over 100 sites.
4	the applicable regulatory framework,	4	JUDGE PERRAULT: Any objection to this
5	including 29-B and RECAP.	5	witness being an expert?
6	VOIR DIRE EXAMINATION	6	MR. WIMBERLEY: We object to him being an
7	BY MR. WIMBERLEY:	7	expert in 29-B, as admitted.
8	Q. Mr. Purdom, I'm Todd Wimberley. I	8	JUDGE PERRAULT: What does Chevron say to
9	deposed you earlier last year. Do you remember	9	their objection to 29-B?
10	that?	10	MR. GREGOIRE: Your Honor, Mr. Purdom has
11	A. I do.	11	testified he's used 29-B extensively in his
12	Q. At that time, you'd told me that you'd	12	work in representing various clients in
	1 1101 1 2	112	Louisiana.
13	never been qualified as an expert in a court of	13	
13 14	law in any court; is that correct?	14	JUDGE PERRAULT: I'll overrule the objection.
13 14 15	<ul><li>law in any court; is that correct?</li><li>A. I've never been offered up as an expert.</li></ul>	14 15	JUDGE PERRAULT: I'll overrule the objection. I'm going to allow it.
13 14 15 16	<ul><li>law in any court; is that correct?</li><li>A. I've never been offered up as an expert.</li><li>Q. You've also told me that are not an</li></ul>	14 15 16	JUDGE PERRAULT: I'll overrule the objection. I'm going to allow it. And state again what areas he's
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13 14 15 16 17 18	<ul><li>law in any court; is that correct?</li><li>A. I've never been offered up as an expert.</li><li>Q. You've also told me that are not an</li><li>expert in 29-B. Do you remember that?</li><li>A. I remember saying I'm not an expert in</li></ul>	14 15 16 17 18	<ul><li>JUDGE PERRAULT: I'll overrule the objection.</li><li>I'm going to allow it.</li><li>And state again what areas he's</li><li>MR. GREGOIRE: Sure. Geology, hydrogeology, site characterization, soil and groundwater</li></ul>
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<ol> <li>13</li> <li>14</li> <li>15</li> <li>16</li> <li>17</li> <li>18</li> <li>19</li> <li>20</li> <li>21</li> <li>22</li> </ol>	<ul> <li>law in any court; is that correct?</li> <li>A. I've never been offered up as an expert.</li> <li>Q. You've also told me that are not an</li> <li>expert in 29-B. Do you remember that?</li> <li>A. I remember saying I'm not an expert in</li> <li>29-B, but I am I have an expert in applying</li> <li>the regulatory standards, which I've done in 29-B</li> <li>cases.</li> <li>Q. But you're not an expert in 29-B?</li> </ul>	14 15 16 17 18 19 20 21 22	<ul> <li>JUDGE PERRAULT: I'll overrule the objection.</li> <li>I'm going to allow it.</li> <li>And state again what areas he's</li> <li>MR. GREGOIRE: Sure. Geology, hydrogeology, site characterization, soil and groundwater investigation and remediation, and the use of the applicable regulatory framework, including RECAP and 29-B.</li> <li>JUDGE PERRAULT: Okay. He shall be allowed</li> </ul>

	Page 29		Page 31
1	Q. So Mr. Purdom, can you describe for the	1	or continue to operate on the property after that
2	judge and the panelists a road map of what you	2	point in time?
3	will testify about today?	3	A. Post-Chevron, yes, they did.
4	A. Sure. I know I met a number of you on	4	Q. And so next, we have, as everyone is
5	the site, and so we'll just go through and talk	5	aware, the amendments to 29-B occurred in 1986.
6	about the chronology, what occurred at the site	6	Is that right?
7	through our records that we've obtained, we'll	7	A. That's right.
8	look at the site setting of the property itself,	8	Q. And that was two years after Chevron
9	and then we'll also be looking at the Chevron most	9	ended its operations on the property?
10	feasible plan areas, including a sampling survey	10	A. Correct.
11	to go over with some of the results.	11	Q. And RECAP was promulgated in what year?
12	Q. So you're first going to address the	12	A. 1998.
13	chronology of uses at the property; is that right?	13	Q. Okay. Now, we move forward,
14	A. That's correct.	14	fast-forward to 2017. And we have an
15	Q. Tell us a little bit about what you did,	15	environmental site evaluation which was prepared
16	and others at ERM, in preparing your understanding	16	for the Henning property. Can you describe and
17	of the various historical uses at the property.	17	talk about that?
18	A. Yes. So we had multiple areas that we	18	A. Yes. So a lot of times well, most
19	are and sources of information that we	19	times when someone is purchasing a property,
20	obtained. So that being actual records from the	20	lenders or in order to evaluate the property,
21	Chevron files that we were able to review and look	21	an environmental site evaluation, often referred
22	at. We also looked at the Department of Natural	22	to as a Phase 1 ESA, will be conducted at the
23	Resources SONRIS database to go through all of the	23	site.
24	records of wells and any historical activities	24	In 2017, the Henning Management did
25	that had gone on at the site, and we also included	25	authorize an environmental site evaluation by
	Page 30		Page 32
1	aerial photography. So we went back and looked at	1	Arabie & Associates to evaluate the site prior to
2	aerial photography, starting from 1940 moving up	2	purchase.
3	until the present day, to understand the operation	3	Q. So Henning Management retained an
4	that had occurred at the site.	4	environmental consultant to review the property
5	Q. So we start with your chronology with	5	for any potential environmental impacts before he
6	the beginning of oil and gas operations on the	6	purchased it?
7	property?	7	A. That's correct.
8	A. Yes. So it's beginning in 1938.	8	Q. That entity was Arabie & Associates?
9	Q. What occurred next as far as it relates	9	A. That's correct.
10	to the Chevron entity that operated at this	10	Q. Is that the same Arabie & Associates
11		11	
	property?	11	that landowners have typically filed in these
12	A. Yes. So Chevron or its predecessor,	12	legacy lawsuits to defend them?
12 13	A. Yes. So Chevron or its predecessor, Gulf, operated starting in 1941 and operated at	12 13	legacy lawsuits to defend them? A. Yes, it is.
12 13 14	A. Yes. So Chevron or its predecessor, Gulf, operated starting in 1941 and operated at the site up until 1984.	12 13 14	<ul><li>legacy lawsuits to defend them?</li><li>A. Yes, it is.</li><li>Q. And so we fast-forward to 2019, when the</li></ul>
12 13 14 15	<ul><li>A. Yes. So Chevron or its predecessor,</li><li>Gulf, operated starting in 1941 and operated at the site up until 1984.</li><li>Q. Did other oil and gas properties [sic]</li></ul>	12 13 14 15	<ul><li>legacy lawsuits to defend them?</li><li>A. Yes, it is.</li><li>Q. And so we fast-forward to 2019, when the lawsuit was filed; is that right?</li></ul>
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12 13 14 15 16 17 18	<ul> <li>A. Yes. So Chevron or its predecessor,</li> <li>Gulf, operated starting in 1941 and operated at the site up until 1984.</li> <li>Q. Did other oil and gas properties [sic] operate on the Henning property during the time that Chevron operated?</li> <li>A. They did, yes.</li> </ul>	12 13 14 15 16 17 18	<ul> <li>legacy lawsuits to defend them?</li> <li>A. Yes, it is.</li> <li>Q. And so we fast-forward to 2019, when the lawsuit was filed; is that right?</li> <li>A. Yes.</li> <li>Q. And since that time, there have been various investigations, sampling, and reports that</li> </ul>
12 13 14 15 16 17 18 19	<ul> <li>A. Yes. So Chevron or its predecessor,</li> <li>Gulf, operated starting in 1941 and operated at the site up until 1984.</li> <li>Q. Did other oil and gas properties [sic]</li> <li>operate on the Henning property during the time that Chevron operated?</li> <li>A. They did, yes.</li> <li>Q. And what companies were those?</li> </ul>	12 13 14 15 16 17 18 19	<ul> <li>legacy lawsuits to defend them?</li> <li>A. Yes, it is.</li> <li>Q. And so we fast-forward to 2019, when the lawsuit was filed; is that right?</li> <li>A. Yes.</li> <li>Q. And since that time, there have been various investigations, sampling, and reports that were provided both in the litigation and leading</li> </ul>
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12 13 14 15 16 17 18 19 20 21	<ul> <li>A. Yes. So Chevron or its predecessor,</li> <li>Gulf, operated starting in 1941 and operated at the site up until 1984.</li> <li>Q. Did other oil and gas properties [sic]</li> <li>operate on the Henning property during the time that Chevron operated?</li> <li>A. They did, yes.</li> <li>Q. And what companies were those?</li> <li>A. We've got it outlined here. H.L.</li> <li>Hawkins, Shell, Coastal States Gas, and there were</li> </ul>	12 13 14 15 16 17 18 19 20 21	<ul> <li>legacy lawsuits to defend them?</li> <li>A. Yes, it is.</li> <li>Q. And so we fast-forward to 2019, when the lawsuit was filed; is that right?</li> <li>A. Yes.</li> <li>Q. And since that time, there have been various investigations, sampling, and reports that were provided both in the litigation and leading up to the most feasible plans that were filed in this case; right?</li> </ul>
12 13 14 15 16 17 18 19 20 21 22	<ul> <li>A. Yes. So Chevron or its predecessor,</li> <li>Gulf, operated starting in 1941 and operated at the site up until 1984.</li> <li>Q. Did other oil and gas properties [sic]</li> <li>operate on the Henning property during the time that Chevron operated?</li> <li>A. They did, yes.</li> <li>Q. And what companies were those?</li> <li>A. We've got it outlined here. H.L.</li> <li>Hawkins, Shell, Coastal States Gas, and there were other entities that also operated.</li> </ul>	12 13 14 15 16 17 18 19 20 21 22	<ul> <li>legacy lawsuits to defend them?</li> <li>A. Yes, it is.</li> <li>Q. And so we fast-forward to 2019, when the lawsuit was filed; is that right?</li> <li>A. Yes.</li> <li>Q. And since that time, there have been various investigations, sampling, and reports that were provided both in the litigation and leading up to the most feasible plans that were filed in this case; right?</li> <li>A. That's right. Those field</li> </ul>
12 13 14 15 16 17 18 19 20 21 22 23	<ul> <li>A. Yes. So Chevron or its predecessor,</li> <li>Gulf, operated starting in 1941 and operated at the site up until 1984.</li> <li>Q. Did other oil and gas properties [sic]</li> <li>operate on the Henning property during the time that Chevron operated?</li> <li>A. They did, yes.</li> <li>Q. And what companies were those?</li> <li>A. We've got it outlined here. H.L.</li> <li>Hawkins, Shell, Coastal States Gas, and there were other entities that also operated.</li> <li>Q. And when did Chevron's operations end?</li> </ul>	12 13 14 15 16 17 18 19 20 21 22 23	<ul> <li>legacy lawsuits to defend them?</li> <li>A. Yes, it is.</li> <li>Q. And so we fast-forward to 2019, when the lawsuit was filed; is that right?</li> <li>A. Yes.</li> <li>Q. And since that time, there have been various investigations, sampling, and reports that were provided both in the litigation and leading up to the most feasible plans that were filed in this case; right?</li> <li>A. That's right. Those field investigations were conducted from 2019 through</li> </ul>
12 13 14 15 16 17 18 19 20 21 22	<ul> <li>A. Yes. So Chevron or its predecessor,</li> <li>Gulf, operated starting in 1941 and operated at the site up until 1984.</li> <li>Q. Did other oil and gas properties [sic]</li> <li>operate on the Henning property during the time that Chevron operated?</li> <li>A. They did, yes.</li> <li>Q. And what companies were those?</li> <li>A. We've got it outlined here. H.L.</li> <li>Hawkins, Shell, Coastal States Gas, and there were other entities that also operated.</li> </ul>	12 13 14 15 16 17 18 19 20 21 22	<ul> <li>legacy lawsuits to defend them?</li> <li>A. Yes, it is.</li> <li>Q. And so we fast-forward to 2019, when the lawsuit was filed; is that right?</li> <li>A. Yes.</li> <li>Q. And since that time, there have been various investigations, sampling, and reports that were provided both in the litigation and leading up to the most feasible plans that were filed in this case; right?</li> <li>A. That's right. Those field</li> </ul>

#### Page 9 (Pages 33-36)

	Dama 22		Dama 25
	Page 33		Page 35
1	Q. Let's talk a little bit about the site	1	salt-scarring or other evidence of Chevron's oil
2	setting and your understanding of that setting.	2	and gas operations other than the what we'll
3	And we'll start with the limited admission areas.	3	talk about a little later as the blowout area?
4	Can you explain what the boxes that are delineated	4	A. Yeah. Other than the there was no
5	in different colors are?	5	surficial scarring or any type of indication of
6	A. Sure. So the black and white, kind of,	6	impacts.
7	checkered pattern, as we'll say it, what's shown	7	Q. So can you describe for the panel and
8	here is the actual property boundary for Henning	8	the judge the site topography?
9	Management. And then what we have here is Areas	9	A. Yes. So this is a USGS topo map, and it
10	1 through 9 outlined, and those are the limited	10	basically shows the elevation of the property.
11	well, the areas of investigation. Chevron limited	11	You're sloping you're gently sloping from about
12	admission areas are Areas 2, 4, 5, 6, and 8.	12	6 feet above mean sea level towards kind of the
13	There is two other areas, Areas 1 and 9,	13	north, northwest portion, coming down to about
14	that are kind of dashed gray lines. Those are	14	zero feet above mean sea level or at mean sea
15	ICON-identified background areas, and then Areas 3	15	level towards the southeastern part of the
16	and 7 are areas that were not operated by Chevron.	16	property.
17	Q. So let's move next to the actual site	17	Q. And also describe for the panel members
18	setting. What do you know about this particular	18	the elevation, surface elevation at the property.
19	site?	19	A. So this is LiDAR data that we Light
20	A. Yes. So up towards the very north	20	Detection and Ranging Data that we pulled as well.
21	I'm seeing if I can get my oops.	21	It confirms really what the previous map showed,
22	Can you go back? I'm trying to get my	22	showing the elevations being about 6 feet above
23	pointer going.	23	mean sea level towards the north, northwest,
24	To the very north of the property of	24	gently sloping to about a zero over towards the
25	the picture here, you see the southern part of the	25	south, southeastern part, going towards Bayou
	Page 34		Page 36
	Page 34	1	Page 36
1	town of Hayes, Louisiana. It's approximately		Lacassine.
2	town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the	2	Lacassine. Q. And you also performed research about
2 3	town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes.	2 3	Lacassine. Q. And you also performed research about the flood zone capacity in the area?
2 3 4	town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line	2 3 4	Lacassine. Q. And you also performed research about the flood zone capacity in the area? A. We did. So this representation, here
2 3 4 5	town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14,	2 3 4 5	Lacassine. Q. And you also performed research about the flood zone capacity in the area? A. We did. So this representation, here again, you see the property outlined in the black
2 3 4 5 6	town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east	2 3 4 5 6	Lacassine. Q. And you also performed research about the flood zone capacity in the area? A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base
2 3 4 5 6 7	town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on	2 3 4 5 6 7	Lacassine. Q. And you also performed research about the flood zone capacity in the area? A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which
2 3 4 5 6	town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly	2 3 4 5 6 7 8	Lacassine. Q. And you also performed research about the flood zone capacity in the area? A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of
2 3 4 5 6 7 8 9	town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the	2 3 4 5 6 7 8 9	Lacassine. Q. And you also performed research about the flood zone capacity in the area? A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding.
2 3 4 5 6 7 8 9 10	town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the kind of far right side of the property, which	2 3 4 5 6 7 8 9 10	Lacassine. Q. And you also performed research about the flood zone capacity in the area? A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding. Q. And you also performed research about
2 3 4 5 6 7 8 9 10 11	town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the kind of far right side of the property, which actually comes across the property at some point	2 3 4 5 6 7 8 9 10 11	<ul> <li>Lacassine.</li> <li>Q. And you also performed research about the flood zone capacity in the area?</li> <li>A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding.</li> <li>Q. And you also performed research about the wetlands characteristics in this area,</li> </ul>
2 3 4 5 6 7 8 9 10 11 12	town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the kind of far right side of the property, which actually comes across the property at some point on the very eastern side, and that is Bayou	2 3 4 5 6 7 8 9 10 11 12	<ul> <li>Lacassine.</li> <li>Q. And you also performed research about the flood zone capacity in the area?</li> <li>A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding.</li> <li>Q. And you also performed research about the wetlands characteristics in this area, including the property; is that right?</li> </ul>
2 3 4 5 6 7 8 9 10 11 12 13	town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the kind of far right side of the property, which actually comes across the property at some point on the very eastern side, and that is Bayou Lacassine. And the land uses have been primarily	2 3 4 5 6 7 8 9 10 11 12 13	<ul> <li>Lacassine.</li> <li>Q. And you also performed research about the flood zone capacity in the area?</li> <li>A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding.</li> <li>Q. And you also performed research about the wetlands characteristics in this area, including the property; is that right?</li> <li>A. That's right.</li> </ul>
2 3 4 5 6 7 8 9 10 11 12 13 14	town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the kind of far right side of the property, which actually comes across the property at some point on the very eastern side, and that is Bayou Lacassine. And the land uses have been primarily rice farming and oil and gas for approximately the	2 3 4 5 6 7 8 9 10 11 12 13 14	<ul> <li>Lacassine.</li> <li>Q. And you also performed research about the flood zone capacity in the area?</li> <li>A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding.</li> <li>Q. And you also performed research about the wetlands characteristics in this area, including the property; is that right?</li> <li>A. That's right.</li> <li>Q. What did your research reflect?</li> </ul>
2 3 4 5 6 7 8 9 10 11 12 13 14 15	town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the kind of far right side of the property, which actually comes across the property at some point on the very eastern side, and that is Bayou Lacassine. And the land uses have been primarily rice farming and oil and gas for approximately the last 80 years.	2 3 4 5 6 7 8 9 10 11 12 13 14 15	<ul> <li>Lacassine.</li> <li>Q. And you also performed research about the flood zone capacity in the area?</li> <li>A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding.</li> <li>Q. And you also performed research about the wetlands characteristics in this area, including the property; is that right?</li> <li>A. That's right.</li> <li>Q. What did your research reflect?</li> <li>A. So this is a map from the U.S. Fish and</li> </ul>
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the kind of far right side of the property, which actually comes across the property at some point on the very eastern side, and that is Bayou Lacassine. And the land uses have been primarily rice farming and oil and gas for approximately the last 80 years. Q. Did you visit this site, Mr. Purdom?	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	<ul> <li>Lacassine.</li> <li>Q. And you also performed research about the flood zone capacity in the area?</li> <li>A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding.</li> <li>Q. And you also performed research about the wetlands characteristics in this area, including the property; is that right?</li> <li>A. That's right.</li> <li>Q. What did your research reflect?</li> <li>A. So this is a map from the U.S. Fish and Wildlife Service, showing the wetlands that were</li> </ul>
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	<ul> <li>town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the kind of far right side of the property, which actually comes across the property at some point on the very eastern side, and that is Bayou Lacassine. And the land uses have been primarily rice farming and oil and gas for approximately the last 80 years.</li> <li>Q. Did you visit this site, Mr. Purdom?</li> <li>A. I did. My first visit was December of</li> </ul>	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	<ul> <li>Lacassine.</li> <li>Q. And you also performed research about the flood zone capacity in the area?</li> <li>A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding.</li> <li>Q. And you also performed research about the wetlands characteristics in this area, including the property; is that right?</li> <li>A. That's right.</li> <li>Q. What did your research reflect?</li> <li>A. So this is a map from the U.S. Fish and Wildlife Service, showing the wetlands that were mapped. The majority of the property is shown as</li> </ul>
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	<ul> <li>town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the kind of far right side of the property, which actually comes across the property at some point on the very eastern side, and that is Bayou Lacassine. And the land uses have been primarily rice farming and oil and gas for approximately the last 80 years.</li> <li>Q. Did you visit this site, Mr. Purdom?</li> <li>A. I did. My first visit was December of 2021. I went two more times in 2022 and then a</li> </ul>	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	<ul> <li>Lacassine.</li> <li>Q. And you also performed research about the flood zone capacity in the area?</li> <li>A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding.</li> <li>Q. And you also performed research about the wetlands characteristics in this area, including the property; is that right?</li> <li>A. That's right.</li> <li>Q. What did your research reflect?</li> <li>A. So this is a map from the U.S. Fish and Wildlife Service, showing the wetlands that were mapped. The majority of the property is shown as not being wetlands, but you do see, over towards</li> </ul>
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	<ul> <li>town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the kind of far right side of the property, which actually comes across the property at some point on the very eastern side, and that is Bayou Lacassine. And the land uses have been primarily rice farming and oil and gas for approximately the last 80 years.</li> <li>Q. Did you visit this site, Mr. Purdom?</li> <li>A. I did. My first visit was December of 2021. I went two more times in 2022 and then a fourth time with the DNR representatives. I think</li> </ul>	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	<ul> <li>Lacassine.</li> <li>Q. And you also performed research about the flood zone capacity in the area?</li> <li>A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding.</li> <li>Q. And you also performed research about the wetlands characteristics in this area, including the property; is that right?</li> <li>A. That's right.</li> <li>Q. What did your research reflect?</li> <li>A. So this is a map from the U.S. Fish and Wildlife Service, showing the wetlands that were mapped. The majority of the property is shown as not being wetlands, but you do see, over towards the eastern side, we do have some freshwater</li> </ul>
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	<ul> <li>town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the kind of far right side of the property, which actually comes across the property at some point on the very eastern side, and that is Bayou Lacassine. And the land uses have been primarily rice farming and oil and gas for approximately the last 80 years.</li> <li>Q. Did you visit this site, Mr. Purdom?</li> <li>A. I did. My first visit was December of 2021. I went two more times in 2022 and then a fourth time with the DNR representatives. I think it was October of 2022.</li> </ul>	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	<ul> <li>Lacassine.</li> <li>Q. And you also performed research about the flood zone capacity in the area?</li> <li>A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding.</li> <li>Q. And you also performed research about the wetlands characteristics in this area, including the property; is that right?</li> <li>A. That's right.</li> <li>Q. What did your research reflect?</li> <li>A. So this is a map from the U.S. Fish and</li> <li>Wildlife Service, showing the wetlands that were mapped. The majority of the property is shown as not being wetlands, but you do see, over towards the eastern side, we do have some freshwater emergent wetlands over towards Bayou Lacassine, as</li> </ul>
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	<ul> <li>town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the kind of far right side of the property, which actually comes across the property at some point on the very eastern side, and that is Bayou Lacassine. And the land uses have been primarily rice farming and oil and gas for approximately the last 80 years.</li> <li>Q. Did you visit this site, Mr. Purdom?</li> <li>A. I did. My first visit was December of 2021. I went two more times in 2022 and then a fourth time with the DNR representatives. I think</li> </ul>	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	<ul> <li>Lacassine.</li> <li>Q. And you also performed research about the flood zone capacity in the area?</li> <li>A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding.</li> <li>Q. And you also performed research about the wetlands characteristics in this area, including the property; is that right?</li> <li>A. That's right.</li> <li>Q. What did your research reflect?</li> <li>A. So this is a map from the U.S. Fish and</li> <li>Wildlife Service, showing the wetlands that were mapped. The majority of the property is shown as not being wetlands, but you do see, over towards the eastern side, we do have some freshwater emergent wetlands over towards Bayou Lacassine, as well as some forest freshwater forested shrub</li> </ul>
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	<ul> <li>town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the kind of far right side of the property at some point on the very eastern side, and that is Bayou Lacassine. And the land uses have been primarily rice farming and oil and gas for approximately the last 80 years.</li> <li>Q. Did you visit this site, Mr. Purdom?</li> <li>A. I did. My first visit was December of 2021. I went two more times in 2022 and then a fourth time with the DNR representatives. I think it was October of 2022.</li> <li>Q. Did you visit the limited admission</li> </ul>	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	<ul> <li>Lacassine.</li> <li>Q. And you also performed research about the flood zone capacity in the area?</li> <li>A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding.</li> <li>Q. And you also performed research about the wetlands characteristics in this area, including the property; is that right?</li> <li>A. That's right.</li> <li>Q. What did your research reflect?</li> <li>A. So this is a map from the U.S. Fish and</li> <li>Wildlife Service, showing the wetlands that were mapped. The majority of the property is shown as not being wetlands, but you do see, over towards the eastern side, we do have some freshwater emergent wetlands over towards Bayou Lacassine, as</li> </ul>
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	<ul> <li>town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the kind of far right side of the property, which actually comes across the property at some point on the very eastern side, and that is Bayou Lacassine. And the land uses have been primarily rice farming and oil and gas for approximately the last 80 years.</li> <li>Q. Did you visit this site, Mr. Purdom?</li> <li>A. I did. My first visit was December of 2021. I went two more times in 2022 and then a fourth time with the DNR representatives. I think it was October of 2022.</li> <li>Q. Did you visit the limited admission areas that you just testified to during your site</li> </ul>	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	<ul> <li>Lacassine.</li> <li>Q. And you also performed research about the flood zone capacity in the area?</li> <li>A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding.</li> <li>Q. And you also performed research about the wetlands characteristics in this area, including the property; is that right?</li> <li>A. That's right.</li> <li>Q. What did your research reflect?</li> <li>A. So this is a map from the U.S. Fish and Wildlife Service, showing the wetlands that were mapped. The majority of the property is shown as not being wetlands, but you do see, over towards the eastern side, we do have some freshwater emergent wetlands over towards Bayou Lacassine, as well as some forest freshwater forested shrub wetland. And then you do see also another little</li> </ul>
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	<ul> <li>town of Hayes, Louisiana. It's approximately 1262, so about two square miles, located at the border of Calcasieu and Jefferson Davis Parishes. You see there's kind of a curved line that you see. That's the Louisiana Highway 14, which bisects the property. And so on the east side, you see primarily active rice farming and on the west side of the property is predominantly fallow field. You can see a water body on the kind of far right side of the property, which actually comes across the property at some point on the very eastern side, and that is Bayou Lacassine. And the land uses have been primarily rice farming and oil and gas for approximately the last 80 years.</li> <li>Q. Did you visit this site, Mr. Purdom?</li> <li>A. I did. My first visit was December of 2021. I went two more times in 2022 and then a fourth time with the DNR representatives. I think it was October of 2022.</li> <li>Q. Did you visit the limited admission areas that you just testified to during your site visits?</li> </ul>	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	<ul> <li>Lacassine.</li> <li>Q. And you also performed research about the flood zone capacity in the area?</li> <li>A. We did. So this representation, here again, you see the property outlined in the black and white. So we are shown within the base floodplain, according to the FEMA zone maps, which showed about a 1 percent annual chance of flooding.</li> <li>Q. And you also performed research about the wetlands characteristics in this area, including the property; is that right?</li> <li>A. That's right.</li> <li>Q. What did your research reflect?</li> <li>A. So this is a map from the U.S. Fish and</li> <li>Wildlife Service, showing the wetlands that were mapped. The majority of the property is shown as not being wetlands, but you do see, over towards the eastern side, we do have some freshwater emergent wetlands over towards Bayou Lacassine, as well as some forest freshwater forested shrub wetland. And then you do see also another little area to kind of the north, northwestern side where</li> </ul>

	Page 37		Page 39
1	property, that's the location where the blowout of	1	geology. We have constructed well, within our
2	one of Gulf's wells occurred; is that right?		expert report, we constructed four cross-sections.
3	A. That's correct. And you can actually	2 3	Two of them are of those are east to I'm
4	see it here mapped in the little blue circle on	3 4	sorry. West to east represented at AA prime, and
5	the northwestern side.	5	you see that goes really across the entirety of
6	Q. So that blowout location is located in a	6	the property, including the two background areas,
7	wetlands area, as opposed to uplands?	7	Areas 1 and then, over to the eastern side,
8	A. It is.	8	Area 9.
9	Q. And describe for the panel what this	9	BB prime, we're going to show both AA
10	means, the drainage basin subsegment, as it	10	prime and BB prime here in just a minute, but that
11	relates to the property.	11	actually we wanted to see what the subsurface
12	A. Yes. As the panel's probably aware,	12	geology was like right there at the blowout area
13	Louisiana Department of Environment Quality maps	13	and then we've got two additional cross-section
14	the basically the drainage within areas to see	14	locations to understand the subsurface geology
15	where it's captured and where it flows.	15	running more on north to south, CC prime and DD
16	So you see the small black and white box	16	prime.
17	here. That again is our property. The yellow	17	Q. So Mr. Purdom, your cross-sections
18	line or the yellow outline indicates the DEQ	18	tracked the aerial extent of the oil and gas
19	drainage subsegment. So in this case, it's	19	operations that Chevron conducted on the property?
20	Lacassine Bayou from headwaters towards Grand	20	A. That's correct.
21	Lake; and those designated uses are primary and	21	Q. And they also track the background
22	secondary contact recreation, fishing and wildlife	22	locations at this property; right?
23	propagation, and then agriculture.	23	A. Correct.
24	Q. What is the composition of the shallow	24	Q. Now, ICON, which is the consultant for
25	soils at the property?	25	Henning Management, determined the location of
	Page 38		Page 40
1	Page 38		Page 40
1	A. Primarily consisting of clays and silts,	1	background or the background locations
2	A. Primarily consisting of clays and silts, and this is a map from the USGS showing that.	2	background or the background locations A. That's correct.
2 3	A. Primarily consisting of clays and silts, and this is a map from the USGS showing that. This is actually confirmed too with our actual	2 3	<ul><li>background or the background locations</li><li>A. That's correct.</li><li>Q at this property.</li></ul>
2 3 4	A. Primarily consisting of clays and silts, and this is a map from the USGS showing that. This is actually confirmed too with our actual on-site, our soil boring logs that we took. So	2 3 4	<ul><li>background or the background locations</li><li>A. That's correct.</li><li>Q at this property.</li><li>And that's on the eastern side of the</li></ul>
2 3 4 5	A. Primarily consisting of clays and silts, and this is a map from the USGS showing that. This is actually confirmed too with our actual on-site, our soil boring logs that we took. So when we were collecting the samples, we would see	2 3 4 5	<ul><li>background or the background locations</li><li>A. That's correct.</li><li>Q at this property.</li><li>And that's on the eastern side of the property?</li></ul>
2 3 4 5 6	A. Primarily consisting of clays and silts, and this is a map from the USGS showing that. This is actually confirmed too with our actual on-site, our soil boring logs that we took. So when we were collecting the samples, we would see the same thing.	2 3 4 5 6	<ul> <li>background or the background locations</li> <li>A. That's correct.</li> <li>Q at this property.</li> <li>And that's on the eastern side of the</li> <li>property?</li> <li>A. Yes. Over it's H-32 A and B and H-33</li> </ul>
2 3 4 5 6 7	A. Primarily consisting of clays and silts, and this is a map from the USGS showing that. This is actually confirmed too with our actual on-site, our soil boring logs that we took. So when we were collecting the samples, we would see the same thing. There is go back, if you don't mind	2 3 4 5 6 7	<ul> <li>background or the background locations</li> <li>A. That's correct.</li> <li>Q at this property.</li> <li>And that's on the eastern side of the</li> <li>property?</li> <li>A. Yes. Over it's H-32 A and B and H-33</li> <li>and 34.</li> </ul>
2 3 4 5 6 7 8	A. Primarily consisting of clays and silts, and this is a map from the USGS showing that. This is actually confirmed too with our actual on-site, our soil boring logs that we took. So when we were collecting the samples, we would see the same thing. There is go back, if you don't mind just real quick.	2 3 4 5 6 7 8	<ul> <li>background or the background locations</li> <li>A. That's correct.</li> <li>Q at this property.</li> <li>And that's on the eastern side of the</li> <li>property?</li> <li>A. Yes. Over it's H-32 A and B and H-33</li> <li>and 34.</li> <li>Q. So let's go to one of the</li> </ul>
2 3 4 5 6 7 8 9	A. Primarily consisting of clays and silts, and this is a map from the USGS showing that. This is actually confirmed too with our actual on-site, our soil boring logs that we took. So when we were collecting the samples, we would see the same thing. There is go back, if you don't mind just real quick. So there's a little bit of an alluvial	2 3 4 5 6 7 8 9	<ul> <li>background or the background locations</li> <li>A. That's correct.</li> <li>Q at this property.</li> <li>And that's on the eastern side of the</li> <li>property?</li> <li>A. Yes. Over it's H-32 A and B and H-33</li> <li>and 34.</li> <li>Q. So let's go to one of the</li> <li>cross-sections, cross-section A to A prime. Can</li> </ul>
2 3 4 5 6 7 8 9 10	A. Primarily consisting of clays and silts, and this is a map from the USGS showing that. This is actually confirmed too with our actual on-site, our soil boring logs that we took. So when we were collecting the samples, we would see the same thing. There is go back, if you don't mind just real quick. So there's a little bit of an alluvial deposit over towards Lacassine Bayou and, again,	2 3 4 5 6 7 8 9 10	<ul> <li>background or the background locations</li> <li>A. That's correct.</li> <li>Q at this property.</li> <li>And that's on the eastern side of the</li> <li>property?</li> <li>A. Yes. Over it's H-32 A and B and H-33</li> <li>and 34.</li> <li>Q. So let's go to one of the</li> <li>cross-sections, cross-section A to A prime. Can</li> <li>you describe to me what the lithology reflects in</li> </ul>
2 3 4 5 6 7 8 9 10 11	A. Primarily consisting of clays and silts, and this is a map from the USGS showing that. This is actually confirmed too with our actual on-site, our soil boring logs that we took. So when we were collecting the samples, we would see the same thing. There is go back, if you don't mind just real quick. So there's a little bit of an alluvial deposit over towards Lacassine Bayou and, again, in that sliver going towards the northwest part of	2 3 4 5 6 7 8 9 10 11	<ul> <li>background or the background locations</li> <li>A. That's correct.</li> <li>Q at this property.</li> <li>And that's on the eastern side of the</li> <li>property?</li> <li>A. Yes. Over it's H-32 A and B and H-33</li> <li>and 34.</li> <li>Q. So let's go to one of the</li> <li>cross-sections, cross-section A to A prime. Can</li> <li>you describe to me what the lithology reflects in</li> <li>these cross-sections and what is of significance</li> </ul>
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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	<ul> <li>A. Primarily consisting of clays and silts, and this is a map from the USGS showing that. This is actually confirmed too with our actual on-site, our soil boring logs that we took. So when we were collecting the samples, we would see the same thing. There is go back, if you don't mind just real quick. So there's a little bit of an alluvial deposit over towards Lacassine Bayou and, again, in that sliver going towards the northwest part of the property where the wetlands were shown.</li> <li>Q. And if you can describe the surface soil characteristics at the property?</li> <li>A. Yes. This map is a U.S. Department of Agriculture surface soil type, and it shows that basically it's a very poorly drained silt, silty loam.</li> <li>Q. Next, you have the cross-section locations. Can you describe what those are and the purpose of your including those in your testimony and presentation today?</li> </ul>	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	<ul> <li>background or the background locations <ul> <li>A. That's correct.</li> <li>Q at this property.</li> <li>And that's on the eastern side of the property?</li> <li>A. Yes. Over it's H-32 A and B and H-33 and 34.</li> <li>Q. So let's go to one of the cross-sections, cross-section A to A prime. Can you describe to me what the lithology reflects in these cross-sections and what is of significance to you?</li> <li>A. Yeah. So if the panel remembers, this is the cross-section that went the entirety of the length of the property. So this spans quite an extensive area that we investigated.</li> <li>So I think the first thing that's of note to me is these green colors that are showing up, representing that these are clays or silty clays, very nonpermeable zones, and you see that really dominates the subsurface geology here.</li> </ul></li></ul>
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	<ul> <li>A. Primarily consisting of clays and silts, and this is a map from the USGS showing that. This is actually confirmed too with our actual on-site, our soil boring logs that we took. So when we were collecting the samples, we would see the same thing. There is go back, if you don't mind just real quick. So there's a little bit of an alluvial deposit over towards Lacassine Bayou and, again, in that sliver going towards the northwest part of the property where the wetlands were shown.</li> <li>Q. And if you can describe the surface soil characteristics at the property?</li> <li>A. Yes. This map is a U.S. Department of Agriculture surface soil type, and it shows that basically it's a very poorly drained silt, silty loam.</li> <li>Q. Next, you have the cross-section locations. Can you describe what those are and the purpose of your including those in your testimony and presentation today?</li> <li>A. Sure. So these are the ERM and ICON</li> </ul>	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	<ul> <li>background or the background locations <ul> <li>A. That's correct.</li> <li>Q at this property.</li> <li>And that's on the eastern side of the property?</li> </ul> </li> <li>A. Yes. Over it's H-32 A and B and H-33 and 34. <ul> <li>Q. So let's go to one of the cross-sections, cross-section A to A prime. Can you describe to me what the lithology reflects in these cross-sections and what is of significance to you?</li> <li>A. Yeah. So if the panel remembers, this is the cross-section that went the entirety of the length of the property. So this spans quite an extensive area that we investigated. <ul> <li>So I think the first thing that's of note to me is these green colors that are showing up, representing that these are clays or silty clays, very nonpermeable zones, and you see that really dominates the subsurface geology here. <ul> <li>There are some areas represented with</li> <li>it's kind of more, I guess, brown here, where it</li> </ul> </li> </ul></li></ul></li></ul>

	Page 41		Page 43
1	areas for some some groundwater in, you know,	1	operational areas, it's generally in the at
2	the areas. Of note, I think a couple other	2	least 30 feet, but it can go down to about and
3	things I want to note is the we look a lot of	3	into the 55 to 60-feet range. So again, some of
4	times to correlate and see if there's connectivity	4	those cross-sections show the variability and
5	within the zones to see if there's communication	5	where those locations are and the depths.
6	across this. And you'll see quite a few	6	Q. Now, it's your conclusion that the pond
7	instances I'll point to H-26 versus H-27 where	7	at the blowout location is not in hydraulic
8	you'll see some brown, more permeable thin zones	8	communication with the shallow groundwater; is
9	that aren't present. You know, there's really no	9	that right?
10	correlation from boring to boring. Those are also	10	A. That's correct.
11	shown between MW-10, H-18, H-19, H-1 as we are	11	Q. We'll get to it later, and some other
12	going really through the operational areas.	12	witnesses will also address it.
13	There's really no good way to connect these small	13	But have you seen any evidence of
14	thin zones.	14	hydraulic communication between the pond itself
15	Q. Let's go next to the next set of	15	and the Chicot Aquifer?
16	cross-sections, B to B prime. And again, what do	16	A. No. And we've got also differences in
17	those cross-sections tell you about the site	17	groundwater elevations between the Chicot that we
18	lithology?	18	have looked through historical records, as well as
19	A. Yes. So this is more in the direct area	19	the elevations in the upper water-bearing zone and
20	of the blowout. And you can actually see, we've	20	the pond itself.
21	actually mapped the blowout pond or blowout area	21	Q. And for the panel's use and edification,
22	on this cross-section. And again, so this is more	22	at what depths does the Chicot Aquifer exist at
23	in operational areas. And what you'll see	23	this site?
24	first of all, we didn't just draw this pond. This	24	A. The Chicot starts around 120 feet and
25	is the actual depth that we measured for the pond.	25	goes down to at least 200.
	Page 42		Page 44
1	So we went out there, did a physical survey of the	1	Q. There is a fairly large clay confining
2	pond to determine how deep that pond is and to	2	unit that separates the shallow groundwater in the
3	also understand that there's a connection with the	3	Chicot; is that correct?
4	shallow groundwater zone that's out there. And we	4	A. That's correct. We went down around
5	did not see that, as you see. Right at H-9, the	5	to I believe our deepest boring was 78 feet. At
6	depth to water there is or the depth to the	6	the actually, right at the blowout area.
7	zone there is right around 45 to 55 feet. And	7	But the lowest extent of the upper parts
8	there's also another line of evidence that's maybe	8	of that water-bearing zone were at the 62,
9	kind of hard to see on this cross-section. But at	9	below-ground surface. So we've got a good 50 feet
10	H-9, you can see where we've got the water level	10	of separation between the upper limits of that
11	plotted. The versus the actual elevation of	11	upper water-bearing zone as well and the upper
12	the water in the pond. And those show a	12	limits of the Chicot.
	difference in elevations. It's a little bit	13	And I guess one more point I'll bring up
13		14	here is we did take a series of geotechnical
13 14	difficult to see here, but we surveyed both the		
	difficult to see here, but we surveyed both the pond elevation as well as, when we were doing our	15	vertical permeability tests. And one of those is
14	pond elevation as well as, when we were doing our	15 16	vertical permeability tests. And one of those is represented here at H-16 R. You'll see it was at
14 15			vertical permeability tests. And one of those is represented here at H-16 R. You'll see it was at the base of the boring within that clay and it was
14 15 16	pond elevation as well as, when we were doing our potentiometric mapping, we looked at the elevation	16	represented here at H-16 R. You'll see it was at
14 15 16 17	pond elevation as well as, when we were doing our potentiometric mapping, we looked at the elevation of groundwater, and there is a difference there,	16 17	represented here at H-16 R. You'll see it was at the base of the boring within that clay and it was
14 15 16 17 18	pond elevation as well as, when we were doing our potentiometric mapping, we looked at the elevation of groundwater, and there is a difference there, indicating there is no hydraulic connection.	16 17 18	represented here at H-16 R. You'll see it was at the base of the boring within that clay and it was a 1.1 times 10 to the minus 7. We took two other
14 15 16 17 18 19	pond elevation as well as, when we were doing our potentiometric mapping, we looked at the elevation of groundwater, and there is a difference there, indicating there is no hydraulic connection. Q. At what depth does the shallow	16 17 18 19	represented here at H-16 R. You'll see it was at the base of the boring within that clay and it was a 1.1 times 10 to the minus 7. We took two other geotech samples down at depth, and those were all
14 15 16 17 18 19 20	<ul><li>pond elevation as well as, when we were doing our</li><li>potentiometric mapping, we looked at the elevation</li><li>of groundwater, and there is a difference there,</li><li>indicating there is no hydraulic connection.</li><li>Q. At what depth does the shallow</li><li>groundwater begin in the subsurface of this site?</li></ul>	16 17 18 19 20	represented here at H-16 R. You'll see it was at the base of the boring within that clay and it was a 1.1 times 10 to the minus 7. We took two other geotech samples down at depth, and those were all in the 10 to the minus 7 to the 10 to the minus 9
14 15 16 17 18 19 20 21	<ul> <li>pond elevation as well as, when we were doing our potentiometric mapping, we looked at the elevation of groundwater, and there is a difference there, indicating there is no hydraulic connection.</li> <li>Q. At what depth does the shallow groundwater begin in the subsurface of this site?</li> <li>A. It well, it varies. So over towards</li> </ul>	16 17 18 19 20 21	represented here at H-16 R. You'll see it was at the base of the boring within that clay and it was a 1.1 times 10 to the minus 7. We took two other geotech samples down at depth, and those were all in the 10 to the minus 7 to the 10 to the minus 9 centimeters per second, so fitting the definition
14 15 16 17 18 19 20 21 22	<ul> <li>pond elevation as well as, when we were doing our potentiometric mapping, we looked at the elevation of groundwater, and there is a difference there, indicating there is no hydraulic connection.</li> <li>Q. At what depth does the shallow groundwater begin in the subsurface of this site?</li> <li>A. It well, it varies. So over towards the eastern side of the property, over close to Bayou Lacassine, it is a little bit shallower over there. I think it's as shallow as maybe about</li> </ul>	16 17 18 19 20 21 22	represented here at H-16 R. You'll see it was at the base of the boring within that clay and it was a 1.1 times 10 to the minus 7. We took two other geotech samples down at depth, and those were all in the 10 to the minus 7 to the 10 to the minus 9 centimeters per second, so fitting the definition of a natural liner.
<ol> <li>14</li> <li>15</li> <li>16</li> <li>17</li> <li>18</li> <li>19</li> <li>20</li> <li>21</li> <li>22</li> <li>23</li> </ol>	<ul> <li>pond elevation as well as, when we were doing our potentiometric mapping, we looked at the elevation of groundwater, and there is a difference there, indicating there is no hydraulic connection.</li> <li>Q. At what depth does the shallow groundwater begin in the subsurface of this site?</li> <li>A. It well, it varies. So over towards the eastern side of the property, over close to Bayou Lacassine, it is a little bit shallower over</li> </ul>	<ol> <li>16</li> <li>17</li> <li>18</li> <li>19</li> <li>20</li> <li>21</li> <li>22</li> <li>23</li> </ol>	represented here at H-16 R. You'll see it was at the base of the boring within that clay and it was a 1.1 times 10 to the minus 7. We took two other geotech samples down at depth, and those were all in the 10 to the minus 7 to the 10 to the minus 9 centimeters per second, so fitting the definition of a natural liner. Q. So next, you're going to talk about

	Page 45		Page 47
1	RECAP requires or calls for the	1	wells, those active wells, is screened at 120 to
2	determination of water wells that are located	2	125 feet, so well below the extent of what we've
3	within a mile of the AOI for the purposes of the	3	seen here on the property that we're evaluating.
4	groundwater classification; is that right?	4	There was also another well on the
5	A. That's correct.	5	property. We couldn't find it in the SONRIS
6	Q. So explain to the panel the work that	6	registration and on the database, but it's
7	you and others at ERM did in researching the water	7	10 inches in diameter, approximately 200 feet, and
8	wells at this property and outside of the	8	when it was tested in 2017, it produced
9	property.	9	3500 gallons per minute. It's in good condition,
10	A. So what we do is we identify the 1-mile	10	but the picture of the surface equipment here
11	radius of the property boundary. So that's	11	shows that some of the surface equipment's not all
12	identified on this figure with that red kind of	12	that in great shape.
13	cloudy-looking figure or line.	13	Q. Where is that water well located, again?
14	The blue line that you see basically	14	A. It is basically on the road where if
15	running along Louisiana Highway 14, that is	15	the panel were to have been out there, I believe
16	actually a public water supply line location. So	16	it's Area 5 where we pulled in, there's a parking
17	and it does dissect and runs along the property.	17	area right there. It was just off that little
18	But then we take the LDNR SONRIS database, we find	18	road where we came in, and I'll show you it here,
19	all the wells within a 1-mile radius and plot	19	and I think I put it in the next figure.
20	those, and that's what you see represented here,	20	Q. So there are no shallow wells that
21	is are those wells that were located within the	21	you've ever known of that exist at the Henning
22	1-mile radius. None of the wells that we have	22	property? And I say "shallow wells." Wells that
23	shown on here are within that upper water-bearing	23	are screened in the shallow groundwater?
24	zone, to the 20 to 60 feet.	24	A. That's correct.
25	Q. So you mentioned the public supply line	25	Q. As well as off-site within that mile
1			
	Page 46		Page 48
	Page 46		Page 48
1	that crosses or traverses the Henning Management	-	radius?
2	that crosses or traverses the Henning Management property; is that right?	2	radius? A. That's correct.
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	Page 49		Page 51
1	within Chevron's exhibits where this particular	1	Q. And the other wells obviously were
2	slide or set of slides can be found, if anyone	2	drilled by others?
3	wants to go back and review them.	3	A. Correct.
4	A. That's correct.	4	Q. Now, you noticed in your site inspection
5	Q. Most of the slides that you've shown	5	some identification or evidence of on the
6	thus far are contained or encapsulated in	6	surface of an abandoned oil and gas operation?
7	Chevron's proposed feasible plan from ERM?	7	A. Correct. And we'll see that through the
8	A. That's correct.	8	drone photography. We'll point it out. But there
9	Q. So let's next pivot to the	9	is a shut-in well on the property. It's not
10	potentiometric map that you have here. Explain	10	related to the Chevron operations, and the
11	what this is and what it shows.	11	remainder of the property is predominantly rice,
12	A. So when we put in I'm sure the	12	rice farming.
13	panelists know, but when we put in a well, we go	13	Q. And this photograph shows the locations
14	and we survey the top of casing of where that well	14	of the wells that were drilled on the property?
15	is to get an actual elevation of where that top of	15	A. Correct. Oil and gas wells only,
16	casing is. Then when we want to determine	16	correct.
17	groundwater flow direction, we'll go out and we	17	Q. And Chevron wells are marked in what
18	will drop a piece of equipment to measure the	18	color?
19	depth to the actual groundwater level. So as soon	19	A. They're as indicated in the end area to
20	as we hit that, we'll know how many X feet down.	20	the right, they're in the yellow circles shows
21	We then take that difference to come up	21	the Chevron wells.
22	with the groundwater elevation. And so we put all	22	Q. And the nonChevron wells are in the
23	those together on a map to be able to contour the	23	other colors, presumably blue, green, orange, and
24	map to show groundwater the direction of	24	a purple, or a magenta?
25	groundwater flow and where it's moving.	25	A. Correct.
	Page 50		Page 52
1	Q. And you have another potentiometric map.	1	Q. So now we have here some historical
2	How does this one differ from the one you just	2	aerial photographs. This is in 1940. Did Chevron
3	testified about?	3	have any wells on the property that it had drilled
4	A. Very similar in nature. Both of these	4	at that time?
5	were taken on December 21st of 2021. This one is	5	A. No. So operations did start oil and
6	the equivalent freshwater head, so it's taking	6	gas exploration started on this field in 1938,
7	into account some of the density of the water	7	but or on the property. But Chevron had not
	which could be a result of chlorides. But you do		
0		8	yet begun operating.
9	see really the same general flow direction being	8 9	Q. Next we have a 1952 aerial photograph.
10	see really the same general flow direction being to the north, kind of northeast over by Bayou		Q. Next we have a 1952 aerial photograph. Are there any parts of this aerial that have some
	see really the same general flow direction being to the north, kind of northeast over by Bayou Lacassine. Toward the background area, you do see	9 10 11	Q. Next we have a 1952 aerial photograph. Are there any parts of this aerial that have some significance or bearing to you?
10	see really the same general flow direction being to the north, kind of northeast over by Bayou Lacassine. Toward the background area, you do see a little bit of a reversal there at that one area,	9 10 11 12	<ul><li>Q. Next we have a 1952 aerial photograph.</li><li>Are there any parts of this aerial that have some significance or bearing to you?</li><li>A. Sure. Over in Area 2, you kind of see</li></ul>
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1	Page 53		Page 55
	A. It is.	1	site.
2	Q. Let's move next to 1970. Anything of	2	Q. Anything of significance to you in those
3	significance to you on this aerial photograph?	3	aerial photographs?
4	A. You do see start to see where there's	4	A. You do see some operators outside of the
5	been some more, obviously, oil and gas operations.	5	Chevron area just adjacent to some of the Chevron
6	You can start to see in some areas some potential	6	areas, but that's the main part.
7	what look to maybe be pit locations, but you do	7	Q. Do you see or does it appear, as you saw
8	start to see the development as an oil and gas	8	in one the earlier photographs, any evidence of
9	field further.	9	farming development or agricultural development?
10	Q. Some of those are Chevron pit locations?	10	A. Yes. You do see, it looks like the land
11	A. Some of them are, yeah.	11	there, especially to the western side, is
12	Q. How many Chevron pits could you identify	12	well-maintained and appears to be used for
13	or can you identify on this aerial?	13	farming.
14	A. Possibly one, two. I can see two that I	14	Q. Then we move next to the 2019 aerial
15	believe I would call pits.	15	photograph, is the year that Henning Management
16	Q. There's also a pit that looks appears	16	filed suit; is that right?
17	to have been used on the southern part of the	17	A. That's correct.
18	property unrelated to Chevron's operations?	18	Q. We don't have any, what appears to be
19	A. That's correct.	19	any scarring around that blowout area?
20	Q. And that's more towards the southern,	20	A. That's correct.
21	almost the right north of the southern	21	Q. So let's talk about the Chevron most
22	boundary	22	feasible plan areas. And when you say "MFP,"
23	A. That kind of pops out, yes.	23	that's what you mean, most feasible plan; right?
24	Q. So next we move to the 1985 aerial	24	A. That's right.
25	photograph. Chevron's operations ended at that	25	Q. So we're going to ask you to identify or
	Page 54		Page 56
	dimensional and minibal and the station of		
1	time; is that right before that time?	1	at least to summarize the sampling soil and
1 2	A. Yes. So Chevron had stopped, ceased	1 2	at least to summarize the sampling soil and groundwater that occurred at this property as a
	-	1 2 3	
2	A. Yes. So Chevron had stopped, ceased	_	groundwater that occurred at this property as a
2 3	A. Yes. So Chevron had stopped, ceased operations in 1984. So this is one year post	3	groundwater that occurred at this property as a part of this lawsuit and this regulatory
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2 3 4 5 6 7	<ul> <li>A. Yes. So Chevron had stopped, ceased operations in 1984. So this is one year post Chevron ceasing operations.</li> <li>Q. And then we move to 2008. Anything of significance to you on this aerial photograph?</li> <li>A. What I'll note is the blowout pond area</li> </ul>	3 4 5	groundwater that occurred at this property as a part of this lawsuit and this regulatory proceeding. So can you describe a little bit about the sampling program? A. Sure. And I do want to point out that
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1	know, stratified columns or anything within the	1	whole suite of 29-B constituents?
2	pond. So we did take surface water samples from	2	A. Yes.
3	the pond. Twenty-four electrical conductivity	3	Q. Did you also sample under RECAP, or
4	probe logs were performed.	4	constituents that are found in RECAP?
5	Q. And just to make sure everyone	5	A. We did. We looked at metals, BTEX, THP.
6	understands, what are electrical conductivity	6	Let's see. Radium, as well as some others.
7	probe logs?	7	Q. So let's hone in on Area 2. Of course,
8	A. So that's when you're geo probing, I	8	this is the area where the blowout occurred. Can
9	think one of the pictures we saw earlier shows a	9	you describe for the panel the sampling locations
10	geoprobe rig standing up. So what they did is	10	and the reasons for them on that in that area?
11	you'll push down this probing of this rod	11	A. Sure. So this really just shows kind of
12	through a rod is a probe log, and it will measure	12	the so ICON had installed sample location H-9,
13	basically the conductance of the soils of that	13	and then ERM went out and, in order to delineate
14	or the media that it's encountering. And as it	14	and investigate we're going to look at the
15	responds in a positive way, that's showing that	15	actual results here shortly just to show those,
16	it's more has more conductivity, conducive of	16	but these are some of the locations and including
17	areas where there might be chlorides or impacts.	17	some monitor wells that we've installed around
18	Q. And you also had HPT probe logs that were installed at the property; is that right?	18	that blowout area to help with the delineation.
19 20	A. Yeah. This is a Hydraulic Profiling	19	Q. And then we move to Area 4, which is the area also where Chevron conducted oil and gas
20 21	Tool, which is basically used to give an	20 21	operations; is that right?
21	indication of porosity, permeability, is there	21 22	A. That's correct. And again, the orange
22	ability to transmit water.	22	dots represent ERM's efforts to go evaluate the
24	Q. You have numerous site inspections that	24	concentrations that were initially reported and
25	occurred by ERM?	25	delineate.
	Page 58		Page 60
1	A. Yes. Throughout I've been out there	1	Q. And the yellow locations are ICON sample
2	four times. I know there's been multiple visits		locations; is that right?
3	by a lot of our other experts throughout the 2019	3	A. Correct.
4	through 2022.	4	Q. Then we move to Area 5. That's another
5	Q. Of course, you have drone-level photography that you alluded to earlier and that	5	area where Chevron conducted oil and gas operations; is that right?
6 7	we'll observe in a bit; right?	6 7	A. That's correct. And you see the ICON
8	A. Correct.	8	locations represented in yellow, ERM represented
9	Q. So if you can briefly describe the soil	9	in orange, and then you also see the area over to
10	sampling areas for the panel.		the to the east of the Area 5, which is an
11	A. Yeah. So what we have here, again, this	11	adjacent operator, not Chevron.
12	is our figure that we I think this is a 2019	12	Q. So Chevron didn't operate on that
13	aerial, and what you see is the orange dots that	13	property outside of the blue box that is directly
14	are represented are ERM soil sample locations that	14	east, where you have some sampling points?
15	were done to try to delineate or investigate	15	A. That's correct. And for the panel, this
16	further the results initially reported by ICON.	16	is that you can start to see a little bit of an
17	The yellow dots are ICON-installed soil sample	17	outline of where we parked when we first got
18	locations, and then you do see a few little purple	18	there, for those who have visited.
19	dots, and those were conducted by HLP and those	19	Q. The sampling points that are located
20	are outside of Chevron's area, so not included in	20	directly east of Area 5, whose sampling points are
21	the limited admission.	21	those?
22	Q. So did you sample for 29-B constituents	22	A. Those were HLP.
23	in the soil? A. We did.	23 24	<ul><li>Q. And who is HLP?</li><li>A. I forget the</li></ul>
24		24	
25	Q. And what constituents were those? The	25	Q. They weren't hired by Chevron?

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1	A. They were not Chevron's representatives	1	blowout occurred. Surface sampling occurred
2	and not hired by us.	2	there. Did they occur anywhere else, the sampling
3	Q. Then we have Area 6. Can you describe	3	surface water?
4	the soil locations there?	4	A. The surface water sampling? No.
5	A. Again, one of the things that kind of	5	Q. So next we have the EC and HPT logs
6	sticks out on this photograph is that area outside	6	which you testified about and described earlier.
7	of that blue line because it holds a lot of water.	7	What do those show or reflect to you?
	That was an adjacent operator that was not	8	A. I'll point the panel to H-12, which is
8	5 1		the, kind of, bigger box over here to the upper
9	Chevron. And when we've been out there, that	9	
10	holds a lot of water. The Chevron area is there	10	left. That is a good a good representation of
11	within the blue outline, and this being Area 6,	11	what a positive response within the EC log is. So
12	you do see the yellow borings or sample locations	12	that shows, down around 50 to 60 feet, that there
13	from ICON, the orange representing ERM.	13	was, you know, good conductivity. And that's also
14	Q. Then we have Area 8, the last area	14	reflected in our groundwater sample results that
15	that's subject to the limited admission. What	15	we've collected. So a good indication of that
16	does the sampling reflect there in the locations?	16	there's likely some chloride there, and we did
17	A. Again, trying to go and delineate, and	17	confirm that with the results.
18	we're going to talk about this here in a little	18	I'll also point the panel to, if you
19	bit, but you're going to see you see we were	19	look down, just as it quickly comes back to
20	trying to delineate, and you start to see kind of	20	basically being non you know, nonconductive.
21	a linear pattern and how we're having to go off	21	So we quickly get out of that chloride and, again,
22	this, and I'll point out that that's actually a	22	we took soil samples below this and confirmed
23	road that's going right there.	23	these results, that the chlorides just aren't
24	So potential for when they were getting	24	there after we got out of that zone.
25	the field reworked, that in order to come up	25	So you'll start to look across. There's
	Page 62		Page 64
1	and do farming, agricultural operations, that	1	other examples, H-16, towards the top there, kind
2	potentially barium well, we'll talk about	2	of top-middle, you do see a little bit of a
3	barium here in a minute, but barium was	3	signature up towards the I guess that's about
4	potentially spread through the area.	4	the 20 to 30-feet range. But you do see it come
5	Q. And here, we have the monitoring well	5	back down. And, really, what these are showing is
6	and surface water sample locations; is that right?	6	you'll see some impacts in some areas where there
7	A. That's right.	7	were historical operations. But as we move
8	Q. And what were the general depths of the	8	laterally out from those locations to delineate,
9	monitoring wells that were installed at the site?	9	we're not seeing those same signatures.
10	A. Yeah. Generally, again, I'll refer you	10	Q. And next, we have the background
11	back to the cross-sections to see where everything	11	locations. And can you describe you've already
12	was. But generally from about 30 to about 55,		testified about it but where those locations are?
13	60 feet, if you do look over, again, to the	13	A. Yes. So we have Area 1 over to the far
14	eastern part of the property, in Area 9, you do	14	west side of the property, H-25, 26, 27, and then
15	see those numbers in parentheses are where the	15	Area 9 being the two wells installed around H-32,
16	actual wells were screened. So you see some 18 to	16	being A and B, and then H-33 and 34 in Area 9.
17	28, 20 to 30, so some shallower zones over towards	17	Q. And all of those background locations,
18	the far east, but you really don't see that as you	18	as you've testified earlier, were selected by
19	move back across the table.	19	ICON?
20	Q. And the actual tables with the sampling	20	A. That's correct.
20	data are included with ERM's plan on behalf of	20	Q. You visited the property, as you stated,
21	Chevron; is that right?		on at least four occasions?
22	A. That's right.		A. Correct.
23 24	Q. And you say surface water sample	23	
24 25	locations. You mentioned the pond where the	24 25	Q. Did you visit the background locations during your site visits?
23	isolations. Fou mentioned the point where the	23	during your site visits?

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1	A. On multiple occasions, yes.	1	showing on that DEQ subsegment.
2	Q. Did you find in your	2	Q. Would you describe the characteristic of
3	boots-on-the-ground, or your site visit, any	3	that pond as being freshwater?
4	vestige of oil and gas operations in the area of	4	A. I would.
5	the background locations?	5	Q. So let's next move to the sampling
6	A. No.	6	results, and we'll start with barium sampling in
7	Q. Did you see any vestige of oil and gas	7	the groundwater. What did the sampling program
8	operations in the vicinity of the background	8	reflect?
9	locations in any of the aerial photographs that	9	A. So what we show here is the barium
10	you reviewed?	10	results in the groundwater wells that we
11	A. No.	11	collected. We have one well right there at
12	Q. So this sets forth the results of	12	Area 2, at H-12, where we showed an exceedance of
13	surface water sampling at the pond at the blowout	13	the conservative groundwater screening standard
14	location; is that right?	14	being the the standard being 2. We were just
15	A. That's right.	15	over it: 2.27.
16	Q. So what I want you to first describe are	16	Ms. Levert will get into additional
17	the efforts that ERM and its contractors extended	17	RECAP analysis to show that, you know, this is
18	in obtaining surface water samples, and then I	18	very it's still protective of human health and
19	want you to describe the results of those samples.	19	the environment. And you also see the rest of the
20	A. Yeah. So, you know, it's easy to say	20	samples all came back very, very low. When we had
21	let's just go grab a water sample. At ERM, we	21	detection, it was very, very low and below the
22	have a pretty robust safety program, so it was	22	RECAP screening standards.
23	actually quite a bit of effort to go actually do	23	Q. Now, you did not do the work in
24	this sampling. But what we did is we got a boat.	24	connection with groundwater classification at ERM
25	We had to go through all of our internal	25	on this particular project; is that right?
	Page 66		Page 68
1	procedures. We got a boat out there on-site.	1	A. I looked at it, I observed it, but I did
2	There was a picture earlier in the slide where you	2	not do that myself.
3	actually saw two of our ERMers in the boat. So we	3	Q. The conclusion is that the shallow
4	dragged that out there, got out on the boat, took	4	groundwater is Class 3; is that right?
5	a pump with some flow-through meters, taped off	5	A. Correct.
6	some tubing to a measuring tape, and dropped that	6	Q. Now, in connection with barium, the
7	down 2 feet below the water surface, and then	7	comparative standard that you used for barium even
8	started pumping from there to obtain our 2-foot	8	though your conclusion was that it's a Class 3,
9	below-surface sample. And then we did the same	9	was the Class 1 drinking water standard as the
10	thing with the down to 13 feet. So we measured	10	most conservative approach; is that right?
11	down to 13 feet, which is 2 feet above the deepest	11	A. That's correct.
12	part of where we measured this at the pond, and	12	Q. So you had one slight exceedance of
13	collected samples from the 13-foot zone.	13	barium using that Class 1 drinking water standard,
14	Q. And what were the results of the surface	14	which Ms. Levert will further address from a human
15	water sampling?	15	health standpoint?
16	A. You see here they're pretty	16	A. That's correct.
17	there's really uneventful. So we show no BTEX	17	Q. Let's next move to the sampling results
18	constituents. Everything was nondetect. Chloride	18	for chloride in the groundwater. What do they
19	being both in the 2 and 13-foot samples are almost	19	show?
20	identical, again showing there's really no	20	A. Again, so what we have here is this blue
21	stratified columns of constituents. And the same	21	bold is showing where we exceed a background of
22	with barium. And I'll also point out, when you	22	687 milligrams per liter. So we do see some
23	looked at the LDEQ subsegment, chloride for that subsegment was listed as, I believe, 90 milligrams	23	chlorides in the groundwater, especially you'll
24 25	per liter, so we're even less than what it's	24	see the highest concentrations are right there at
25	per mer, so were even ress than what it's	25	the blowout area, down around the 50-foot zone,

	Page 69		Page 71
1	which correlates well with the EC logs that we	1	the site remains unimpacted by benzene.
2	showed.	2	Q. Mr. Angle will address, along with
3	What you do, though, see in the	3	Levert, those two exceedances and their proposal
4	groundwater is rapidly declining conditions as we	4	for handling; right?
5	move away from the areas where we had detects.	5	A. Correct.
6	And we feel like we're delineated across the site	6	Q. Next we have the hydrocarbon sampling in
7	with one exception where we've proposed an	7	the groundwater. What do those show?
8	additional monitor well to the north, just to the	8	A. So ICON took TPH mixtures and reported
9	north of Area 2, to supplement the data that we	9	some results that so ERM went to go further
10	have.	10	investigate. In accordance with, kind of, the
11	Q. So one thing of note in connection with	11	preferred RECAP method on evaluating TPH, we took
12	the chloride results in the groundwater you	12	the fractionation data for each of these which
13	said it earlier and it's you can see it towards	13	shows specific carbon chains or carbon to evaluate
14	the bottom of this screen, that background for	14	against those standards, and we showed no impacts
15	chlorides at this site is 687 milligrams per	15	above any regulatory standards here.
16	liter; is that right?	16	Q. Okay. Let's do a little deeper dive
17	A. That's correct.	17	into the Chevron most feasible plan areas. Let's
18	Q. So the secondary drinking water standard	18	first start at Area No. 2. What were the
19	for chlorides itself is based upon aesthetics and	19	historical uses at that part of the property?
20	taste; correct?	20	A. Yeah. So we're showing here, this is an
21	A. Correct.	21	aerial photograph taken when we did the drone
22	Q. And that's 250 milligrams per liter?	22	survey on the left, but the well this is the
23	A. That's correct.	23	blowout area, obviously, and it was drilled by
24	Q. So background chlorides in the	24	Gulf in 1941, which is the same year that the
25	groundwater at this property is more than two	25	blowout occurred. Subsequent to that, it's been
			I
	Page 70		Page 72
1	times, almost three times what the secondary	1	agricultural use.
1 2	times, almost three times what the secondary drinking water standard is; is that right?	1 2	agricultural use. Q. And then this is a drone image of that
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	Page 73		Page 75
1	zone, and Mr. Angle will address that one and	1	areas, a not very good correlation with the
2	what was the sampling location where you found,	2	operational areas versus where we're actually
3	immediately below the root zone, an SAR and ESP	3	seeing this. As we try to delineate, again,
4	exceedance?	4	you're going to start to see and we're going to
5	A. Yes. So this was just SAR, and it was	5	show some actual photos comparing where the
6	at H-12 from zero to 2 feet.	6	operational areas and some linear features where
7	Q. And Mr. Angle will address that in his	7	there have been some improvements on the property
8	testimony?	8	for agricultural and land use.
9	A. That's correct.	9	Q. All right. Let's move to Area 4. What
10	Q. Taking into consideration Judge Cain's	10	were the historical site uses there?
11	ruling, which Mr. Carmouche prominently broadcast	11	A. So Gulf operated producing wells
12	earlier; right?	12	starting in 1941 and two saltwater disposal wells
12	A. Correct. I will point out one more	12	in 1957 and 1977. Those all those wells were
14	thing on this. So the blue boxes that you see on	14	P&Aed in 1983 and 1984.
15	these tables represents where we did take SPLP	15	And then subsequent operators after Gulf
15	samples to within the unsaturated zone. So you	16	were there, and we had that location of that
17	see we've got a good collection of SPLP data at	17	shut-in well, and we're going to show that here in
17	this area, within this area.	17	just a second on the drone photography.
19	Q. Did you see any particular trend	19	Q. And here's the drone image of Area 4; is
20	associated with the salt signature in the soil at	20	that right?
20	this property?	20	A. That's correct. So you see the truck
21	A. Really, there was it was pretty	22	just to the, I guess, left side of the truck,
22	uneventful within that upper upper area, there	23	you'll see kind of a little pad not pad but
23	really wasn't much to look at. Again, it was just	24	just kind of an open area there. That's the
24	one area within the zero to 2-foot sample that was	25	shut-in well location. If you look up to the top
25	one area within the zero to 2 root sample that was	20	shat in wen iseaton. If you look up to the top
	Page 74		Page 76
1	really the only thing that we needed to go		of the screen, that's Area 2 and you can see the
2	evaluate a little further.	2	pond up there.
1 <sup>2</sup>			
3	Q. And when taking into account the	3	Q. What are the results of the salt-based
	effective root zone, is it your opinion and others	3 4	Q. What are the results of the salt-based sampling that was conducted in Area 4?
3	effective root zone, is it your opinion and others who will appear this week that salt has been	3 4 5	<ul><li>Q. What are the results of the salt-based sampling that was conducted in Area 4?</li><li>A. Much like Area 2, we did have one</li></ul>
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	Page 77		Page 79
1	that H-21 and testifying to that H-21, H-21 R and	1	Areas 4 and 2 are kind of up to the top part of
2	basically the zero to 3-foot results that we're	2	the screen.
3	seeing here.	3	Q. And the results of the salt-based
4	Q. So while we're on SPLP, that is an	4	sampling at Area 5 were what?
5	analysis and testing procedure that has been	5	A. Like Areas 2 and 4, we had one and we
6	relied upon not only by LDNR and LDEQ along with	6	had a total of three of these locations where,
7	other lines of evidence to show the scope and	7	when the original sampling was done, we showed
8	extent of cross-media transfer of chlorides? Is	8	something in the zero to either zero to 2 to
9	that right? Salt based constituents?	9	zero to 4-foot intervals. So at H-18 here, we did
10	A. That's correct. It's one of the tools	10	see the same thing like we did in the other two
11	in the toolbox, but we have multiple lines of	11	areas. We went and resampled at 1-foot intervals
12	evidence through actual sample concentrations. We	12	from zero to 1, 1 to 2, and 2 to 3. The intervals
13	pulled the subsurface geology at the site, and	13	within the effective root zone came back below
14	that's just one of the tools that can be used to	14	regulatory standards, and Mr. Angle will continue
15	show that we're protective of groundwater.	15	to discuss this further.
16	Q. Summarize for us the results of barium	16	We do have a contingent SPLP chloride
17	sampling at Section 4, or Area 4.	17	sample shown here at H-18 R 2 to, again, satisfy
18	A. So again, same sorry. This is that one	18	the, you know, desire to have SPLPs at some of the
19	I pointed out, I think when we were looking at one	19	higher concentrations within the unsaturated zone.
20	of the earlier photographs. You see the linear	20	Q. And next, we have the barium soil
21 22	pattern or the linear line there that was taken right along that road surface. Everything, again,	21 22	results for Area 5. And what do they show? A. Yeah. Again, you'll see the zero to 2
22	is contained within that zero to 2-foot sample.	22 23	is really where everything is contained, you know,
23	Low concentrations, you know, and again Ms. Levert	23 24	the spread.
	will talk about that.	24	I will point out that there's really
23		25	I will point out that there s Teany
	Page 78		Dama 80
			Page 80
1	And just the you're going to see here		in a lot of our data, there's discrepancy between
2	And just the you're going to see here that, again, the nonconformance to the historical	2	in a lot of our data, there's discrepancy between results between what ERM and ICON reported. And
2 3	And just the you're going to see here that, again, the nonconformance to the historical E&P operations versus where we're seeing some	2 3	in a lot of our data, there's discrepancy between results between what ERM and ICON reported. And again, Ms. Levert will kind of delve into that
2 3 4	And just the you're going to see here that, again, the nonconformance to the historical E&P operations versus where we're seeing some results.	2 3 4	in a lot of our data, there's discrepancy between results between what ERM and ICON reported. And again, Ms. Levert will kind of delve into that even further, but that's another important note
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	Page 81		Page 83
1	operator outside of Chevron. And there's an	1	A. Yeah. If you kind of look over towards
2	impounded area that holds water and that's heavily	2	the left-hand side, you'll see the birds playing
3	vegetated.	3	around. But it's just a beautiful green pasture,
4	Q. This is a drone image of Area 6; is that	4	just a beautiful field, really no indication of
5	right?	5	any oil field operations. And again, you see
6	A. Correct. So as we're going down that	6	where the row where we show those, kind of, linear
7	road, it's actually off to the left-hand side	7	features for barium that's over shown on the
8	where the tall trees are located. Again, that	8	right-hand side of the screen.
9	area that you see kind of prominently sticks out,	9	Q. One the times you visited the site was
10	that's not Chevron's area.	10	with some of the panel members
11	Q. And you now have the salt-based sampling	11	A. Correct.
12	results of the soil in Area 6. What did those	12	Q who are here today; right?
13	show?	13	A. Yes.
14	A. So you see the yellow locations showing	14	Q. And all of you visited most, if not all,
15	the original ICON location where ERM went back and	15	of these areas; is that right?
16	sampled and we don't show any exceedances.	16	A. Yes. The panel members who were there,
17	Q. There is one location, is there not,	17	yeah, did have, but yes.
18	that Mr. Angle will address immediately beneath	18	Q. So let's go to Area 8. What did the
19	the root zone in that area?	19	salt-based sampling show?
20	A. I don't believe	20	A. Yeah. No real impacts that we needed to
21	Q. There is not?	21	delineate any further, and, again, we show the
22	A. Not at this location, yeah.	22	blue box down at H-3 where we which is outside
23	Q. Okay.	23	of the area but where we took an SPLP sample.
24	Let's go next to the barium results in	24	Q. Then you have barium results in the soil
25	the soil. What do they show at Area 6?	25	at Area 8. What do they show?
	Page 82		Page 84
1	A. Once again, not to bore the panel here,	1	Page 84 A. Yeah. You see again, that road we
1 2		1 2	
	A. Once again, not to bore the panel here,	2 3	A. Yeah. You see again, that road we showed to the right-hand side of the drone we just saw, and, again, we see H-4 and how we tried to
2	A. Once again, not to bore the panel here, but limited to the zero to 2-foot, there is	2 3	A. Yeah. You see again, that road we showed to the right-hand side of the drone we just
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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	<ul> <li>A. Once again, not to bore the panel here, but limited to the zero to 2-foot, there is discrepancy between ERM and ICON. I'll point out one example, but there's many here. H-24, zero to 2, ERM had 294, ICON had 3,490. And there's other examples as you look across all the data sets that were produced between ERM and ICON. So that it's limited to that zero to 2-foot sample, and we do show here that we want to we're proposing some additional delineation samples. I think we have a total of seven at this location. Yeah. Or maybe eight. Eight locations, between some resamples at some locations and some delineation borings.</li> <li>Q. Let's go to the last area that's subject to the limited admission area, Area 8. What were its historical uses?</li> <li>A. So this well was drilled by Gulf in 1946. It was actually a dry hole, so it was P&amp;Aed one year later, in 1947. It's heavily vegetated. It was heavily vegetated until around 2017, 2019, and it was converted to agricultural uses. It's</li> </ul>	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	<ul> <li>A. Yeah. You see again, that road we showed to the right-hand side of the drone we just saw, and, again, we see H-4 and how we tried to delineate but it just kept going along that linear pattern. And low concentrations confined within the zero to 2-foot area, and we are also proposing a handful of resamples and delineation borings to continue to try to delineate barium even further.</li> <li>Q. So we have really two constituents, if you might call them, of concern in the soil. It's barium and also chlorides; right?</li> <li>A. Correct.</li> <li>Q. And you've talked a lot about the barium soil sampling results and groundwater results and also the chloride data set. So summarize for this panel and the judge, if you can, the summary of the barium sampling results.</li> <li>A. Yeah. So first, there was no 29-B exceedances for true total barium. So that waswe didn't have anything across all the data that we collected. Barium does exceed the groundwater screening standard at only one location, which was</li> </ul>

	Page 85		Page 87
1	And then, again, the distribution of	1	any of the experts either for ICON or from ERM or
2	barium poorly correlates with the E&P features,	2	any of Chevron's other experts that the shallow
3	and we think that's likely attributed to the	3	groundwater at this property is not a USDW; is
4	reworking of the surface soils through	4	that right?
5	agricultural use, construction of roads, et	5	A. I would that is my guess. I agree.
6	cetera.	6	MR. GREGOIRE: Those are all the questions I
7	And we've got these two images here	7	have. Thank you.
8	showing the 1981, you can see the operational	8	CROSS-EXAMINATION
9	area; and then, in 2019, where you see the road.	9	BY MR. WIMBERLEY:
10	And you don't see the correlation in 1981, but you	10	Q. Mr. Purdom, I just want to make a few
11	do in the 2019 data set.	11	things clear.
12	And then mean exceedances of screening	12	You're not the one on your team that
13	standard reported by ICON were not confirmed in	13	identified the chloride and barium background
14	the ERM split.	14	concentrations in the soil and groundwater; right?
15	Q. And what is the summary, if you can	15	A. I'm not the one who did that; correct.
16	provide that, of the sampling results for	16	Q. And you're not the one that identified
17	salt-based constituents?	17	any of the AOIs according to RECAP?
18	A. I think the probably the headline is	18	A. Correct.
19	that we're delineated with the exception of that	19	Q. And you're not the one who decided what
20	one location where we want to put a monitor well	20	the groundwater classification was?
21	into Area 2 up to the north. That's the one	21	A. I did look at that data. Mr. Angle in
22	location. But elevated chloride and groundwater	22	our team did go through that, but I was part of
23	was localized to the former E&P operations. And	23	that discussion and reviewed that.
	then as we did step out, there was concentrations	24	Q. You're relying upon Mr. Angle's opinion
25	where we did have some impacts, you see them	25	for that; right?
	Page 86		Page 88
1	rapidly decrease and decline. The chloride is	1	A. Correct. But I concur with Mr. Angle's
2	in groundwater is delineated in each of the	2	assessment that it's a GW 3.
3	limited admission areas except that one area	3	Q. Just because there's a public water
4	north north of Area 2.	4	supply available, does that mean that we're not
5	The 29-B salt parameters in soil are	5	supposed to protect the groundwater under RECAP?
6	delineated laterally and vertically in each of the	6	Does that have anything to do with the definition
7	limited admission areas. There was no 29-B salt	7	of groundwater under RECAP?
8	parameter exceedance within the effective root	8	A. Repeat the I'm not quite sure where
9	zone. And we've shown multiple lines of evidence	9	
10	of protection of the underground source of	10	Q. The availability of the public water
11	drinking water being vertical delineation to the	11	supply, does that play into the classification of
12	lab data, the EC probe logs again, I'll point	12	groundwater under RECAP?
13	you back to those where we did see the highest	13	A. Well, what I'll say is this this
14	impacts as confirmed by the lab data that we	14	the shallow groundwater that we do see at the
15	quickly showed that decrease, and we confirmed	15	surface is unusable due to its poor nature and the
		116	yield that we have. So we don't identify that
16	that decrease with the laboratory data in the	16	there's a mapph a company of a second density of the second
17	soils as well. The vertical permeability, we had	17	there's a useable source of groundwater there at the cite until you get into the Chicot Aguifer
17 18	soils as well. The vertical permeability, we had three of them from 10 to the minus 7 to 10 to the	17 18	the site until you get into the Chicot Aquifer.
17 18 19	soils as well. The vertical permeability, we had three of them from 10 to the minus 7 to 10 to the minus 9 showing that it meets the definition of a	17 18 19	the site until you get into the Chicot Aquifer. Q. And you're going to rely on Mr. Angle to
17 18 19 20	soils as well. The vertical permeability, we had three of them from 10 to the minus 7 to 10 to the minus 9 showing that it meets the definition of a natural liner, and the SP chloride data. So we've	17 18 19 20	<ul><li>the site until you get into the Chicot Aquifer.</li><li>Q. And you're going to rely on Mr. Angle to ^sum that up?</li></ul>
17 18 19 20 21	soils as well. The vertical permeability, we had three of them from 10 to the minus 7 to 10 to the minus 9 showing that it meets the definition of a natural liner, and the SP chloride data. So we've got multiple lines of evidence showing that we're	17 18 19 20 21	<ul><li>the site until you get into the Chicot Aquifer.</li><li>Q. And you're going to rely on Mr. Angle to</li><li>^sum that up?</li><li>A. Well, I agree with that. I think</li></ul>
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	Page 89		Page 91
1	completely agree that it's a GW 3.	1	aquifer that can be used for public consumption.
2	Q. So the ground out there from zero to	2	Q. So it is an aquifer?
3	30 feet, is it soil or is there an aquifer?	3	A. It's a water-bearing zone. It's
4	A. I would not consider any aquifer below,	4	stringers of that of water, but I don't
5	down until you get to the Chicot.	5	consider that to be an aquifer.
6	Q. Okay.	6	Q. Do you understand that, under
7	Now, the shallow groundwater stringers	7	definitions in RECAP, a Groundwater 3 means it's
8	that you described, would you consider those	8	an aquifer?
9	hydraulically connected?	9	A. It follows up with that word "aquifer,"
10	A. In some areas, there's some connection.	10	but it's a water-bearing zone.
11	But for the most part, as we showed on those	11	MR. WIMBERLEY: No further questions.
12	cross-sections, you'll have borings right next to	12	JUDGE PERRAULT: Any redirect?
13	each other where there is absolutely no	13	MR. GREGOIRE: None.
14	connection. So no, I don't determine this to be a	14	JUDGE PERRAULT: Do any of you have questions
15	continuous connected to groundwater zone.	15	for this witness?
16	Q. So they're somewhat connected but not	16	PANELIST DELMAR: Yes, Your Honor. We're
17	fully connected?	17	kind of discussing it.
18	A. There's areas where there's small	18	JUDGE PERRAULT: Do you need a second? Take
19	areas where there is some connection, but these	19	a second.
20	are really more stringers, and we've put some in	20	While they're doing that, I want it make
21	the ground where there was small areas of	21	it clear. Let's see. Exhibit 1.7, which was
22	connection. But for the most part across the	22	the curriculum vitae, was there any objection
23	facility, we even had a lot of areas where we went	23	to that being admitted into evidence?
24	to go look to take groundwater samples and there	24	MR. CARMOUCHE: No. No objections.
25	was nothing there to collect or the samples, when	25	MR. GREGOIRE: Judge, just for clarity on the
	Page 90		Page 92
	Page 90	1	Page 92
1	we were purging, they went dry.	1	record, Mr. Purdom referred to several of the
2	we were purging, they went dry. Q. So the various stringers out there, as	2	record, Mr. Purdom referred to several of the attachments and appendices in the proposed
2 3	<ul><li>we were purging, they went dry.</li><li>Q. So the various stringers out there, as you describe them, are they separate aquifers?</li></ul>	2 3	record, Mr. Purdom referred to several of the attachments and appendices in the proposed most feasible plan. So with that being said,
2 3 4	<ul><li>we were purging, they went dry.</li><li>Q. So the various stringers out there, as you describe them, are they separate aquifers?</li><li>A. I'm not calling them aquifers. I'm</li></ul>	2 3 4	record, Mr. Purdom referred to several of the attachments and appendices in the proposed most feasible plan. So with that being said, Chevron files and offers Chevron Exhibit
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2 3 4 5 6	<ul><li>we were purging, they went dry.</li><li>Q. So the various stringers out there, as you describe them, are they separate aquifers?</li><li>A. I'm not calling them aquifers. I'm calling them basically stringers of silt that have a little bit of water in them, but I don't</li></ul>	2 3 4 5 6	record, Mr. Purdom referred to several of the attachments and appendices in the proposed most feasible plan. So with that being said, Chevron files and offers Chevron Exhibit No. 1, which is its proposed feasible plan and attachments. In addition to Chevron 147,
2 3 4 5 6 7	<ul><li>we were purging, they went dry.</li><li>Q. So the various stringers out there, as you describe them, are they separate aquifers?</li><li>A. I'm not calling them aquifers. I'm calling them basically stringers of silt that have a little bit of water in them, but I don't consider them an aquifer.</li></ul>	2 3 4 5 6 7	record, Mr. Purdom referred to several of the attachments and appendices in the proposed most feasible plan. So with that being said, Chevron files and offers Chevron Exhibit No. 1, which is its proposed feasible plan and attachments. In addition to Chevron 147, which is his CV, Chevron 45, which is RECAP
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1	MR. GREGOIRE: Yes.	1	THE WITNESS: Correct.
2	JUDGE PERRAULT: So Exhibit 147, Mr. Purdom's	2	PANELIST DELMAR: The figures? Okay.
3	curriculum vitae, is admitted into evidence	3	They weren't in the presentation. I
4	without objection.	4	just wanted to make sure.
5	Thank you for correcting that.	5	THE WITNESS: Right. Just for the time and
6	JUDGE PERRAULT: Is the panel ready?	6	consideration, we just wanted to have those
7	PANELIST DELMAR: Yes, Your Honor.	7	couple in there.
8	JUDGE PERRAULT: Who wants to go first?	8	PANELIST DELMAR: Also, do you I'm going
9	PANELIST DELMAR: I will. Chris Delmar.	9	to jump around a little bit on my questions.
10	JUDGE PERRAULT: Okay. Please proceed.	10	But do you know the depth of the Bayou
11	PANELIST DELMAR: So I have a couple of	11	Lacassine?
12	questions about the cross-section well, I	12	THE WITNESS: Yes. We did measure that. I
13	have a question about the cross-section as	13	believe it's 10 feet was the depth to the
14	well as some of the potentiometric surface	14	bottom.
15	data that was measured.	15	PANELIST DELMAR: Okay.
16	So for the cross-section locations, you	16	And I do have one question about, again,
17	have the A to A prime. It has a nice east to	17	the potentiometric surface on H-10. When you
18	west look, trend until about H-3 and then it	18	had it measured, most of the wells in the
19	makes this big sort of north-south dog leg.	19	area were 1 foot or minus 1 foot below sea
20	Could you explain why y'all decided to	20	level. This one was minus 5. So there's
21	make that sort of track?	21	obviously a very significant difference
22	THE WITNESS: Really, we wanted to really	22	between that. Was water removed before the
23	just capture all of the data that was right	23	sampling? Like was it because I'm
24	over there in that background. So it was	24	assuming no one's pumping from this
25	just to capture more area. So it was we	25	monitoring well?
	Page 94		Page 96
			-
1	could have cut it off at I think it was	1	THE WITNESS: Right.
2	H-32 A and B where we had, so we could have	2	PANELIST DELMAR: So I don't assume it's a
3	cut it off at that point, but we were right	3	pumping center. But what caused that sort of
4	there with those other two, so we just let it	4	draw-down at that spot?
5	jut down.	5	THE WITNESS: Which well was that? Was that
6	PANELIST DELMAR: Also, between H-3 and H-32,	6	the one over towards the far east?
7	are there any other sample points there, any	7	PANELIST DELMAR: H-10.
8 9	logs available that could have given some more information? Judging by the scale, it's	8	THE WITNESS: So no. We never the first
10	about 2500 to 3,000 feet of just here's one	9	thing we do when we go out to take the water levels is that's our first activity, so no
10	spot, here's the other one, here's the next.	10	•
11	THE WITNESS: Yeah. So we did look at the	11 12	draw-down, no type of pumping or sampling is occurring prior to that water level being
12	deeper borings to try to get the most	12	collected.
13	indication. There were some more borings,	15 14	PANELIST DELMAR: So just sort of minus
15	but they just didn't have the depth to really	14	just negative 5 feet is kind of anomalous,
16	provide a whole lot of detail that really	15	"something happened and you don't know what"
17	meant anything. All of our boring logs are	10	kind of thing?
18	included in our expert reports and so we've	18	THE WITNESS: Well, it could be the
19	produced that, so they're there and	19	stratigraphy down below. That may be the one
20	available, but there wasn't any, you know,	20	where there's a little more sandy zone to it.
21	real reason why we didn't include those,	20	So I believe that may be part of the
22	other than they just really provide the depth	22	explanation there.
		<i>LL</i>	
23	information.		-
23 24		22 23 24	PANELIST DELMAR: And my last question, referring to the chloride in groundwater

	Page 97		Page 99
1	at the bottom of the slides was	1	Q. What do you do, Mr. Ritchie?
2	687 milligrams per liter.	2	A. I'm an ecologist, and I work with my own
3	THE WITNESS: Correct.	3	company, Ritchie Ecological Environmental
4	PANELIST DELMAR: And I'm looking at the	4	Services.
5	background values in Area 1 and Area 9. And	5	Q. What is your role in this case?
6	all of those are lower than 687. So how did	6	A. The role in this case, I have worked
7	you calculate background for that?	7	with Dr. Luther Holloway. We have coauthored a
8	THE WITNESS: Yeah, so that was done by	8	report. Our purpose of our study was to view the
9	within our ERM team using the ProUCL	9	vegetation health of the site and characterize the
10	software, and Ms. Levert would have to go	10	effective root zone of the vegetation growing on
11	into a little bit more detail on how that was	11	the site.
12	done, but that was done through ProUCL.	12	Q. What is your educational background?
13	JUDGE PERRAULT: Anyone else have a question?	13	A. I have a bachelor's degree in ecology
14	PANELIST OLIVIER: I think we're good. Thank	14	and evolutionary biology from Tulane University.
15	you.	15	I also have a master's degree from University of
16	MR. CARTER: Our next witness is Patrick	16	Florida College of Agriculture and Life Sciences
17	Ritchie.	17	in soil and water science.
18	JUDGE PERRAULT: Do y'all want to take a	18	Q. Do you have professional certifications?
19	ten-minute break?	19	A. I do. I have two professional
20	Any objection? We're going to take a	20	certifications. The first one is a certified
21	ten-minute break, and then we'll come back	21	senior ecologist that requires ten years of
22	with your next witness.	22	experience in the field of ecology as well as
23	We'll go off the record.	23	education as well. Similar, the professional
24	(Recess taken at 10:45 a.m. Back on	24	wetlands scientist also has requirements for
25	record at 10:58 a.m.)	25	education and experience, and I hold both of those
	D		
	Page 98		Page 100
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1 2	JUDGE PERRAULT: We're back on the record. It's now 10:58. I'm Charles Perrault. We're	1 2	currently. Q. Do you have experience in evaluating
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	Page 101		Page 103
1	with Dr. Hallaners, Versus stiened Dr. Hallaners	1	I have done at this momenty. We account the
1	with Dr. Holloway. You mentioned Dr. Holloway.		I have done at this property. We assessed the
2	Who is Dr. Holloway?	2	surveyed the rice crops, also some trees and some herbaceous vegetation in the fallow areas of the
3	A. Dr. Luther Holloway is a Ph.D. who has done effective root zone studies for many years.	3	property. We've also determined the effective
45	He has significant experience, over 40 or 50 years	4 5	root zone, and it's very shallow for this type of
6	of experience, and I've worked with him for many	6	site, these types of soils. And the effective
7	years and others that have done effective root	7	root zone is ranges between 5 and 10 inches.
8	zone studies in Louisiana, but he has since	8	And in our study, we also take a tour of the site,
9	retired.	9	and we look at the vegetation. And as the panel
10	Q. Have you testified before LDNR before?	10	has seen in some of our aerial views and drone
11	A. That is correct, I have.	10	footage, the property is growing healthy and has
11	Q. Which case was that?	11	robust vegetation throughout the site.
12	A. That was the Newman case.	12	Q. So we've been using this term "effective
14	Q. What did you testify about in the Newman	-	root zone." What is an effective root zone?
15	case?	14	A. So the effective root zone represents
16	A. It was similar to this case. I did an	16	the portion of the plant's root system that
17	effective root zone study with Dr. Luther Holloway	17	obtains the maximum amount of nutrients and water
18	in that case, also viewing the vegetation and the	18	that sustains it through its entire life cycle,
19	different habitat types of that property as well.	19	through its germination all the way through its
20	Q. Have you worked with Dr. Holloway on	20	growth and reproductive cycle.
21	matters where he testified to LDNR about the	20	Again, it's not the deepest roots, but
22	effective root zone?	22	it is the majority of the root system.
23	A. Yes. We've been working together	23	Q. There is an illustration on this slide.
24	similar, in a partnership so to speak, for many	23	What is this illustration that is on this slide?
25	years. And some of these cases that he's worked	25	A. So this is important for the panel to
	,		The bound is in inportant for the parter to
	Page 102		Page 104
1	Page 102 on most notably would be Hero Lands recently, LA	1	Page 104 see and understand. So this is photographs that
1 2	-		see and understand. So this is photographs that were taken from the soil cores from the samples
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	Page 105		Page 107
1	Q. How is the methodology for analyzing	1	Q. And describe the hand auger method.
2	effective root zones and effective root zone	2	A. And the hand auger is an additional
3	studies, how has that been developed?	3	method that we'll utilize particularly in deeper
4	A. It's been developed over many, many	4	soils. I'm sure the panel has used a hand auger
5	years. So root zone studies are very	5	before. We've all gotten behind one and turned it
6	labor-intensive, and the methods of looking at	6	in the soil. And what we'll do is, similar to the
7	roots and root systems really hasn't changed much	7	monoliths, is turn the hand auger, pull out a soil
8	over the years. And what we have here is one	8	core, expose the roots that are present or absent
9	example of one of the oldest documents that we've	9	in that, and make our determination based on that
10	used as as one of the methods or documents that	10	method as well.
11	describe the methodology for conducting one of	11	Q. Did you use all of these techniques for
12	these assessments.	12	your root zone study on the Henning property?
13	This one's a 1971 paper from Sherman and	13	A. Yes, we did.
14	Genuchten. It's a Dutch paper, and it's been	14	Q. When did you go to the Henning property?
15	supplemented with multiple iterations of new	15	A. It was November, December of 2021.
16	studies and new types of papers and peer-reviewed	16	Q. So how many days were you on-site on the
17	papers that all have consistent methodology	17	Henning property for the effective root zone
18	similar to what we have used in this site.	18	study?
19	Q. What are the methods that you find in	19	A. For this study, it was a week of work.
20	the literature for studying effective root zones?	20	Q. And that was in November, December?
21	A. So for this site, we incorporated and	21	A. Yes, sir, that's correct.
22	utilized three different methods. So as the quote	22	Q. How were you able to do a vegetative
23	down at the bottom is another paper that describes	23	study in the winter? A. There is definitely some differences in
24 25	methodology, it's often necessary to do multiple methods. Root systems are very complex, and the	24 25	an overwinter survey than in the spring; however,
25		25	an overwinter survey than in the spring, however,
	Page 106		Page 108
1	different vegetation types warrant multiple		many plant species will actually flower or grow
	methods. And what we did here is we looked at		seeds and produce in the wintertime, as some of
	methods. And what we did here is we looked at three different methods: excavation, a monolith	2 3	seeds and produce in the wintertime, as some of the panel may know.
2 3 4	methods. And what we did here is we looked at three different methods: excavation, a monolith and the hand auger.	2 3 4	seeds and produce in the wintertime, as some of the panel may know. We also have evergreen species and
2 3 4 5	<ul><li>methods. And what we did here is we looked at three different methods: excavation, a monolith and the hand auger.</li><li>Q. Describe the excavation method.</li></ul>	2 3 4 5	seeds and produce in the wintertime, as some of the panel may know. We also have evergreen species and things like that that we can observe. And then
2 3 4 5 6	<ul><li>methods. And what we did here is we looked at three different methods: excavation, a monolith and the hand auger.</li><li>Q. Describe the excavation method.</li><li>A. The excavation is simply what it sounds</li></ul>	2 3 4 5 6	seeds and produce in the wintertime, as some of the panel may know. We also have evergreen species and things like that that we can observe. And then also just as far as trees and things like that go,
2 3 4 5 6 7	<ul><li>methods. And what we did here is we looked at three different methods: excavation, a monolith and the hand auger.</li><li>Q. Describe the excavation method.</li><li>A. The excavation is simply what it sounds like: We get out there with some shovels and hand</li></ul>	2 3 4 5 6 7	seeds and produce in the wintertime, as some of the panel may know. We also have evergreen species and things like that that we can observe. And then also just as far as trees and things like that go, just looking at the structure of the ecosystem,
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1 2	Page 109		Page 111
			-
2	A. We do a tour of the entirety of the	1	on-site, so it was one of ours that we selected.
	site, particularly around some of the well	2	The herbaceous species, we had four
3	locations that are part of this hearing today.	3	different species that we looked at. We had the
4	And that's what we do, is the majority of the	4	bushy bluestem, sand spikerush, common rush and
5	site, we look at it, yes, sir.	5	the sugarcane plume grass. And one thing notable
6	Q. What sorts of vegetation did you see on	6	about that, which Dr. Helen Connelly will probably
7	the property?	7	discuss, those are often found in some wetlands
8	A. So what we'll try and do is get a good	8	species as well.
9	representation of how the land is being used with	9	And then we also did rice observations
10	the vegetation types that we have there. So this	10	as well.
11	one, we have obviously rice agricultural crop, but	11	So on this picture right here to the
	we also found some areas where there were trees	12	left, or the western portion of the property,
13	growing. So we wanted to do an assessment of the	13	those yellow dots indicate the herbaceous
14	trees as well, particularly if there was some	14	locations. And those were fields that were left
15	potential for growth of trees. And also the	15	fallow during the time of our investigation.
16	fallow areas where you had just vegetation	16	The central portion, those green dots indicate the three locations where we observed the
17	herbaceous shrubby vegetation growing at some of	17	trees. And then to the east and southeast, those
18	the former agricultural fields. So those were the	18	are the blue dots that indicate where the rice
19	three vegetative classes that we reviewed. Q. What were your observations about the	19	observations were made.
20	agricultural crop?	20	Q. How did you select the specific
21	A. It was extremely dense, they have	21 22	locations that are shown on the map?
22	completed their harvest and everything up here to	22 23	A. So before we go out in the field, we do
23	be similar to a fine-growing rice crop.	23 24	a number of different things to select our
24 25	Q. What were your observations about the	24 25	locations. One thing is we'll look at historical
25	Q. What were your observations about the	23	iocations. One timing is we in look at instorical
	Page 110		Page 112
1	trees on the site?	1	aerial photos, again looking at if there are any
2	A. So the trees, as Mr. Purdom had shown	2	footprints of formal operational areas or any
3	through some of those historical aerials, there	3	other kind of land activity.
4	was a lot of operations on-site and so the trees	4	We'll also look at the USDA soil survey.
5	that we were able to find, they were either by	5	We like to try and get a good representation of
	Bayou Lacassine, but the ones that we investigated	6	the different types of soils on-site, as soils can
6	ware control to the property. They were a second		
	were central to the property. They were a second	7	dictate root growth and penetration in the soils
	growth. They had mixed class of different	8	dictate root growth and penetration in the soils as well.
7	growth. They had mixed class of different species. And what we did is we made observations	8 9	dictate root growth and penetration in the soils as well. And then other things, like ICON's
7 8 9 10	growth. They had mixed class of different species. And what we did is we made observations of the most dominant and oldest trees that we saw	8 9 10	dictate root growth and penetration in the soils as well. And then other things, like ICON's report or any of these areas of you know, where
7 8 9 10 11	growth. They had mixed class of different species. And what we did is we made observations of the most dominant and oldest trees that we saw on the site.	8 9 10 11	dictate root growth and penetration in the soils as well. And then other things, like ICON's report or any of these areas of you know, where the sampling has been conducted. And what we'll
7 8 9 10 11 12	growth. They had mixed class of different species. And what we did is we made observations of the most dominant and oldest trees that we saw on the site. Q. What were your observations about the	8 9 10 11 12	dictate root growth and penetration in the soils as well. And then other things, like ICON's report or any of these areas of you know, where the sampling has been conducted. And what we'll do is we'll take all of that information and we'll
7 8 9 10 11 12 13	growth. They had mixed class of different species. And what we did is we made observations of the most dominant and oldest trees that we saw on the site. Q. What were your observations about the herbaceous plants on-site?	8 9 10 11 12 13	dictate root growth and penetration in the soils as well. And then other things, like ICON's report or any of these areas of you know, where the sampling has been conducted. And what we'll do is we'll take all of that information and we'll try to get a good representation of the property
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7 8 9 10 11 12 13 14 15 16 17 18	growth. They had mixed class of different species. And what we did is we made observations of the most dominant and oldest trees that we saw on the site. Q. What were your observations about the herbaceous plants on-site? A. Now, the herbaceous plants were very vigorous. And you can on in this photograph, and those panel members that have been on-site, you can see there's a wide variety of different species growing in those fallow areas.	8 9 10 11 12 13 14 15 16 17 18	dictate root growth and penetration in the soils as well. And then other things, like ICON's report or any of these areas of you know, where the sampling has been conducted. And what we'll do is we'll take all of that information and we'll try to get a good representation of the property and avoiding some of those constraints that I mentioned as far as former operational areas and things like that. Q. So let's look at each type of specimen separately.
7 8 9 10 11 12 13 14 15 16 17 18 19	<ul> <li>growth. They had mixed class of different</li> <li>species. And what we did is we made observations</li> <li>of the most dominant and oldest trees that we saw</li> <li>on the site.</li> <li>Q. What were your observations about the</li> <li>herbaceous plants on-site?</li> <li>A. Now, the herbaceous plants were very</li> <li>vigorous. And you can on in this photograph, and</li> <li>those panel members that have been on-site, you</li> <li>can see there's a wide variety of different</li> <li>species growing in those fallow areas.</li> <li>Q. So on the next slide, what is this map</li> </ul>	8 9 10 11 12 13 14 15 16 17 18 19	dictate root growth and penetration in the soils as well. And then other things, like ICON's report or any of these areas of you know, where the sampling has been conducted. And what we'll do is we'll take all of that information and we'll try to get a good representation of the property and avoiding some of those constraints that I mentioned as far as former operational areas and things like that. Q. So let's look at each type of specimen separately. How did you measure the root zone for
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7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	growth. They had mixed class of different species. And what we did is we made observations of the most dominant and oldest trees that we saw on the site. Q. What were your observations about the herbaceous plants on-site? A. Now, the herbaceous plants were very vigorous. And you can on in this photograph, and those panel members that have been on-site, you can see there's a wide variety of different species growing in those fallow areas. Q. So on the next slide, what is this map showing? A. So this is a representation of our	8 9 10 11 12 13 14 15 16 17 18 19 20 21	dictate root growth and penetration in the soils as well. And then other things, like ICON's report or any of these areas of you know, where the sampling has been conducted. And what we'll do is we'll take all of that information and we'll try to get a good representation of the property and avoiding some of those constraints that I mentioned as far as former operational areas and things like that. Q. So let's look at each type of specimen separately. How did you measure the root zone for the rice? A. So what we did with the rice is we did a
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	growth. They had mixed class of different species. And what we did is we made observations of the most dominant and oldest trees that we saw on the site. Q. What were your observations about the herbaceous plants on-site? A. Now, the herbaceous plants were very vigorous. And you can on in this photograph, and those panel members that have been on-site, you can see there's a wide variety of different species growing in those fallow areas. Q. So on the next slide, what is this map showing? A. So this is a representation of our sample locations. So we have selected three tree	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	dictate root growth and penetration in the soils as well. And then other things, like ICON's report or any of these areas of you know, where the sampling has been conducted. And what we'll do is we'll take all of that information and we'll try to get a good representation of the property and avoiding some of those constraints that I mentioned as far as former operational areas and things like that. Q. So let's look at each type of specimen separately. How did you measure the root zone for the rice? A. So what we did with the rice is we did a combination of the monolith and the hand auger.
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	<ul> <li>growth. They had mixed class of different</li> <li>species. And what we did is we made observations</li> <li>of the most dominant and oldest trees that we saw</li> <li>on the site.</li> <li>Q. What were your observations about the</li> <li>herbaceous plants on-site?</li> <li>A. Now, the herbaceous plants were very</li> <li>vigorous. And you can on in this photograph, and</li> <li>those panel members that have been on-site, you</li> <li>can see there's a wide variety of different</li> <li>species growing in those fallow areas.</li> <li>Q. So on the next slide, what is this map</li> <li>showing?</li> <li>A. So this is a representation of our</li> <li>sample locations. So we have selected three tree</li> <li>different species: The red maple, the sweet gum</li> </ul>	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	dictate root growth and penetration in the soils as well. And then other things, like ICON's report or any of these areas of you know, where the sampling has been conducted. And what we'll do is we'll take all of that information and we'll try to get a good representation of the property and avoiding some of those constraints that I mentioned as far as former operational areas and things like that. Q. So let's look at each type of specimen separately. How did you measure the root zone for the rice? A. So what we did with the rice is we did a combination of the monolith and the hand auger. So going down to 24 inches, maybe a couple inches
7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	growth. They had mixed class of different species. And what we did is we made observations of the most dominant and oldest trees that we saw on the site. Q. What were your observations about the herbaceous plants on-site? A. Now, the herbaceous plants were very vigorous. And you can on in this photograph, and those panel members that have been on-site, you can see there's a wide variety of different species growing in those fallow areas. Q. So on the next slide, what is this map showing? A. So this is a representation of our sample locations. So we have selected three tree	8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	dictate root growth and penetration in the soils as well. And then other things, like ICON's report or any of these areas of you know, where the sampling has been conducted. And what we'll do is we'll take all of that information and we'll try to get a good representation of the property and avoiding some of those constraints that I mentioned as far as former operational areas and things like that. Q. So let's look at each type of specimen separately. How did you measure the root zone for the rice? A. So what we did with the rice is we did a combination of the monolith and the hand auger.

	Page 113		Page 115
1 2 3 4 5 6 7 8 9 10 11 12 13	<ul> <li>previously. We extracted the rice crop, we opened up the soil core and looked at it and made our assessment of the rooting depth of this. And the effective root zone for the rice crops ranged from 5 to 7 inches.</li> <li>Q. How did you measure the root zone for the trees?</li> <li>A. So trees are a little bit more a little bit more work out there; right? So we had a number of individuals, and we all had shovels and spades and hand augers and everything else, and we went out there and excavated around all of these roots. What the panel can see in this</li> </ul>	2 3 4 5 6 7 8 9 10 11 12 13	<ul> <li>clays for a reason. It's pretty heavy. And so, because of that clay content, it's naturally flooded. A lot of those areas were flooded, which makes it perfect for rice cultivation.</li> <li>Q. And what is your third opinion in the case?</li> <li>A. The third one deals with remediation.</li> <li>So the purpose of the effective root zone is to provide additional insight or additional parameter to Mr. Angle and others that will the panel to determine what remediation depth is necessary for the growth of vegetation.</li> <li>So we highlighted that the effective root zone is not provide additional depth is necessary for the growth of vegetation.</li> </ul>
14 15	photograph, we spray-painted the roots bright yellow so that you could see where the roots go.	14 15	root zone is quite shallow in this case and that anything beyond that, for the growth of
16	So we follow those major roots, and we dig around	15	vegetation, is unnecessary.
17	them and then find if there's any roots that are	17	MR. CARTER: Thank you for your time. We
18	descending in the profile, we'll dig and follow	18	pass the witness.
19	those as well, and we'll make our assessment based	19	JUDGE PERRAULT: Any cross?
20 21	on those excavations. And for this site, we had effective root zone between 5 and 10 inches for	20 21	MR. KEATING: Yes, Your Honor. CROSS-EXAMINATION
21	the different trees.	21 22	BY MR. KEATING:
23	Q. And how did you measure the effective	23	Q. Judge Perrault, panel members,
24	root zones for the herbaceous plants?	24	Mr. Ritchie, Matt Keating for Henning Management
25	A. Herbaceous is the exact same methodology	25	LLC.
	Page 114		Page 116
1	as the rice. We extracted the monolith, also did	1	Mr. Ritchie, do you recall I took your
1 2	as the rice. We extracted the monolith, also did hand augers below it. And as you can see on the	1 2	deposition in this case a few months back?
	hand augers below it. And as you can see on the right-hand side, we were able to cut the core		<ul><li>deposition in this case a few months back?</li><li>A. Yes, sir. You feeling better now?</li></ul>
2 3 4	hand augers below it. And as you can see on the right-hand side, we were able to cut the core open, view the root systems as they were growing	2 3 4	<ul><li>deposition in this case a few months back?</li><li>A. Yes, sir. You feeling better now?</li><li>Q. I am. Thank you.</li></ul>
2 3 4 5	hand augers below it. And as you can see on the right-hand side, we were able to cut the core open, view the root systems as they were growing in situ on the site, and we had an effective root	2 3 4 5	<ul><li>deposition in this case a few months back?</li><li>A. Yes, sir. You feeling better now?</li><li>Q. I am. Thank you.</li><li>I just want to clarify a few things with</li></ul>
2 3 4 5 6	hand augers below it. And as you can see on the right-hand side, we were able to cut the core open, view the root systems as they were growing in situ on the site, and we had an effective root zone between 5 and 9 inches.	2 3 4	<ul><li>deposition in this case a few months back?</li><li>A. Yes, sir. You feeling better now?</li><li>Q. I am. Thank you.</li><li>I just want to clarify a few things with</li><li>regard to this particular property and what your</li></ul>
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	Page 117		Page 119
1	suitable for growing rice?	1	Q. You're not offering any opinions about
2	A. It's growing rice as we speak, so I	2	whether or not this property is suitable for
3	believe that that is a positive statement.	3	stocked fishing ponds right now, are you?
4	Q. Are you aware that the district court	4	A. I'm not opining on that.
5	judge has ordered that, based on Chevron's	5	Q. Are you experienced in residential or
6	admission, the Henning property is not suitable	6	commercial building construction?
7	for its intended uses?	7	A. I have experience with site assessments,
8	A. I've reviewed the order, but again,	8	permitting for commercial and industrial
9	that's legal determination; so as a scientist, I'm	9	facilities. I do have that experience.
10	looking at the site itself and making my	10	Q. Okay. Did you do any determination in
11	determination based on the data that I collected.	11	this case whether this property was presently
12	Q. So you're choosing to not consider and,	12	suitable for residential or commercial
13	in fact, ignore the district court's order?	13	development, be it warehouses, rice drying
14	A. That's not necessarily what I'm doing as	14	operations or even a residential subdivision?
15	far as the legal interpretations and things like	15	A. No. That is not part of my
16	that. That would be for an attorney or someone	16	Q. So you're not offering any opinions
17	else to handle. My purpose or scope of my work is	17	about whether the property is or is not suitable
18	to provide the information for the panel and	18	for those things?
19	others to determine those results.	19	A. No. That's outside of my scope.
20	Q. You're not asking these panel members to	20	Q. When I deposed you back in August, you
21	ignore the district court's order, are you?	21	said that you had not read the Henning Management
22	A. No. Again, my scope is based on the	22	corporate deposition; correct?
23	study that I did as far as determining effective	23	A. That's correct.
24	root zone.	24	Q. Have you since read it?
25	Q. Have you ever been involved in the	25	A. Yes, I have.
	Page 118		Page 120
1		1	
1 2	construction, maintenance, operation of any	1 2	Q. So, to be fair, you did not take into
			Q. So, to be fair, you did not take into consideration what Mr. Henning's potential future
2	construction, maintenance, operation of any crawfish ponds?	2	Q. So, to be fair, you did not take into
2 3	construction, maintenance, operation of any crawfish ponds? A. No.	2 3	Q. So, to be fair, you did not take into consideration what Mr. Henning's potential future uses of the property are in your analysis; true?
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1	Page 121		Page 123
1	And any issues relative to	1	publications. There's a number of publications
2	contamination, whether there is or is not	2	
3	contamination, whether there is of is not contamination on the property, is outside of your		for me to just tell the panel that this is a
4	area today; correct?		number that you need to look at, there is a wide
5	A. I have not opined on contamination.		variety of studies and things like that and that's
6	Q. Okay. Your opinions with regard to	6	why site-specific information is probably
7	effective root zone have no bearing on any	7	important.
8	groundwater whether or not any groundwater	8	So for my experience, there is healthy
9	remediation is required; true?	9	rice growing on-site, is where I would defer to my
10	A. No. I don't have any opinions on	10	opinions in this case.
10	groundwater.	11	Q. You didn't undertake to evaluate the
11	Q. You agree some crops are more	12	salt tolerance of the various vegetation on this
12	salt-tolerant than others?	12	property, did you?
13	A. I agree with that.	13	A. No.
	Q. You agree that when you have an EC, or	15	Q. All you did was an effective root zone
15	electrical conductivity which Mr. Purdom talked	15 16	analysis; correct?
16 17	about earlier, above 3 millimhos per centimeter,	17	A. That's correct. I did not do that
	your rice crops can have a reduction in yield?	18	analysis.
18 19	A. There has been published studies that	19	Q. You coauthored this report with
20	have that as a threshold; however, there are	20	Dr. Luther Holloway; correct?
20	site-specific things that could have differences.	20	A. Yes, sir.
21	Q. But that's a peer-reviewed published	21	Q. Is Dr. Holloway kind of a mentor of
22	standard that generally is applied?	23	yours?
23	A. Yes.	23	A. He has been for years, with many others.
24	Q. Okay. Similarly, when you have EC above	25	Q. And he's, as you stated earlier
25	Q. Okuy. Shinhariy, when you have be above		
	Page 122		Page 124
1	1.7 millimhos per centimeter, sugarcane crops can	1	5 5 5 6
2	have a reduction in yield; true?	2	more experienced at doing root studies at this
3	A. That's true. And as far as literature,	3	point in your career; true?
4	I've also seen literature that has numbers that	4	A. I've probably done I'm not sure the
5	are greater than that. And some of my experience	5	exact number he's done, but as far as the ones
6	in sugarcane has countered to that number as well.	6	here in Louisiana, I've probably conducted work
7	And that's what I'm basically saying, is that I	7	with him on almost all of them other than, you
1			-
8	have experience with other sites that have had	8	know, maybe a handful of them. So the last ten
9	similar crops grown and those numbers are not a	8 9	know, maybe a handful of them. So the last ten years, I've worked on almost all of the ones he's
	similar crops grown and those numbers are not a hard and fast rule.	8 9	know, maybe a handful of them. So the last ten years, I've worked on almost all of the ones he's worked on in Louisiana.
9 10 11	similar crops grown and those numbers are not a hard and fast rule. Q. Okay.	8 9 10 11	know, maybe a handful of them. So the last ten years, I've worked on almost all of the ones he's worked on in Louisiana. Q. And he had another 30 or 40 years before
9 10 11 12	similar crops grown and those numbers are not a hard and fast rule. Q. Okay. Can you cite to any publications that	8 9 10 11 12	<ul><li>know, maybe a handful of them. So the last ten years, I've worked on almost all of the ones he's worked on in Louisiana.</li><li>Q. And he had another 30 or 40 years before that on his own?</li></ul>
9 10 11 12 13	similar crops grown and those numbers are not a hard and fast rule. Q. Okay. Can you cite to any publications that say otherwise?	8 9 10 11 12 13	<ul><li>know, maybe a handful of them. So the last ten years, I've worked on almost all of the ones he's worked on in Louisiana.</li><li>Q. And he had another 30 or 40 years before that on his own?</li><li>A. Well, yes; correct.</li></ul>
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DNR HEARING - HENNING MGMT. VS. CHEVRON DAY 1

1	Page 125		Page 127
1	A. Yes, I have.	1	matter that came before this LDNR panel?
2	Q. You would agree with me, then, that the	2	A. I am aware of that, yes.
3	Litel property is located about 3 miles from the	3	Q. You're aware, then, that the root zone
4	Henning property?	4	was determined to be 8 feet on that property?
5	A. Yes.	5	A. So in reading that, there was a couple
6	Q. Are you aware that Dr. Holloway	6	different things with that. They looked at a
7	determined the effective root zone on the Litel	7	total rooting depth as opposed to an effective
8	property, a rice farm less than 3 miles from the	8	root zone, and there was also rooting depth was
9	Henning property, to be 24 inches?	9	not 8 feet, as I recall. It was less than that.
10	A. So at the time, I didn't know how to	10	Q. Do you recall that for certain?
11	answer that question, but I do now. The rice	11	A. As I sit here today, I believe that was
12	growing on the Litel property had an effective	12	what I had read.
13	root zone ranging from 5 to 11 inches. So the	13	Q. Okay. It was significantly more than
14	deepest effective root zone for the rice was	14	12 inches, was it not?
15	11 inches on that site.	15	A. It was greater than 12 inches.
16	Q. You're aware, though, that Dr. Holloway	16	Q. Do you recall, when you visited the
17	recommended soil excavation down to 24 inches,	17	Henning property, seeing multiple live oak trees
18	which is twice what you're recommending in this	18	out there?
19	case; correct?	19	A. There were live oaks, yes.
20	A. Yes. And again, to the panel's	20	Q. Okay.
21	understanding, is that we will give a	21	Have you ever personally or
22	recommendation based on a wide variety of	22	professionally been involved in planting a live
23	vegetation. There was some vegetation that	23	oak tree on property?
24	Dr. Holloway viewed on the Litel property that was	24	A. Yes. We actually planted one after my
25	not present at the Henning property.	25	mom passed, for her, yes.
	Page 126		Page 128
1	Q. You previously told me that you had not	1	Q. Are you aware that if you purchase a
2	done any work on East White Lake, or Vermilion		10 in the seliment line set for seven all in such
4		2	10-inch-caliper live oak, for example, in a pot,
3	Parish School Board case; correct?	2 3	that you have at least a 4-foot root ball at the
2 3 4	Parish School Board case; correct? A. That's incorrect.		that you have at least a 4-foot root ball at the
	<ul><li>Parish School Board case; correct?</li><li>A. That's incorrect.</li><li>Q. You have done with work on it?</li></ul>	3	that you have at least a 4-foot root ball at the
4	<ul><li>Parish School Board case; correct?</li><li>A. That's incorrect.</li><li>Q. You have done with work on it?</li><li>A. East White Lake? Yes.</li></ul>	3 4	<ul><li>that you have at least a 4-foot root ball at the moment you first plant it in the ground?</li><li>A. I don't have any knowledge of the specifics of the root ball.</li></ul>
4 5	<ul><li>Parish School Board case; correct?</li><li>A. That's incorrect.</li><li>Q. You have done with work on it?</li><li>A. East White Lake? Yes.</li><li>Q. Okay. Do you recall when I previously</li></ul>	3 4 5	<ul><li>that you have at least a 4-foot root ball at the moment you first plant it in the ground?</li><li>A. I don't have any knowledge of the specifics of the root ball.</li><li>Q. Okay. And certainly you would expect</li></ul>
4 5 6	<ul><li>Parish School Board case; correct?</li><li>A. That's incorrect.</li><li>Q. You have done with work on it?</li><li>A. East White Lake? Yes.</li><li>Q. Okay. Do you recall when I previously asked you if you were aware of how deep the soil</li></ul>	3 4 5 6	<ul><li>that you have at least a 4-foot root ball at the moment you first plant it in the ground?</li><li>A. I don't have any knowledge of the specifics of the root ball.</li><li>Q. Okay. And certainly you would expect the roots to grow deeper with that after you plant</li></ul>
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	Page 129		Page 131
1	What is your understanding of the	1	questions? None?
2	typical rooting zone for a live oak tree?	2	You're free to go. Thank you very much.
3	A. Well, so we're asking about things that	3	Next witness.
4	we didn't assess in this study, so I'm going to	4	MR. CARTER: Chevron calls Dr. John Frazier.
5	have to defer to my other experience when you ask	5	JUDGE PERRAULT: With this witness, was there
6	me questions about that. So	6	an exhibit for his curriculum vitae?
7	Q. Why didn't you assess the live oak trees	7	MR. CARTER: That is in Chevron Exhibit 5.
8	on this property?	8	JUDGE PERRAULT: Any objection are you
9	A. Because they were deer residents and	9	offering Exhibit 5 into evidence?
10	they were not in the in, as I would say, a more	10	MR. CARTER: Yes.
11	native habitat of this site. So they weren't	11	JUDGE PERRAULT: Any objection to Exhibit 5
12	considered for that reason.	12	being admitted into evidence?
13	Q. They're on the property, are they not?	13	MR. KEATING: No objection.
14	A. Right. But as I've discussed with the	14	JUDGE PERRAULT: No objection. It shall be
15	panel, when we select our locations, we have a	15	admitted.
16	bunch of those areas that we kind of avoid; right,	16	JUDGE PERRAULT: Doctor, please state your
17	because there could be some potential impacts to	17	name for the record.
18	the rooting depth based on that.	18	THE WITNESS: John Ronald Frazier.
19	So if it's too close to a house, we've	19	JOHN FRAZIER,
20	all seen what happens to tree roots when they're	20	having been first duly sworn, was examined and
21	too close to a house and things like that. So	21	testified as follows:
22	things like that are why we would not include a	22	JUDGE PERRAULT: Do we have any documents?
23	sample location like that.	23	MR. CARTER: Yes. We have a PowerPoint as
24	Q. There was a house on the property?	24	well for Dr. Frazier.
25	A. It wasn't a house that I recall. I	25	JUDGE PERRAULT: Thank you. Please proceed.
	Page 130		Page 132
			rage 152
1		1	
1	can't remember exactly what it was, but there was	1	DIRECT EXAMINATION
2	can't remember exactly what it was, but there was some reason why we did not select that location.	2	DIRECT EXAMINATION BY MR. CARTER:
2 3	<ul><li>can't remember exactly what it was, but there was some reason why we did not select that location.</li><li>Q. The bottom line, Mr. Ritchie, is that</li></ul>	-	DIRECT EXAMINATION BY MR. CARTER: Q. Please introduce yourself to the panel.
2 3 4	<ul><li>can't remember exactly what it was, but there was some reason why we did not select that location.</li><li>Q. The bottom line, Mr. Ritchie, is that your testimony is limited in this case to</li></ul>	2 3 4	DIRECT EXAMINATION BY MR. CARTER: Q. Please introduce yourself to the panel. A. My name is John R. Frazier. I'm a
2 3 4 5	<ul><li>can't remember exactly what it was, but there was some reason why we did not select that location.</li><li>Q. The bottom line, Mr. Ritchie, is that your testimony is limited in this case to determining what you think the effective root zone</li></ul>	2 3	DIRECT EXAMINATION BY MR. CARTER: Q. Please introduce yourself to the panel. A. My name is John R. Frazier. I'm a health physicist.
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	Page 133		Page 135
1	Q. Do you have any professional	1	you been an expert in?
2	certifications?	2	A. Several of the cases have been the
3	A. Yes. I'm a certified health physicist.	3	legacy claims of NORM-impacted soil or water or
4	That's the only organization that certifies it, is	4	equipment, and several of the cases were
5	the American Board of Health Physics. I achieved	5	associated with personal injury claims. I do
6	certification. The tests are a lot like a	6	external I do not external, but I do
7	professional engineer or something like that. I	7	radiation dose assessments, external and internal.
8	achieved certification in 1981. And every four	8	MR. CARTER: I'd like to tender Dr. Frazier
9	years, you've got to recertify. And so I'm	9	as an expert in the areas of health physics,
10	recertified through 2025, I think it is.	10	radiation safety, soil and groundwater
11	Q. Have you received any professional	11	radioactivity, and radiation dose assessment.
12	recognitions?	12	MR. KEATING: No objection.
13	A. Yes. I'm I was elected member of the	13	JUDGE PERRAULT: No objection. He shall be
14	National Council on Radiation Protection &	14	admitted as an expert.
15	Measurements for 12 years and worked on several	15	BY MR. CARTER:
16	committees writing reports for the NCRP.	16	Q. And Dr. Frazier, did you prepare a
17	The NCRP is an organization chartered by	17	report in this matter?
18	Congress to advise the president and the Congress	18	A. Yes, I did. I brought along a copy.
19	on and the public on matters relating to	19	Q. So yes, I'd like to file and offer
20	radiation protection and measurements.	20	Dr. Frazier's expert report, which is Exhibit 3,
21	I was then elected as a distinguished	21	Chevron Exhibit 3, as well.
22	emeritus member of the NCRP, which I now serve.	22	So very good.
23	Our meeting is coming up in March in Bethesda.	23	So Dr. Frazier, let's talk about your
24	Q. What is your experience with assessing	24	key opinions in this matter.
25	radiation at oil field sites?	25	Could you summarize your key opinions in
	Page 134		Page 136
1	Page 134	1	Page 136
1	A. Several years. More like about 25 years	1	this matter?
2	A. Several years. More like about 25 years or so at oil field sites. Experienced both in	2	this matter? A. Yes. Two pieces of pipe that I found
2 3	A. Several years. More like about 25 years or so at oil field sites. Experienced both in terms of making the measurements themselves of	2 3	<ul><li>this matter?</li><li>A. Yes. Two pieces of pipe that I found and the plaintiffs found on the site, not very</li></ul>
2 3 4	A. Several years. More like about 25 years or so at oil field sites. Experienced both in terms of making the measurements themselves of radiation levels and then analyzing or evaluating	2 3 4	this matter? A. Yes. Two pieces of pipe that I found and the plaintiffs found on the site, not very long pieces of pipe that had above background
2 3 4 5	A. Several years. More like about 25 years or so at oil field sites. Experienced both in terms of making the measurements themselves of radiation levels and then analyzing or evaluating radiological data for environmental samples like	2 3 4 5	this matter? A. Yes. Two pieces of pipe that I found and the plaintiffs found on the site, not very long pieces of pipe that had above background gamma radiation readings. I looked at by
2 3 4 5 6	A. Several years. More like about 25 years or so at oil field sites. Experienced both in terms of making the measurements themselves of radiation levels and then analyzing or evaluating radiological data for environmental samples like water and soil and vegetation over, I think,	2 3 4 5 6	this matter? A. Yes. Two pieces of pipe that I found and the plaintiffs found on the site, not very long pieces of pipe that had above background gamma radiation readings. I looked at by across the site or looking to see if I had more
2 3 4 5 6 7	A. Several years. More like about 25 years or so at oil field sites. Experienced both in terms of making the measurements themselves of radiation levels and then analyzing or evaluating radiological data for environmental samples like water and soil and vegetation over, I think, about it lasted more than 25 years.	2 3 4 5	this matter? A. Yes. Two pieces of pipe that I found and the plaintiffs found on the site, not very long pieces of pipe that had above background gamma radiation readings. I looked at by across the site or looking to see if I had more equipment pipe on the site, but there were two
2 3 4 5 6 7 8	A. Several years. More like about 25 years or so at oil field sites. Experienced both in terms of making the measurements themselves of radiation levels and then analyzing or evaluating radiological data for environmental samples like water and soil and vegetation over, I think, about it lasted more than 25 years. Q. How many times you have assessed	2 3 4 5 6 7 8	this matter? A. Yes. Two pieces of pipe that I found and the plaintiffs found on the site, not very long pieces of pipe that had above background gamma radiation readings. I looked at by across the site or looking to see if I had more equipment pipe on the site, but there were two pieces found and actually plaintiff had
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	Page 137		Page 139
1	after ICON went out and did their NORM survey, I	1	radiation detector in this part of it here
2	got a call from the law firm representing Chevron.	2	(indicating).
3	Q. So at the time you were retained, did	3	And the it's a scintillation
4	you understand that ICON had gone out and surveyed	4	detector. It sparkles when the gamma ray hits it.
5	for NORM?	5	Some of you probably use these. And the rate
6	A. Yes. They had observed, on behalf of	6	meter is up above here, the high-voltage power
7	the defendants with them, and they had Chevron	7	support.
8	with them, and that observer had made some notes	8	And this is the type of sound you get
9	and so they produced the notes to me, and I said,	9	reading from just normal background. In this
10	well, it looks like there's a couple of pieces of	10	room, it's about 5 microR per hour in here. And
11	pipe out there.	11	that's from probably the materials around that we
12	Q. And then did you go out later and	12	have in the room and that also includes the
13	conduct an assessment, a survey, yourself of the	13	cosmic the gamma ray from cosmic rays, not
14	Henning property for oil field NORM?	14	photo, not light, but gamma rays from that. So
15	A. Yes, I did. My first response was: I	15	that's the instrument I used.
16	like the ICON report and I agree with I know	16	Q. And you used that to measure the
17	the guy that did it and I trust it, and I don't	17	background at the site when you got there?
18	need to go out there. They said, no, we want you	18	A. Yes. Both in terms of in the air and
19	to go out there. So I went out there in June of	19	then I had a strap around it where I could lower
20	2022.	20	it down to the ground level. And, again, I got
21	Q. When you went out there, did you assess	21	about 10 microR per hour for the gamma readings at
22	the background level	22	the meter and then on the region down at the
23	A. No. I'm sorry. I went out there in	23	ground.
24	January of 2022. Sorry. Before my report.	24 25	Q. Did you conduct measurements you mentioned a location where ICON had found two
25	That's the key thing.	25	mentioned a location where icoly had found two
	Page 138		Page 140
1		1	Page 140 pieces of pipe above background. Did you conduct
1 2	Q. A few months after you were retained in June of 2021?		
	Q. A few months after you were retained in		pieces of pipe above background. Did you conduct
2	<ul><li>Q. A few months after you were retained in June of 2021?</li><li>A. That's right. Right, I was out there in January of 2022.</li></ul>	2	<ul><li>pieces of pipe above background. Did you conduct measurements there too?</li><li>A. Yes, yes. And all background till you get right at the pipe, literally right at the</li></ul>
2 3	<ul><li>Q. A few months after you were retained in June of 2021?</li><li>A. That's right. Right, I was out there in</li></ul>	2 3	<ul><li>pieces of pipe above background. Did you conduct measurements there too?</li><li>A. Yes, yes. And all background till you get right at the pipe, literally right at the pipe, and you go down in contact with the pipe and</li></ul>
2 3 4	<ul><li>Q. A few months after you were retained in June of 2021?</li><li>A. That's right. Right, I was out there in January of 2022.</li><li>Q. So when you went out to the Henning property, did you assess the background radiation</li></ul>	2 3 4 5 6	<ul><li>pieces of pipe above background. Did you conduct measurements there too?</li><li>A. Yes, yes. And all background till you get right at the pipe, literally right at the pipe, and you go down in contact with the pipe and I was getting 70 microR per hour, and that's what</li></ul>
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		1	
	Page 141		Page 143
1	this pipe came from, but it's there now, and it	1	document all of this. And in fact, they'll have
2	should be removed.	2	to pull some soil samples at the time they do this
3	Q. If you'll look at the next slide, what	3	as part of their release survey.
4	is this next slide showing?	4	Q. Now, you mentioned before that you had
5	A. Oh, this is the piece of pipe that	5	surveyed soil at the site. Do you understand that
6	ICON's representative Derek Pourciau, he had	6	ICON had also surveyed soil at the site?
7	actually spray-painted it. And this is one of the	7	A. Yes. And I had a copy of Derek's
8	pipes that had the elevated reading. In contact,	8	Mr. Pourciau's notes. And then I had a copy of
9	it was 70 microR per hour, and if you come up to a	9	the person who accompanied those the
10	meter, it's a little over a yard, above it, it was	10	accompanied notes are in here. I actually made
11	background. So it's you have to be right on it	11	more notes than this little paragraph here. It's
12	to find it, and it doesn't present an external	12	in my report. There's a few pages of notes, but
13	dose unless you're down lying on top of it.	13	yes, these are from my notes.
14	Q. So could the two pieces of pipe that	14	Q. And how did you decide which locations
15	were measured above background pose any potential risk of radium in the soil or in the groundwater?	15	to survey on the Henning property for soil? A. I started with the locations where the
16 17	risk of radium in the soil or in the groundwater? A. Well, I measured around on the soil and	16 17	pipe was. Or I looked to make sure I was there.
17	so did Derek Pourciau. And no indication of	17	But I also surveyed any place I walked, any place
10	anything in the soil around there. Pipe the	19	I walked to see if there's any readings above
20	scale or the NORM in pipe is usually on the inner	20	background. I didn't find any above background.
20	surface that's builds up over time as scale. It's	20	I found some 6 over gravel and about 10s 10 to
22	very insoluble. The only way you can get it out	21	12 over the dirt around there, and that's all
23	of the pipe is either it falls out or knock it	23	background range for Louisiana, in fact.
24	out. And during remediation, they would take the	24	And so this was and I went by
25	pipe and they'll put tape on both ends and haul it	25	fortunately, by four wheelers, we rode out to some
	Page 142		Page 144
1	away. But if you knock it out on the pipe, it		of these monitoring wells and while we were
2	away. But if you knock it out on the pipe, it would be down on the ground. I didn't see any	2	of these monitoring wells and while we were riding, I had the probe, the detector, suspended
2 3	away. But if you knock it out on the pipe, it would be down on the ground. I didn't see any evidence of that at all. And it's barium sulfate,	2 3	of these monitoring wells and while we were riding, I had the probe, the detector, suspended over the road or over the area there, and it
2 3 4	away. But if you knock it out on the pipe, it would be down on the ground. I didn't see any evidence of that at all. And it's barium sulfate, radium barium sulfate, and it's extremely	2 3 4	of these monitoring wells and while we were riding, I had the probe, the detector, suspended over the road or over the area there, and it didn't get any elevated readings.
2 3	away. But if you knock it out on the pipe, it would be down on the ground. I didn't see any evidence of that at all. And it's barium sulfate, radium barium sulfate, and it's extremely insoluble. So even if it's lying on the ground,	2 3 4 5	of these monitoring wells and while we were riding, I had the probe, the detector, suspended over the road or over the area there, and it didn't get any elevated readings. But when we get to the monitoring wells,
2 3 4 5 6	away. But if you knock it out on the pipe, it would be down on the ground. I didn't see any evidence of that at all. And it's barium sulfate, radium barium sulfate, and it's extremely insoluble. So even if it's lying on the ground, it's not going to dissolve and go down into the	2 3 4 5 6	of these monitoring wells and while we were riding, I had the probe, the detector, suspended over the road or over the area there, and it didn't get any elevated readings. But when we get to the monitoring wells, I would walk to them, make measurements all around
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	Page 145		Page 147
1	wells and one of the samples didn't make it to the	1	Q. And those tables list radium-226 and
2	lab or didn't get results from the lab anyway, so		radium-228 measurements?
3	out of the 28, they got 27 groundwater samples	3	A. Yes. They list the result. And the
4	from ICON. And then there were split samples of	4	standard of uncertainly there is 2-sigma calculated standard of uncertainty for each of the
5	those 28. ERM didn't lose their one sample there, but they had 28 samples, but since they shipped it	5 6	measurements, both of radium-226 and 228.
6 7	to ERM shipped theirs to Eberline. ICON	7	What I didn't list on this table but
8	shipped theirs to Pace lab. Pace lab is just west	8	I've looked at since then was the minimal
9	of Pittsburgh, Pennsylvania. And both of these	9	detectable concentration, what the lab says is
10	are good labs. I've used both of them on	10	minimum detectable concentration. I looked at
11	different times. Eberline, though, does a batch	11	that later. But I didn't put it on there.
12	split, a batch duplicate with each batch, and they	12	That details of information are in the lab
13	had four batches. So you've got 28 plus 4 is the	13	reports themselves.
14	32. So we had 59 analyses performed for	14	Q. When you look at the minimum
15	radium-226 and radium-228.	15	JUDGE PERRAULT: Let me stop you there for a
16	Q. And in fact, after ICON had sent	16	second. I just want to make it clear on the
17	groundwater samples from a number of locations to	17	record. This page 8 and 9, what exhibit is
18	Pace and split with Eberline, were there also some	18	this?
19	pulled from the ERM monitoring wells that were	19	MR. CARTER: This is from Exhibit 3, Chevron
20	also split in the same way?	20	Exhibit 3.
21	A. Yeah. That's included in the total	21	JUDGE PERRAULT: All right. Please proceed.
22	number. The total number there is both the	22	BY MR. CARTER:
23	original ICON samples and splits and then the	23	Q. So you mentioned observing the minimum
24	Eberline I mean the ERM's samples and splits	24	detectable concentration for each sample and the
25	for them.	25	CSU, which is the standard uncertainty for each
	Page 146		Page 148
1	Page 146		Page 148
1	Q. And did you review sample results from	1	sample. When you looked at those, what
2	Q. And did you review sample results from both Pace and Eberline?	2	sample. When you looked at those, what observation did you have about the results that
2 3	<ul><li>Q. And did you review sample results from</li><li>both Pace and Eberline?</li><li>A. Yes. And I included those in two tables</li></ul>	2 3	sample. When you looked at those, what observation did you have about the results that are shown on pages 8 and 9 from the Pace and
2 3 4	<ul><li>Q. And did you review sample results from</li><li>both Pace and Eberline?</li><li>A. Yes. And I included those in two tables</li><li>in my report and looked at those. And I'm sort of</li></ul>	2 3 4	sample. When you looked at those, what observation did you have about the results that are shown on pages 8 and 9 from the Pace and Eberline lab data?
2 3 4 5	<ul><li>Q. And did you review sample results from both Pace and Eberline?</li><li>A. Yes. And I included those in two tables in my report and looked at those. And I'm sort of a data geek. I like to look at numbers. And so I</li></ul>	2 3 4 5	<ul><li>sample. When you looked at those, what</li><li>observation did you have about the results that</li><li>are shown on pages 8 and 9 from the Pace and</li><li>Eberline lab data?</li><li>A. Well, there's two qualifiers that are</li></ul>
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1	Page 149		Page 151
1	Q. The next bullet point says that from	1	dose above background? In terms of calculating
	Pace, there were three samples, H-9, H-12 and		it, it would present one. But you've got to have
3	H-16, that exceeded the MCL for drinking water at		someone drinking that water and you've got to have
4	the tap for community water systems. Can you see	4	someone over periods of time drinking it.
5	that?	5	But my experience with radium
6	A. Yes, you can see that on page 8. If you		ingestion and not just my experience, the
7	look on page 8, if you look at H-9 for Pace, you	7	published data for radium ingestion says that,
8	see a 5.20. And if you look at H-12, for Pace,		really, you're going to ingest hundreds of times
9	which is 20.7 for radium-226, and then if you look		more than the MCL for radium throughout your life
10	at H-16 which has .837 for radium-226 but it's	10	before you can have an ingested radium that would
11	4.55 for radium-228 and the MCL is the sum of the	11	cause health effects. Now, that's based upon the
	two results or the sum of the two		radium doll painters and based upon the other
13	concentrations, radium-226 plus 228.		radium workers.
14	And so if we look at that, we see that	14	So the MCL for radium is 5 picocuries
15	we've got these three wells, 9 get the right	15	per liter. It's a very low number. And there's
16	one here. Nine, 12, and 16 that have	16	actually a lot of community water systems in the
17	concentrations greater than the 5 picocuries per	17	country that have radium higher than the MCL.
18	liter. That's the MCL from US EPA for the	18	They don't shut them down. They just measure it,
19	combined radium-226 and 228.	19	say it's higher and then they continue using it.
20	Q. How do the Eberline results for those	20	It's not a cut-off where you have a health effect
21	three samples compare to the Pace results for	21	above it or where you don't.
22	those three samples?	22	Q. Are there any Louisiana regulations
23	A. Well, they didn't show it, but I relied	23	governing oil field NORM in groundwater?
24	on the Pace results because if you got that much	24	A. No.
25	solids in it, you see Eberline, for H-9, had	25	Q. There is a figure in ICON's paper
	Page 150		Page 152
1	38,386. You see, for H-9, the TDS there? Got	1	showing a background radium level for groundwater
	38,386 milligrams per liter. That's a lot of		on the Henning property of 0.86 picocuries per
3	solids. That's 38 grams per liter, okay? And so		liter?
4	with that many grams per liter, they should have	4	A. Do you have that one?
5	gotten a higher number, like Pace got. So I	5	Q. Is there a basis in the data for
6	relied on Pace results for that. I even, in my	6	calculating the background level of radium on this
7	deposition, back in August I guess it was,	7	property?
8	Mr. Wimberley deposed me. That's what I said: I		A. Well, ICON claimed to calculate the
	white white the second se	8	A. Well, ICON claimed to calculate the
9	relied on the Pace results.		background by having five background wells and
	•		
9	relied on the Pace results.	9	background by having five background wells and
9 10	relied on the Pace results. Q. Does the measurement above the MCL, the	9 10	background by having five background wells and they looked at the radium-226 and the radium-228
9 10 11	<ul><li>relied on the Pace results.</li><li>Q. Does the measurement above the MCL, the</li><li>5 picocuries per liter in the Pace results for</li></ul>	9 10 11	background by having five background wells and they looked at the radium-226 and the radium-228 in those five background wells. Those results are
9 10 11 12	relied on the Pace results. Q. Does the measurement above the MCL, the 5 picocuries per liter in the Pace results for these three wells, indicate a potential for health	9 10 11 12	background by having five background wells and they looked at the radium-226 and the radium-228 in those five background wells. Those results are listed on table 1 on page 8. They're listed
9 10 11 12 13	relied on the Pace results. Q. Does the measurement above the MCL, the 5 picocuries per liter in the Pace results for these three wells, indicate a potential for health effects from the groundwater at the site?	9 10 11 12 13	background by having five background wells and they looked at the radium-226 and the radium-228 in those five background wells. Those results are listed on table 1 on page 8. They're listed there. I forget the numbers there now. It's I think it's H-3, H-32 A, 32 B, 33, and 34. But if you look at those results,
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	Page 153		Page 155
1	So I don't know the basis for that .86.	1	record at 1:06 p.m.)
2	I know what they claim it is, but the data upon	2	JUDGE PERRAULT: We're back on the record.
3	which they base it is not those are nondetects.	3	Today's date is February 6th. It's now 1:06.
4	Q. Has there been any testing of	4	I'm Charles Perrault. We took a break for
5	radionuclides in surface water on the Henning	5	lunch, and now we're going to begin again
6	property?	6	with Dr. Frazier.
7	A. Yes. You heard earlier about the two	7	MR. GREGOIRE: Just as a matter of
8	samples. One was 2 feet down at the blowout pond.	8	housekeeping, Judge Perrault. Victor
9	The other was 13 feet down. And those samples	9	Gregoire again. We want to file and offer
10	were collected and analyzed. They're actually on	10	Exhibit 18, Chevron Exhibit 18, which is
11	the bottom of the table on page 9.	11	drone footage that Mr. Purdom referred to
12	Q. We also see the results on the slide	12	earlier in his testimony. I spoke with
13	that is being shown as well.	13	Mr. Keating and Mr. Wimberley and they do not
14	A. Yeah. And all four of those results	14	object to that submission.
15	were the radium-226 and radium-228 were	15	JUDGE PERRAULT: If there's no objection,
16	nondetects.	16	then Exhibit 18, the drone footage, will be
17	Q. What is your opinion about the surface	17	admitted.
18	water sample results?	18	MR. KEATING: No objection, Your Honor. May
19	A. Regarding radium, it's clean water.	19	I proceed, Your Honor?
20	Q. Did you assess the overall potential for	20	JUDGE PERRAULT: So we're doing cross?
21	health effects from radionuclides presented by the	21	MR. KEATING: Yes, Your Honor.
22	Henning property?	22	JUDGE PERRAULT: Please proceed.
23	A. Yes.	23	CROSS-EXAMINATION
24	Q. In looking at this slide, as the final	24	BY MR. KEATING:
25	slide in your presentation, what did you conclude?	25	Q. Dr. Frazier, how are you doing?
	Page 154		Page 156
1	A. I just there's no reasonable	1	
2	potential for anyone on or near the property to	1 2	<ul><li>A. I'm pretty good. How are you doing?</li><li>Q. Pretty good. Did you get a good lunch?</li></ul>
3	receive a radiation dose for oil field NORM on the	2	A. It was okay.
4	property greater than the range of natural	4	Q. You should have come with us.
5	background radiation doses in Louisiana. You just	4 5	Dr. Frazier, you did not author any of
6	don't have a source that's going to give you	6	the texts of Chevron's proposed most feasible
7	that any radiation dose above the range of	7	plan; correct?
8	natural background.	8	A. Not to my knowledge.
9	Now, do you receive a radiation dose?	9	Q. Okay.
10	Sure. From natural background, just like we're	10	Your contribution to the MFP proposed by
11	receiving it in this room. But being out on this	11	Chevron is to the extent to your which your
12	site, would you get a radiation dose greater than	12	report, which is attached to the MFP as Exhibit
13	the range of background in Louisiana? No. No	13	appendix R excuse me is incorporated into
14	scenario about what you can get there.	14	the overall report. Is that true?
15	MR. CARTER: Thank you, Dr. Frazier. Pass	15	A. That is my understanding, yes.
16	the witness.	16	Q. You agree that produced water can
17	JUDGE PERRAULT: Do you want to do your cross	17	contain radium-226 and radium-228; correct?
18	now or after lunch? It's up to you.	18	A. They can.
19	MR. KEATING: I might be more efficient if I	19	Q. And you agree that when oil and gas
20	did it after lunch. I can streamline my	20	exploration and production activity occurs and
21	outline based on the	21	production is being drawn from an underground
22	JUDGE PERRAULT: Okay. We'll take a lunch	22	geological formation that contains radium-226 and
23	break. It's now 12:05, so we'll come back at	23	228, that radium can and often does come to the
24	1:05.	24	surface with the produced water; true?
	(Lunch recess taken at 12:05 p.m. Back on	25	A. Yes. And the amounts vary

	Page 157		Page 159
1	significantly.	1	in those groundwater samples; true?
2	Q. And it's also your opinion that	2	A. That's correct, yes.
3	radium-226 and 228 can occur naturally in the	3	Q. Let's look at those sampling results in
4	groundwater in Louisiana without any produced	4	your report that we talked about earlier with
5	water being introduced; correct?	5	Mr. Carter.
6	A. I'd say, rather than say "can," it does.	6	Can you pull up Dr. Frazier's report,
7	It's always if you've got solids in water,	7	page 8, table 1, please?
8	you've got radium in water.	8	JUDGE PERRAULT: That's Exhibit 3; correct?
9	Q. Fair enough.	9	MR. KEATING: Yes; correct.
10	When you have radium at an oil field	10	A. This is on page 8 of the handout.
11	site like this one, though, and it does come from	11	BY MR. KEATING:
12	the produced water, there are a few different	12	Q. Yes.
13	places we might find it and you talked a little	13	So Dr. Frazier, not to rehash, but
14	bit about this earlier. One place is as scale or	14	generally speaking, table 1 on page 8, what that
15	sludge in pipe or production equipment; right?	15	does is summarized the samples taken by ICON in
16	A. That's correct, yes.	16	March of 2020 and August of 2021 with splits taken
17	Q. And you talked about a few pieces of	17	by ERM; correct?
18	pipe that were located on the property. Do you	18	A. Yes. Within that date range, yes.
19	recall that?	19	Q. Right. And then on page 9 of your
20	A. Yes.	20	report, table 2, contains a similar summary but
21	Q. Another place we can find that radium	21	these are from the samples collected at the behest
22	can be in the soil or sediment; true?	22	of ERM with splits taken by ICON later in 2021;
23	A. You can.	23	correct?
24	Q. And	24	A. Yes.
25	A. You mean oil field NORM, yes, you can.	25	Q. And within each of those tables, we
	5 150		
	Page 158		Page 160
1		1	
1	Q. And in this case, that's not an issue;	1	basically see the same thing, which is the sample
2	Q. And in this case, that's not an issue; right?	2	basically see the same thing, which is the sample ID I pressed the wrong button. There we go.
	<ul><li>Q. And in this case, that's not an issue;</li><li>right?</li><li>A. That's correct, it's not an issue that I</li></ul>	2 3	basically see the same thing, which is the sample ID I pressed the wrong button. There we go. Sample ID here, which corresponds to
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2 3 4	<ul><li>Q. And in this case, that's not an issue;</li><li>right?</li><li>A. That's correct, it's not an issue that I could find anywhere on the site.</li><li>Q. So finally, we come to the one that</li></ul>	2 3 4	basically see the same thing, which is the sample ID I pressed the wrong button. There we go. Sample ID here, which corresponds to
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	Page 161		Page 163
1	A. Same column headings, yes.	1	These sample ID locations, if you look
2	Q. Same column headings and rows	2	at "boring ID" over here we'll zoom on that
3	A. And information, yeah.	3	real quick some but not all of these correspond
4	Q. Other than the sample ID locations?	4	to the boring IDs we see in table 1 of your
5	A. Yes.	5	report; correct?
6	Q. All right.	6	A. To the best of my knowledge, that's
7	The radium samples that we see both for	7	correct.
8	Eberline and Pace, those are measured in	8	Q. Okay. So we're talking about the same
9	picocuries per liter; correct?	9	locations where the samples are referenced in
10	A. That is correct, yes.	10	table 1 of your report; true?
11	Q. And then the total dissolved solid	11	A. Yes. This gives the depth and also the
12	sample results are measured in milligrams per	12	date of collection.
13	liter; right?	13	Q. Okay.
14	A. Yes. As shown on the table there.	14	Now, I want to call your attention
15	Q. Yes, sir.	15	specifically to H-9 through H-12 on table 3 of
16	Now, TDS, or total dissolved solids, is	16	ICON's plan. And if we could scroll over to total
17	made up of, among other things, chlorides; right?	17	dissolved solids and chlorides, please, which is
18	A. Yes. And as you get to higher	18	about halfway.
19	concentrations of TDS, the chlorides are somewhere	19	All right.
20	between 50 and 60 percent of the TDS.	20	So that's going to be yeah. It's
21	Q. So chlorides are a big driver of TDS	21	going to be the one you're on right now.
22	when you see it in groundwater like this; right?	22	A. Yes.
23	A. Yes. Especially as you get into higher	23	Q. It's going to be here (indicating).
24	concentrations of TDS.	24	A. There's 32,700 and 3,320, and 63,600.
25	Q. You talked about earlier about how the	25	Q. And then we've got H-12 here, which is
	Page 162		Page 164
1		1	
1 2	Page 162 ICON samples were sent to the Pace lab and the ERM samples were sent to the Eberline lab; true?	1 2	24,900 total dissolved solids, 11,900 chlorides;
	ICON samples were sent to the Pace lab and the ERM		24,900 total dissolved solids, 11,900 chlorides; right?
2	ICON samples were sent to the Pace lab and the ERM samples were sent to the Eberline lab; true? A. Yes, that's correct.	2	24,900 total dissolved solids, 11,900 chlorides; right? A. No. The 24,900 is H-16.
2 3	ICON samples were sent to the Pace lab and the ERM samples were sent to the Eberline lab; true?	2 3	24,900 total dissolved solids, 11,900 chlorides; right?
2 3 4	<ul><li>ICON samples were sent to the Pace lab and the ERM samples were sent to the Eberline lab; true?</li><li>A. Yes, that's correct.</li><li>Q. And you acknowledge that you think</li></ul>	2 3 4	<ul><li>24,900 total dissolved solids, 11,900 chlorides;</li><li>right?</li><li>A. No. The 24,900 is H-16.</li><li>Q. H-16; correct. I'm sorry.</li></ul>
2 3 4 5	<ul><li>ICON samples were sent to the Pace lab and the ERM samples were sent to the Eberline lab; true?</li><li>A. Yes, that's correct.</li><li>Q. And you acknowledge that you think they're both good labs and you think they're both</li></ul>	2 3 4 5	<ul><li>24,900 total dissolved solids, 11,900 chlorides; right?</li><li>A. No. The 24,900 is H-16.</li><li>Q. H-16; correct. I'm sorry.</li><li>A. And you can see these same numbers on</li></ul>
2 3 4 5 6	ICON samples were sent to the Pace lab and the ERM samples were sent to the Eberline lab; true? A. Yes, that's correct. Q. And you acknowledge that you think they're both good labs and you think they're both reliable in the way they measured the samples;	2 3 4 5 6	<ul> <li>24,900 total dissolved solids, 11,900 chlorides; right?</li> <li>A. No. The 24,900 is H-16.</li> <li>Q. H-16; correct. I'm sorry.</li> <li>A. And you can see these same numbers on page 8 of my report, table 1.</li> </ul>
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	Page 165		Page 167
1	saying earlier; correct?	1	all these groundwater samples by a long-shot;
2	A. Yes.		correct?
3	Q. Especially when you get in these higher	3	A. As based on the chloride levels from the
4	concentrations, the concentration of total	4	ICON table, yes.
5	dissolved solids is driven in large part by	5	Q. And you don't have any reason to dispute
6	chlorides?	6	the chloride concentrations?
7	A. Yes. The fraction as you get to high	7	A. No. That's not my area of expertise,
8	TDS, fraction is pretty close to the same.	8	but that's usually what I see.
9	Q. Now, looking at H-12, we see and I'll	9	Q. You usually see that proportion of
10	refer you to table 1 of your report first total	10	chlorides in TDS at that range?
11	dissolved solids are 63,600; correct?	11	A. Yes. As you get to higher
12	A. Yes, that's correct.	12	concentrations of TDS, that's what you generally
13	Q. And then if you look at ICON's table	13	see.
14	here, you see the corresponding chlorides for H-12	14	Q. Again, where we see the highest TDS in
15	to be 39,200 milligrams per liter; right?	15	chlorides by far, we also see the highest combined
16	A. That's correct.	16	radium concentrations by far; true?
17	Q. So that tracks with what we just looked	17	A. Yes.
18	at for H-9 as well; right?	18	Q. From your earlier testimony, you recall
19	A. Yes.	19	identifying that the H-9 and H-12 groundwater
20	Q. Okay.	20	samples were taken near what we've referred to as
21	Now, by comparison, Dr. Frazier, you	21	the blowout pond?
22	agree with me that seawater from the Gulf of	22	A. I don't think I testified to that.
23	Mexico roughly has a chloride concentration of, on	23	Q. Okay.
24	average, of about 19,000 milligrams per liter?	24	MR. KEATING: Can you pull up figure 6 from
25	A. That's not I don't know. That's not	25	ICON's MFP, please? Zoom in on the Area 2 on
	Page 166		Page 168
	Page 166	1	Page 168
1	my area of expertise.	1	the west side, please.
2	my area of expertise. Q. Okay. So assuming that would be	2	the west side, please. JUDGE PERRAULT: What exhibit is this from?
2 3	<ul><li>my area of expertise.</li><li>Q. Okay. So assuming that would be correct, both H-9 and H-12 has higher salinity</li></ul>	2 3	the west side, please. JUDGE PERRAULT: What exhibit is this from? MR. KEATING: This is still Exhibit E.
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	Page 169		Page 171
1	Q. Looking back to table 1 of your report,	1	you can't explain where they came from; true?
2	page 8, going back to H-9 and H-12 that we've	2	A. No, I didn't say I couldn't explain
	looked at previously, you agree with me,	3	where it came from. I said it's not aged produced
	Dr. Frazier, that the fact that we see these	4	water.
	increased concentrations of combined radium, by	5	The theory is if you have high
	far compared to the other sample locations, where	6	chlorides, the theory is and it's why you have
7	we also see these increased concentrations of	7	radium in water with high chlorides. The high
8	total dissolved solids and chlorides, by far	8	chlorides bring the natural radium into solution
9	compared to the other sample locations, suggestive		in the from the surrounding areas.
10	of radium from aged produced water and not	10	Q. And that's true when you have
11	naturally occurring; correct?		chloride-impacted soil, is it not?
12	A. No. No. It's not. And the reason is,	12	A. That's correct. At real high
13	you look at the radium-226 concentration and the	13	concentrations of chlorides, you have the radium
	radium-228 concentration. Radium-228 halflife is	14	coming into the solution with the water. But as
15	5.75 years. Okay? The radium-228's	15	soon as the chloride levels drop or as soon as the
16	concentrations here are greater than radium-226.	16	TDS drops, the radium is adsorbed on the
17	And once the produced water comes up from the	17	surrounding soils. So as you go from a site where
18	ground, it's the radium-226 is no longer with	18	you have high chlorides to where you have lower
19	the uranium parent, 238 parent, and radium-228 is	19	chlorides, the radium is no longer in solution but
20	no longer with their thorium 232 parent, and so	20	goes on to the surrounding by adsorption onto
21	the radium both of those radium isotopes follow	21	surrounding materials. And that's documented on
22	their decay. Radium-226 halflife is 1600 years.	22	national and international publications that I've
23	Radium-228 is 5.75 years. So if it's aged	23	cited in my report.
24	produced water, the radium-228 concentration	24	Q. Dr. Frazier, you have to acknowledge
25	decreases relative to the radium-226. We don't	25	that you do not consider and you completely ignore
	Page 170		Page 172
1	see that here. We see concentrations	1	the likelihood that these high TDS concentrations
2	approximately one to one, roughly, and that's what		in the groundwater and high chloride
3	you would get with normal solids in Louisiana	3	concentrations in the groundwater were caused by
4	water unrelated to oil production.	4	the introduction of produced water, whether we're
5	Q. Dr. Frazier, I understand your analysis	5	talking about bottom-up or top-down?
6	regarding the 226-228 ratio based on their	6	A. The more I can't answer that yes or
7	differing half lives and separation from their	7	no. But I'll say the more solids you have in the
8	parent. Not withstanding that perfect-world	8	water, any water, the more radium you're going to
9	scenario, the bottom line is, the total dissolved	9	have in that water. The higher the TDS, the
10	solids and the chlorides you see at H-9 and H-12,	10	higher the radium is going to be.
11	4 1 1 1 1 0	11	Q. And when Mr. Wimberley took your
	those aren't naturally occurring levels?		
12	A. I don't know where those came from, but	12	deposition, you candidly acknowledged that you
13	A. I don't know where those came from, but I do know that those are higher than you'd		deposition, you candidly acknowledged that you cannot rule out the possibility, if not the
13 14	A. I don't know where those came from, but I do know that those are higher than you'd normally find, often find in the site, the solid,	12	deposition, you candidly acknowledged that you cannot rule out the possibility, if not the likelihood, that the increased concentrations of
13 14 15	A. I don't know where those came from, but I do know that those are higher than you'd normally find, often find in the site, the solid, the TDS and the chlorides. I'm not a chlorides	12 13 14 15	deposition, you candidly acknowledged that you cannot rule out the possibility, if not the likelihood, that the increased concentrations of TDS in chlorides we're seeing here and the
13 14 15 16	A. I don't know where those came from, but I do know that those are higher than you'd normally find, often find in the site, the solid, the TDS and the chlorides. I'm not a chlorides specialist, but those are high concentrations of	12 13 14 15 16	deposition, you candidly acknowledged that you cannot rule out the possibility, if not the likelihood, that the increased concentrations of TDS in chlorides we're seeing here and the corresponding increased radium is not resultant
13 14 15 16 17	A. I don't know where those came from, but I do know that those are higher than you'd normally find, often find in the site, the solid, the TDS and the chlorides. I'm not a chlorides specialist, but those are high concentrations of TDS. But the ratios here of the 226 and 228 do	12 13 14 15 16 17	deposition, you candidly acknowledged that you cannot rule out the possibility, if not the likelihood, that the increased concentrations of TDS in chlorides we're seeing here and the corresponding increased radium is not resultant from chloride-impacted soil as a result of the oil
13 14 15 16 17 18	A. I don't know where those came from, but I do know that those are higher than you'd normally find, often find in the site, the solid, the TDS and the chlorides. I'm not a chlorides specialist, but those are high concentrations of TDS. But the ratios here of the 226 and 228 do not show at all aged produce water.	12 13 14 15 16 17 18	deposition, you candidly acknowledged that you cannot rule out the possibility, if not the likelihood, that the increased concentrations of TDS in chlorides we're seeing here and the corresponding increased radium is not resultant from chloride-impacted soil as a result of the oil and gas operations by Chevron and Gulf on this
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<ol> <li>13</li> <li>14</li> <li>15</li> <li>16</li> <li>17</li> <li>18</li> <li>19</li> <li>20</li> <li>21</li> <li>22</li> </ol>	<ul> <li>A. I don't know where those came from, but</li> <li>I do know that those are higher than you'd</li> <li>normally find, often find in the site, the solid,</li> <li>the TDS and the chlorides. I'm not a chlorides</li> <li>specialist, but those are high concentrations of</li> <li>TDS. But the ratios here of the 226 and 228 do</li> <li>not show at all aged produce water.</li> <li>Q. Dr. Frazier, you've stated that already,</li> <li>and I understand your point.</li> <li>But you can't explain, then, why the</li> <li>radium concentrations, combined 226, 228, are the</li> </ul>	12 13 14 15 16 17 18 19 20 21 22	<ul> <li>deposition, you candidly acknowledged that you cannot rule out the possibility, if not the likelihood, that the increased concentrations of TDS in chlorides we're seeing here and the corresponding increased radium is not resultant from chloride-impacted soil as a result of the oil and gas operations by Chevron and Gulf on this property?</li> <li>A. Yes. I testified yes on the at the deposition, and I've testified in court to that same thing.</li> </ul>
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<ol> <li>13</li> <li>14</li> <li>15</li> <li>16</li> <li>17</li> <li>18</li> <li>19</li> <li>20</li> <li>21</li> <li>22</li> </ol>	<ul> <li>A. I don't know where those came from, but</li> <li>I do know that those are higher than you'd</li> <li>normally find, often find in the site, the solid,</li> <li>the TDS and the chlorides. I'm not a chlorides</li> <li>specialist, but those are high concentrations of</li> <li>TDS. But the ratios here of the 226 and 228 do</li> <li>not show at all aged produce water.</li> <li>Q. Dr. Frazier, you've stated that already,</li> <li>and I understand your point.</li> <li>But you can't explain, then, why the</li> <li>radium concentrations, combined 226, 228, are the</li> </ul>	12 13 14 15 16 17 18 19 20 21 22	<ul> <li>deposition, you candidly acknowledged that you cannot rule out the possibility, if not the likelihood, that the increased concentrations of TDS in chlorides we're seeing here and the corresponding increased radium is not resultant from chloride-impacted soil as a result of the oil and gas operations by Chevron and Gulf on this property?</li> <li>A. Yes. I testified yes on the at the deposition, and I've testified in court to that same thing.</li> </ul>

	Page 173		Page 175
1	high TDS came from here. But I'm looking at the	1	A. (Reviews document.)
2	radiological perspective of it. And certainly the	2	It sure looks like that way, yes. And
3	theory is that if you have higher chlorides,	3	hence, if you have low TDS, you have low radium.
4	you're going to have more radium in the water.	4	Q. And you I'm sorry. I thought you
5	Higher TDS, you're going to have more radium in	5	were finished.
6	the water. That's why you start off with	6	A. And indeed, the radiums on these five
7	higher that's why you start off with radium-226	7	samples, both 226 and 228, were nondetects.
8	and 228 in your produced water anyway, anyway down	8	Q. So it logically follows, Dr. Frazier,
9	the formation.	9	does it not, that where you have locations with
10	But when it comes up, the radiums are no	10	the lowest TDS and the lowest chlorides, which is
11	longer with their parents and so they're following	11	what we see at these background locations, are
12	their respective decays. So if you look at	12	appropriate locations for determining background
13	concentrations of 226 and 228 and if 228 is	13	for radium as well; true?
14	equal or higher than the radium-226, it's no old	14	A. No. Not necessarily. It's like trying
15	produced water. It could be from the stuff around	15	to determine where's the background for TDS.
16	it, but it's not from old produced water.	16	You've got low numbers for TDS, but you've got
17	Q. Dr. Frazier, that point notwithstanding,	17	other numbers that are a lot higher that are not
18	I just want to be sure the panel understands.	18	impacted no radium increases. There's a
19	That does not change your answer to the	19	tremendous variation of TDS in groundwater that
20	previous question, that you cannot rule out and,	20	you find out there. And like trying to find
21	in fact, you agree it's likely that these	21	the background for radium is like trying to find a
22	increased TDS in chlorides and corresponding	22	background for TDS. They've chosen five wells
23	increased radium we see at these locations is the	23	that have low TDS in it, but and they've tried
24	result of chloride-impacted soils from the oil and	24	to calculate for radium concentration in that
25	gas operations?	25	background, or those wells that they call
	Page 174		Page 176
			-
1	A. I can't rule it out, but I don't know		background. But it doesn't necessarily follow.
2	where the high TDS and high chlorides come from.	2	You've got such a variation of it there.
2			
3	There's sort of a pocket of it there. As you go	3	Q. Dr. Frazier, you made no attempt to
4	away from that pocket	3 4	determine what you thought background for radium
4 5	away from that pocket Q. Where the blowout well is located?	3 4 5	determine what you thought background for radium might be for groundwater on this property; true?
4 5 6	<ul><li>away from that pocket</li><li>Q. Where the blowout well is located?</li><li>A. Can I finish my answer?</li></ul>	3 4 5 6	<ul><li>determine what you thought background for radium might be for groundwater on this property; true?</li><li>A. No. Because the more TDS you have, the</li></ul>
4 5 6 7	<ul><li>away from that pocket</li><li>Q. Where the blowout well is located?</li><li>A. Can I finish my answer?</li><li>As you go away from that pocket, the TDS</li></ul>	3 4 5 6 7	<ul><li>determine what you thought background for radium might be for groundwater on this property; true?</li><li>A. No. Because the more TDS you have, the higher the radium you have.</li></ul>
4 5 6 7 8	<ul><li>away from that pocket</li><li>Q. Where the blowout well is located?</li><li>A. Can I finish my answer?</li><li>As you go away from that pocket, the TDS</li><li>drops off significantly and the chlorides drop off</li></ul>	3 4 5 6 7 8	<ul><li>determine what you thought background for radium might be for groundwater on this property; true?</li><li>A. No. Because the more TDS you have, the higher the radium you have.</li><li>Q. Dr. Frazier, neither 29-B nor RECAP</li></ul>
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	Page 177		Page 179
1	Q. If that were, in fact, the case, you	1	JUDGE PERRAULT: No objection. So ordered.
2	agree that, for every combined radium we have on	2	So Exhibit E is admitted.
3	this property, 226 plus 228, concentration that's	3	Is E-31 part of E?
4	above 5.0 picocuries per liter, that would be a	4	MR. KEATING: It is, Your Honor.
5	violation of regulations?	5	JUDGE PERRAULT: Okay. All right.
6	A. That's there's no regulations I've	6	Call your next witness.
7	ever seen for radium in groundwater from oil field	7	MR. GROSSMAN: Your Honor, Chevron calls
8	production, none.	8	Dr. John Kind.
9	Q. Fair enough.	9	JUDGE PERRAULT: All right, Doctor. Please
10	MR. KEATING: No further questions.	10	state your name for the record.
11	MR. CARTER: No redirect.	11	THE WITNESS: John Kind.
12	JUDGE PERRAULT: Does the panel have any	12	JUDGE PERRAULT: Spell you last name for the
13	questions?	13	record.
14	PANELIST OLIVIER: No questions from the	14	THE WITNESS: K-I-N-D.
15	panel.	15	DR. JOHN KIND,
16	JUDGE PERRAULT: Thank you very much.	16	having been first duly sworn, was examined and
17	THE WITNESS: Thank y'all.	17	testified as follows:
18	JUDGE PERRAULT: We have some exhibits	18	DIRECT EXAMINATION
19	outstanding. We have Exhibit 3. Are y'all	19	BY MR. GROSSMAN:
20	admitting that chart?	20	Q. Dr. Kind, how are you currently
21	MR. CARTER: Yes, we move for the admission	20	employed?
22	of Chevron Exhibit 3.	22	A. I work for a company called the Center
23	JUDGE PERRAULT: Any objection?	23	for Toxicology and Environmental Health. We're a
24	MR. KEATING: No objection.	24	consulting firm located in Little Rock, Arkansas.
25	JUDGE PERRAULT: No objection. So ordered	25	Q. What's your position there?
	<sup>0</sup>		
	Daga 179		Dago 190
	Page 178		Page 180
1	Exhibit 3.	1	JUDGE PERRAULT: Counsel, please state your
2	Exhibit 3. JUDGE PERRAULT: Exhibit 31, is that your	2	JUDGE PERRAULT: Counsel, please state your name for the record.
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2 3 4 5 6	Exhibit 3. JUDGE PERRAULT: Exhibit 31, is that your exhibit that they offered? MR. CARTER: That was, I think, you guy's MR. KEATING: If it's a number, I think it's y'all.	2 3 4 5 6	<ul><li>JUDGE PERRAULT: Counsel, please state your name for the record.</li><li>MR. GROSSMAN: Louis Grossman for Chevron.</li><li>A. So I'm a principal toxicologist and certified industrial hygienist at CTEH.</li><li>BY MR. GROSSMAN:</li></ul>
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1	in toxicology from the University of Georgia in	1	committee for that group.
2	2000.	2	There's also the ACGIH, which is the
3	Q. So you've been working as a toxicologist	3	American Conference of Governmental Industrial
4	for 22 years now?	4	Hygienists. I'm a member of that organization.
5	A. That's correct.	5	And as part of that, I also sit on the emergency
6	Q. And what did you do at CTEH?	6	response planning guideline committee. So we
7	A. So at CTEH, I was the senior vice	7	derive emergency exposure guidelines for HAZMAT
8	president of health sciences, which I stepped down	8	incidents and things of that nature so first
9	from that role a couple years ago, so I do a lot	9	responders and others can take, you know helps
10	less administrative work and more science now.	10	guide them take protective actions and things like
11	But one of the main things that I do and	11	that.
12	our department does is we serve as leaders of	12	Q. And you've also authored scientific
13	emergency response teams in the field. So I don't	13	papers?
14	know if you guys have seen the headlines about the	14	A. Yes.
15	train derailment in Ohio that happened a couple	15	Q. Tell us a little bit more about those.
16	days ago. We have a team up there. So both	16	A. So I've authored a number of papers and
17	Dr. Wnek and I have been helping them kind of from	17	book chapters on different areas, really in
18	the background.	18	particular in relation to this, published a recent
19	So through that work, I've done a lot of	19	chapter on looking at risks of exposure to
20	different types of responses to releases all over	20	hydrocarbons after different types of releases.
21	North America. I've also worked on a lot of these	21	Q. And you've been admitted to testify as
22	types of oil field matters as well.	22	an expert in both toxicology and human health risk
23	And then I do industrial hygiene	23	assessment before?
24	projects and other human health risk assessment	24	A. Yes.
25	projects as well.	25	Q. In fact, you've been admitted as an
	Page 182		Page 184
1	Page 182 Q. And you touched on this, but you've got	1	Page 184 expert in front of this panel; correct?
1 2	Q. And you touched on this, but you've got experience working with the types of constituents	1 2	expert in front of this panel; correct? A. Yes, I have.
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	Page 185		Page 187
1	appendix A to that report.	1	And then finally, the only constituent
2	BY MR. GROSSMAN:	2	that actually carried through the analysis was
3	Q. Dr. Kind, you coauthored that report	3	barium in soil. And when we did our dose response
4	with Dr. Wnek; correct?	4	analysis, we did a risk characterization, we
5	A. Yes.	5	determined that that barium in soil did not
6	Q. Would you mind telling us about the	6	represent a risk to current and future users to
7	methodology you employed to perform your risk	7	the property.
8	assessment?	8	Q. So in your opinion, Dr. Kind, from a
9	A. Sure. So we'll get into the individual	9	human health perspective, is there any need to go
10	steps of this later, but from a high level, we	10	out and remove soil from this property?
11	look at all the available environmental data and	11	A. No, there's not.
12	then we look at potential ways that people might	12	Q. And in your opinion as a toxicologist
13	be exposed to those media, figure out which	13	and human health risk assessor, is there any need
14	exposure pathways are complete, and then we	14	to remove groundwater from this property?
15	calculate well, first, we conduct a screening	15	A. No, there's not.
16	using RECAP and EPA methodology to see which	16	Q. Now, Dr. Kind, we're going to hear from
17	chemicals we might carry through the analysis.	17	Ms. Levert. I'd like you to explain to the panel
18	Once we do that, then we take the additional step	18	how your analysis differs from or borrows from her
19	of actually calculating dosages that the site-user	19	analysis.
20	might receive and we compare those not only to	20	A. Sure. So here, we've got kind of
21	health-based screening values but also to	21	definitions of toxicology risk assessment.
22	toxicology benchmark values from the scientific	22	Ms. Levert performed what we would call a
23	literature.	23	regulatory risk assessment consistent with RECAP
24	Q. You also went out to the site; correct?	24	guidance to help guide what areas of the site may
25	A. Yes.	25	or may not need to be addressed or cleaned up.
	Page 186		Page 188
1		1	
1 2	Q. And that's part of the methodology you	1	Risk assessment, as it's presented in a
	Q. And that's part of the methodology you employed in this case?	1 2 3	Risk assessment, as it's presented in a regulatory standpoint, is really designed to be
2	<ul><li>Q. And that's part of the methodology you employed in this case?</li><li>A. That is, yes.</li></ul>	2	Risk assessment, as it's presented in a regulatory standpoint, is really designed to be protective of human health but not predictive of
2 3	Q. And that's part of the methodology you employed in this case?	2 3	Risk assessment, as it's presented in a regulatory standpoint, is really designed to be
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	Page 189		Page 191
1	comparison to determine the chances for actual	1	A. We did, yes.
2	health effects and risks to occur.	2	Q. And why is that?
3	Q. And at the sake of being redundant, I'd	3	A. So to be really more comprehensive in
4	like you to go ahead and explain the toxicological	4	what we did. So the RECAP regulation requires the
5	risk assessment methodology that you employed	5	use of wet weight concentrations for evaluating
6	here.	6	direct contact to soil. The EPA methodology uses
7	A. Sure. So risk assessment has four basic	7	dry weight concentrations to do the same thing.
8	steps, and I'll give you a quick overview of those	8	So we actually looked at both wet and dry weight
9	now and we'll dig a little deeper into each of	9	when we did our analysis.
10	these in the presentation.	10	Q. So to summarize for step one, you took
11	The first is hazard identification.	11	this massive body of data and you looked at all of
12	It's looking at what's on the property, what here	12	those sampling results and decided which
13	could be a potential chemical of concern, what has	13	constituents needed further evaluation; is that
14	the potential to cause harm to, in this case,	14	fair?
15	human populations? So you look at the data	15	A. That's correct.
16	through the hazard identification.	16	Q. Let's talk about petroleum hydrocarbons.
17	Step two is exposure assessment. So	17	And I know you mentioned this earlier about TPH
18	then you're saying how might a user to this	18	fractionation versus TPH mixtures. Can you tell
19	property be exposed to these constituents? Are	19	us a little bit more about that?
20	they in the soil, water, are they in the air? And	20	A. Yes. So there's two ways to look at
21	how might people come in contact with those media?	21	hydrocarbon data in the soil or groundwater. One,
22	That's step two.	22	which ICON Environmental used in this case, is
23	Step three is the dose response	23	called total petroleum hydrocarbon mixture. So
24	assessment. So it's looking at those exposure	24	you've probably heard of TPH, GRO, DRO, ORO or
	levels and determining, you know, are they	25	gasoline or oil or diesel range organics. That's
			Dage 192
1	Page 190	1	Page 192
1	sufficient to present a risk to health.	1	a pretty rough screening tool for looking at
2	sufficient to present a risk to health. And then step four is the risk	1 2 2	a pretty rough screening tool for looking at hydrocarbons in soil. We consider those data on a
2 3	sufficient to present a risk to health. And then step four is the risk characterization, which is combining everything	3	a pretty rough screening tool for looking at hydrocarbons in soil. We consider those data on a screening level.
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	Page 193		Page 195
1	A. That's correct, yes.	1	that forward in our analysis either.
2	Q. In looking at the TPH fractions, what	2	Q. So of all the constituents you looked
3	did you conclude?	3	at, barium was the only one that needed to be
4	A. So we looked at TPH fractions. There	4	carried forward; correct?
5	were no exceedances of the RECAP Management	5	A. Correct.
6	Option-1 nonindustrial screening standards, so we	6	Q. Can you summarize again why that is?
7	did not move those forward in our analysis.	7	A. Yes. Because barium was the only
8	Q. You're talking about the TPH mixtures?	8	compound that from Chevron areas in soil that
9	A. Yes. Yes.	9	carried through the MO-1 residential screening
10	Q. And those exceeded RECAP MO-1 standards?	10	process.
11	A. The mixtures did when we took it to look	11	Q. And you used residential screening?
12	at the fractions well, there were some mixtures	12	A. We did. Yes.
13	that did, but when we looked at the fractions,	13	Q. And why is that?
14	those did not exceed the standards, so we did not	14	A. And we'll get into this a little more
15	further those in our analysis.	15	later, but residential represents the most
16	Q. So there's no scientific or	16	health-protective screening scenario for a given
17	toxicological reason to carry forward TPH	17	property.
18	fractions for the remainder of your analysis; is	18	Q. So going through the rest of your
19	that right?	19	analysis, the next step is to look at potential
20	A. That's correct.	20	exposure pathways; correct?
21	Q. So with respect to constituents of	21	A. Yes.
22	potential concern, let's turn away from	22	Q. And you have it listed as exposure
23	hydrocarbons. What other constituents did you look at?	23	assessment? A. Yes.
24	A. Well, we looked at all the constituents,	24 25	Q. So what pathways did you consider here?
25	A. Wen, we looked at an the constituents,	23	Q: 50 what pathways did you consider here?
	Page 194		Page 196
1	Page 194 but that also includes a number of metals as well	1	Page 196 A. Well, we considered direct contact with
1 2			
	but that also includes a number of metals as well		A. Well, we considered direct contact with
2	but that also includes a number of metals as well that were measured in the soil. The only two that did not screen out through that process would be arsenic and barium;	2	A. Well, we considered direct contact with soil, direct contact with water, and also the potential for consumption of wildlife on the property.
2 3	but that also includes a number of metals as well that were measured in the soil. The only two that did not screen out through that process would be arsenic and barium; however, arsenic was in there was one I	2 3	<ul><li>A. Well, we considered direct contact with soil, direct contact with water, and also the potential for consumption of wildlife on the property.</li><li>Q. Give the panel an idea of what an</li></ul>
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	Page 197		Page 199
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1	from the soil, and also ingestion of soil.	1	exposure pathway there, so people can't be
2	On the other side, you'll see the	2	exposed. If you can't be exposed, then there's no
3	incomplete pathways. Groundwater pathway is	3	risk. So we did not include those in our further
4	deemed incomplete based upon classification of	4	analysis.
5	Groundwater 3, poor natural quality and yield and	5	Q. There's no scientific need to; correct?
6	the fact that there are no drinking water wells	6	A. That's correct.
7	within that shallow zone on the site or within a	7	Q. Now, with respect to soil exposure
8	mile of the site in the well survey.	8	pathways, what scenarios did you account for
9	Q. Can I stop you right there for a second,	9	there? I and know you said dermal inhalation and
10	Dr. Kind?	10	ingestion. But with respect to potential land
11	A. Yes.	11	uses or current land uses, what did you consider?
12	Q. What if somebody wanted water at this	12	A. So we looked at two different exposure
13	site?	13	scenarios. One would be industrial exposure
14	A. Well, if somebody wanted water at this	14	scenarios. So this would be things like farming,
15	site, there are really a couple of viable options.	15	petroleum E&P operations, you know, anything that
16	One, the well survey that we did shows that people	16	dealed with occupational-type exposure.
17	who complete wells for drinking water within a	17	The other thing we looked at was what's
18	mile of the property complete them in the Chicot	18	called a nonindustrial exposure scenario. That
19	Aquifer, which I think the shallowest of those	19	relates to somebody actually having a residence
20	wells is about 125 feet and they go on down to	20	and residing on that property for 24 hours a day
21	200-something feet.	21 22	for 350 days a year.
22	The second is I think you've heard	22	Q. All right. So now we have a constituent. We have barium, and we have a
23	earlier, there's municipal water that's available	23 24	potential exposure pathway through soil. What's
24	throughout the site as well. Q. And there is also a water well on this		next?
25	Q. And there is also a water wen on this	25	licat.
	Page 198		Page 200
1		1	Page 200 A. So the next thing is to do our dose
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	Page 201		Page 203
1	or manifestation.	1	These dots with the vertical bars
2	Just a quick example of a few with this	2	represent hypothetical data points, and that's
3	concept, a couple examples. So water, you know, a	3	what the curve is drawn through, those data
4	quart and a half of water is safe. If you drink 15 quarters at one time, that can be lethal.	4 5	points. So key things to look at here, I talked
5	Aspirin, as we all know, a couple aspirin can be	5	about the effects levels from the literature. So
6 7	safe. If you have eight aspirin at a time, you	7	this level here is called the LOAEL, this the
8	can get ringing of the ears. If you have 30, you	8	Lowest Observable Adverse Effect Level. So that's
9	can get a bleeding ulcer in your stomach because	9	the lowest concentration test that produced some
10	of the acid. If you have 90 at a time, that could	10	type of effect. That's called the LOAEL. We'll
11	be a lethal dose. Lima beans actually contain	11	talk about that in a minute.
12	cyanide. So one helping's good, but ten cups at a	12	This is the No Observed Adverse Effect
13	time has enough cyanide to be lethal. So these	13	Level. This is the highest dose where you don't
14	are just everyday examples of a dose response.	14	see an effect. So when you talk about something
15	Q. So to do your analysis of a potential	15	like a reference dose or a RECAP screening value,
16	dose here, what do you compare it to?	16	they're based off of these LOAELs and NOAELs, and
17	A. So in this case, we looked at a few	17	what happens is, in this case, we have an example
18	benchmarks. One is called the reference dose, and	18	of a NOAEL. You say all right, that's the NOAEL,
19	that is a health protective value that's derived	19	this was a study in laboratory rats. So we don't
20	by the EPA, US EPA, that's designed to be	20	know exactly how humans are going to respond
21	protective of even sensitive subpopulation for	21	compared to rats, so we're going to add a
22	daily exposure for a lifetime. So we work with	22	protective factor. We don't know the variability
23	that. We also look at values in the scientific	23	within the human population, so we're going to add
24	literature that have been shown to be like the	24	another protective factor. Maybe this was a
25	lowest effect level that's been seen in the	25	three-month study instead of a full lifetime
	Page 202		Page 204
	Page 202		Page 204
1	scientific literature. So those are our main	1	study, so we're going to add another protective
2	scientific literature. So those are our main comparison benchmark points.	2	study, so we're going to add another protective factor. So you add protective factors in and then
2 3	<ul><li>scientific literature. So those are our main</li><li>comparison benchmark points.</li><li>Q. Okay. The reference dose that you</li></ul>	2 3	study, so we're going to add another protective factor. So you add protective factors in and then finally you get your reference dose here.
2 3 4	<ul><li>scientific literature. So those are our main comparison benchmark points.</li><li>Q. Okay. The reference dose that you mentioned is protective, isn't it?</li></ul>	2 3 4	study, so we're going to add another protective factor. So you add protective factors in and then finally you get your reference dose here. So we know this reference dose is safe
2 3 4 5	<ul><li>scientific literature. So those are our main comparison benchmark points.</li><li>Q. Okay. The reference dose that you mentioned is protective, isn't it?</li><li>A. Yes. It's protective of even sensitive</li></ul>	2 3 4 5	study, so we're going to add another protective factor. So you add protective factors in and then finally you get your reference dose here. So we know this reference dose is safe because we have all these safety factors in here,
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2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	<ul> <li>scientific literature. So those are our main comparison benchmark points.</li> <li>Q. Okay. The reference dose that you mentioned is protective, isn't it?</li> <li>A. Yes. It's protective of even sensitive subpopulations.</li> <li>Q. Let's talk a little bit more about reference dose. I think we have two slides here to help that explanation. We'll start with this one right here. What does this one show us?</li> <li>THE WITNESS: Do you mind if I stand up and point at the screen?</li> <li>JUDGE PERRAULT: Go ahead. Just speak loud.</li> <li>A. Okay. I'll do that.</li> <li>So this draft is what we would call a dose response curve in toxicology. So if you look at the X axis, it's the log of the dose, so as you go out on the axis, it's a higher dose. This is the percent response. So this is the percent of a population. We can say it's a population of laboratory animals. So zero precent response up to 100 percent response. This blue line is the</li> </ul>	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	<ul> <li>study, so we're going to add another protective factor. So you add protective factors in and then finally you get your reference dose here.</li> <li>So we know this reference dose is safe because we have all these safety factors in here, but we also know that it's conservative and it may not reflect the actual concentration of where that adverse health effect occurs. So we looked at both the reference doses and the LOAELs in this case for barium. If you want to go to the next slide.</li> <li>Q. Yeah, I like this slide.</li> <li>A. Yeah. This is actually a practical application of that. So this is a reference dose summary for a chemical called pyrene, which is a polycyclic aromatic hydrocarbon. It's actually found sometimes in aged petroleum. This is the concentration or the dose in milligrams of compound per kilogram of body weight per day. This is the LOAEL in in this study. This is a rat study. 125 milligrams per kilogram per day. This is the no observed adverse affect</li> </ul>

	Page 205		Page 207
1	you've got ten-fold protective factor for	1	location average. So oftentimes, there are split
1	intraspecies variability, humans to rats.	2	samples from the same location, so we would
	Interspecies variability, variability among	3	average those and look at maximum average of
	humans, another factor of ten for this being a	4	those. We looked at averages for the different
5	sub-chronic or a weeks-long study instead of a	5	areas of interest here, and then we also looked at
6	years-long study. Another factor of three for	6	what's called the 95 percent upper confidence
7	lack of other studies, and then, if you're doing	7	limit, which is a statistical derivation of what
8	RECAP, there's another factor of ten if you're	8	the maximum, kind of, average exposure could be
9	looking at the screening level of RECAP. So you	9	across that area. It's of all these values,
10	end up with a dose of .003 milligrams per kilogram	10	it's still conservative, but it's the most
11	per day, which is thousands and thousands of times	11	realistic of the potential exposure scenarios.
12	lower than the actual level that's the lowest	12	Q. And so what does this chart here on the
13	level that's been shown to not have effects or	13	side show with industrial and residential?
14	have effects in this laboratory animal species.	14	A. Yes. Yeah. So as I mentioned earlier,
15	So there's a lot of that conservatism and health	15	we looked at both the industrial and residential
16	protection that's built into these values.	16	exposure scenarios. So if you look at the left
17	Q. Where do the reference doses come from?	17	column, those are the different exposure
18	A. The reference doses come from the EPA.	18	parameters that we used, and you'll see industrial
19	They have a database called the Integrated Risk	19	and residential on the other two columns. So the
20	Information System where they derive and house all	20	first difference there is the duration of
21	of these reference doses.	21	exposure. An industrial exposure assumes 25 years
22	Q. In other words, you're not making these	22	of exposure. Residential can assume 30 years as
23	up?	23	an adult or six years as a child.
24	A. That's correct.	24	The frequency of exposure, for industrial you think somehody's out there for 50
25	Q. These are published?	25	industrial, you think somebody's out there for 50
L			
<u> </u>	Page 206		Page 208
1	A. That's correct.	1	weeks a year, five-day workweek, that's 250 days.
1 2	<ul><li>A. That's correct.</li><li>Q. So now we get to the last step. Step</li></ul>	2	weeks a year, five-day workweek, that's 250 days. Residential is 350 days a year.
	<ul><li>A. That's correct.</li><li>Q. So now we get to the last step. Step four, the risk characterization. Tell us a little</li></ul>	2 3	weeks a year, five-day workweek, that's 250 days. Residential is 350 days a year. The time is 8 hours a day for somebody
2 3 4	<ul><li>A. That's correct.</li><li>Q. So now we get to the last step. Step four, the risk characterization. Tell us a little bit about this.</li></ul>	2 3 4	weeks a year, five-day workweek, that's 250 days. Residential is 350 days a year. The time is 8 hours a day for somebody who's working on a property versus 24 hours a day
2 3 4 5	<ul><li>A. That's correct.</li><li>Q. So now we get to the last step. Step four, the risk characterization. Tell us a little bit about this.</li><li>A. Yes. So the risk characterization</li></ul>	2 3 4 5	weeks a year, five-day workweek, that's 250 days. Residential is 350 days a year. The time is 8 hours a day for somebody who's working on a property versus 24 hours a day for someone who's living there.
2 3 4 5 6	<ul><li>A. That's correct.</li><li>Q. So now we get to the last step. Step</li><li>four, the risk characterization. Tell us a little</li><li>bit about this.</li><li>A. Yes. So the risk characterization</li><li>involves taking what we learned about the exposure</li></ul>	2 3 4 5 6	weeks a year, five-day workweek, that's 250 days. Residential is 350 days a year. The time is 8 hours a day for somebody who's working on a property versus 24 hours a day for someone who's living there. The ingestion rate of soil, this is
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	Page 209		Page 211
1	He's not discussed soil pica at all in his	1	included in human health risk assessments unless
2	report, he didn't discuss soil pica anywhere	2	there's specific reason to do so.
3	in his deposition, and I'm not aware of what	3	Q. Thank you, Dr. Kind.
4	he's about to say.	4	So let's move to this next slide that
5	JUDGE PERRAULT: All right.	5	shows two tables that are also included in
6	How is this relevant?		Exhibit 4, which is your exhibit report.
7	BY MR. GROSSMAN:	7	A. Yes.
8	Q. Dr. Kind, did you consider soil pica?	8	Q. Would you please explain to the panel
9	A. It's something that we consider	9	and to the judge what these tables show?
10	MR. WIMBERLEY: I object, Your Honor.	10	A. Yes. If you don't mind me getting up
11	JUDGE PERRAULT: I'm asking	11	
12	MR. GROSSMAN: Judge, it's a potential	12	So these are tables from the expert
13	exposure scenario that they looked at and did	13	report. They're identically set up. The
14	not consider for very good reasons, and I'd	14	difference here is the top table looks at wet
15	like him to be able to explain that to you	15	weight results and the bottom table looks at dry
16	and the panel.	16	weight results. So these, again, are this child
17	JUDGE PERRAULT: It wasn't considered?	17	residential scenario. Again, we mentioned barium
18	MR. GROSSMAN: They considered it, and they	18	was the only chemical that carried through. We
19	ruled it out. So it's not in his report, but	19	looked at site max, site location average, the 95
20	it's	20	UCL for Area 6 because that was the area that had
20	JUDGE PERRAULT: So if it's ruled out, how is	21	the highest 95 percent UCL and the 95 percent
22	it relevant?	22	upper confidence level for the site as a whole.
23	MR. GROSSMAN: It's an assumption that I'd	23	Total daily intake in milligrams per kilogram a
24	like him to speak to.	24	day is the dose for that child receptor based on
25	JUDGE PERRAULT: I'm asking you: How is it	25	each of these concentrations. The next column is
25			
	Page 210		Page 212
1	relevant if they ruled it out?		that reference dose that I showed you in those
1 2	relevant if they ruled it out? MR. GROSSMAN: I think the fact that he ruled	2	that reference dose that I showed you in those couple of figures. That is the health protective
	relevant if they ruled it out? MR. GROSSMAN: I think the fact that he ruled it out and the reasons why is relevant.	2 3	that reference dose that I showed you in those couple of figures. That is the health protective value from the EPA that says it's protective of
2	relevant if they ruled it out? MR. GROSSMAN: I think the fact that he ruled it out and the reasons why is relevant. JUDGE PERRAULT: We'll hear that. Go ahead.	2 3	that reference dose that I showed you in those couple of figures. That is the health protective
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2 3 4	relevant if they ruled it out? MR. GROSSMAN: I think the fact that he ruled it out and the reasons why is relevant. JUDGE PERRAULT: We'll hear that. Go ahead. BY MR. GROSSMAN: Q. So explain what soil pica is and then	2 3 4 5 6	that reference dose that I showed you in those couple of figures. That is the health protective value from the EPA that says it's protective of even sensitive populations for a lifetime of exposure. Next is how many times below the
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2 3 4 5 6	<ul> <li>relevant if they ruled it out?</li> <li>MR. GROSSMAN: I think the fact that he ruled it out and the reasons why is relevant.</li> <li>JUDGE PERRAULT: We'll hear that. Go ahead.</li> <li>BY MR. GROSSMAN:</li> <li>Q. So explain what soil pica is and then explain to the panel why you ruled it out here.</li> <li>A. Sure. So soil pica is ingestion of an</li> </ul>	2 3 4 5 6 7 8	that reference dose that I showed you in those couple of figures. That is the health protective value from the EPA that says it's protective of even sensitive populations for a lifetime of exposure. Next is how many times below the reference dose the total daily intake was. So if you're below the reference dose, that means you're
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	Page 213		Page 215
1	recorded, and that's just not a realistic	1	the species it is.
	scenario. So that's why I was saying that really	2	In this case, XRD indicates that the
$\begin{vmatrix} 2 \\ 2 \end{vmatrix}$	these UCLs assume kind of an even distribution		barium is an insoluble form called barium, or
3	across that, either the Area 6 or the whole site,	3	
4		4	barium sulfate. So when we do our analysis, we
5	so that's a more realistic type of exposure	5	assume that all the barium is actually some type
6	scenario.	6	of bioavailable barium, that the standards we're
7	Q. And what these tables show, if I'm	7	working off of assume it's bioavailable,
8	reading them correctly, is that even in the	8	potentially toxic. So we've done our calculations
9	unrealistic scenario where a child is spending 350	9	and even assuming that it is soluble barium,
10	days, 24 hours a day at the areas with the highest	10	again, as I just showed you, that does not present
11	concentrations, they're still not even approaching the reference dose?	11	a risk to human health. But when you consider
12		12	that the barium is likely insoluble, likely barium
13	A. They are still less than the reference	13	sulfate, then that just gives you an even greater
14	dose; correct.	14	margin of safety to not have concern for a risk to
15	Q. So what does this tell you about barium	15	human health in the soil.
16	at the site?	16	Q. So turning back to these two tables,
17	A. Well, overall, this tells me that barium	17	7.15 and 7.16, those are evaluating the soluble
18	at the site does not present a risk to human	18	bioavailable form of barium; correct?
19	health. Q. It's below the reference dose?	19	A. Those are considering all that barium to
20		20	be bioavailable and soluble.
21		21	Q. And in your opinion, is the barium at
22	<ul><li>Q. And it's below the LOAEL?</li><li>A. That is correct.</li></ul>	22	this site bioavailable?
23		23	A. Well, I think XRD would show there's a
24	Q. Now, we're talking about barium. And	24	lot of barium as barium sulfate, which would not
25	the barium that you used in your analysis, is that	25	be bioavailable.
	Page 214		Page 216
1	Page 214 the same barium found at the site?	1	Page 216 Q. So, Dr. Kind, in summary, can you give
1 2			
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	Page 217		Page 219
1	for its intended use?	1	manganese in that water that render it unsafe
1 2	A. Again, what my analysis showed is that		naturally without treatment.
3	there's no potential risk to human health for	3	Q. I'm talking about the benzene and the
4	users of the property; so in that extent, I would	4	barium.
5	say yes.	5	A. Again, I've you know, we talked about
6	Q. What's the intended use of the	6	benzene during my depo, and I told you before that
7	groundwater on this property?	7	I couldn't find anything in the scientific
8	A. I don't believe there is an intended	8	literature that showed those levels would be
9	use.	9	unsafe. And since then, I've looked at both
10	Q. So you believe there's no intended use	10	cancer and noncancer values for benzene, and the
11	for the groundwater on this property, it's not	11	concentration at that one location would not
12	intended to be drunk, for instance?	12	indicate that there would be adverse health
13	A. I don't recall seeing mention of that.	13	effects if you drank that water.
14	What we know from the groundwater is there is a	14	MR. WIMBERLEY: So, listen now, he's telling
15	deep well into the Chicot Aquifer on the property	15	you that he can't say it's safe to drink.
16	and there's wells in the Chicot within the area.	16	BY MR. WIMBERLEY:
17	But that's my recollection of the use of	17	Q. How many places on the property did you
18	groundwater in the general region around the	18	do the XRD analysis?
19	property.	19	A. I did not do that myself. I think ERM
20	Q. What's the intended use of the shallow	20	did that with two of the higher barium
21	groundwater on this property?	21	concentration locations
22	A. Again, I'm not aware that there is one.	22	Q. Did you order the XRD analysis?
23	Q. Did you do anything to figure out what	23	A. I don't recall doing that. I think that
24	the intended use was?	24	was maybe done before we got involved.
25	A. Again, I don't recall seeing any	25	Q. Okay. So this whole thing you went
	Page 218		Page 220
1		1	
1 2	intended use and we're talking about a GW 3 with	1	through with Mr. Grossman about how you believe
2	intended use and we're talking about a GW 3 with poor water quality, naturally poor water quality		through with Mr. Grossman about how you believe the barium on the property is barite and not
2 3	intended use and we're talking about a GW 3 with poor water quality, naturally poor water quality and yield, so	3	through with Mr. Grossman about how you believe the barium on the property is barite and not soluble barium, this all depends on the XRD
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2 3 4	intended use and we're talking about a GW 3 with poor water quality, naturally poor water quality and yield, so Q. Did you ask Mr. Henning what his intended use was?	3	<ul><li>through with Mr. Grossman about how you believe the barium on the property is barite and not soluble barium, this all depends on the XRD analysis; right? That's the only proof you have?</li><li>A. Well, again, you have that, combined</li></ul>
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	Page 221		Page 223
1	spots?	1	used methodology from RECAP, methodology from US
2	A. Again, you sample the highest ones,		EPA, but I did not do a regulatory RECAP risk
3	higher ones that you can find and analogize that	3	assessment.
4	to the others.	4	Q. You were able to do what made more sense
5	Q. Are you aware that there are microbes	5	as a scientist; right? Looked at this from a
6	that could break down barium sulfate?	6	science perspective?
7	A. Not specifically. There are,	7	A. Well, I looked at it from a toxicology
8	obviously I mean, there are	8	perspective. I went beyond standard human health
9	sulfatefate-consuming microbes, but I haven't done	9	risk assessment and did a toxicology assessment.
	that specifically.	10	Q. So if something in EPA rules or
10	Q. Is it something that you've never	11	something in RECAP rules maybe didn't make sense
11	studied?	11	to you as a scientist, you were free to disregard
	A. I mean, I've studied it in general but	12	those and explain to this jury or this panel why
13	not specifically to barium.	13	your analysis makes sense; right?
14			A. I don't know what you mean by disregard.
15	Q. Did you do anything to understand	15	A. I don't know what you mean by disregard. Again, I used methodology from both of those
16	whether or not the microbes in this property are	16	
17	able to break down the barium sulphate into barium sulfide, for instance, or barium carbonate?	17	Q. Did you use all the RECAP methodology? Did you follow every letter of the law?
18		18	
19	A. I didn't. And again, it doesn't really	19	A. Again, I used the RECAP methodology that
20	matter for my analysis because I assumed all the	20	was germane to exposure parameters in calculating
21	detected barium was bioavailable, so that's really	21	doses and screening and things of that nature.
22	not germane	22	Q. Did you identify AOIs in accordance with
23	Q. That's not something you did?	23	RECAP?
24	A. Again, no. I took the health protective	24	A. Again, I did not do that. That's
25	assumption that all that barium was indeed	25	something that Mrs. Levert did, who did the
	Page 222		Page 224
1	bioavailable, so it really doesn't matter because	1	regulatory risk assessment.
2	I assumed it was soluble, not insoluble.	2	Q. Can we agree that in health risk
3	Q. And you don't deny that barium sulfate	3	assessment the RECAP, the linchpin of the whole
4	can be broken down by microbes into barium	4	thing really is what's that compliance
5	sulphide or barium carbonate?	5	concentration or what's that concentration that we
6	A. I told you I did not do that analysis,	6	see in the ground?
7	so I can't tell you either way.	7	A. Well, the exposure ^point concentration
8	Q. The analysis that you did was not a	8	is certainly important but
	strictly RECAP analysis; right?		
9	strictly KLCAI analysis, fight:	9	Q. That drives the whole boat; right?
9 10	A. I did an analysis that used RECAP and	9 10	<ul><li>Q. That drives the whole boat; right?</li><li>A. Well, it's one of the factors. There's</li></ul>
			-
10	A. I did an analysis that used RECAP and	10	A. Well, it's one of the factors. There's
10 11	A. I did an analysis that used RECAP and EPA methodology, but I went beyond your standard	10 11	A. Well, it's one of the factors. There's a lot of factors that go into the screening
10 11 12	A. I did an analysis that used RECAP and EPA methodology, but I went beyond your standard RECAP analysis to actually do the toxicology	10 11 12	A. Well, it's one of the factors. There's a lot of factors that go into the screening process and calculating doses
10 11 12 13	A. I did an analysis that used RECAP and EPA methodology, but I went beyond your standard RECAP analysis to actually do the toxicology assessment.	10 11 12 13	<ul> <li>A. Well, it's one of the factors. There's a lot of factors that go into the screening process and calculating doses</li> <li>Q. And the data points</li> </ul>
10 11 12 13 14	<ul><li>A. I did an analysis that used RECAP and</li><li>EPA methodology, but I went beyond your standard</li><li>RECAP analysis to actually do the toxicology</li><li>assessment.</li><li>Q. And I think you and I went back and</li></ul>	10 11 12 13 14	<ul> <li>A. Well, it's one of the factors. There's</li> <li>a lot of factors that go into the screening</li> <li>process and calculating doses</li> <li>Q. And the data points</li> <li>MR. GROSSMAN: Todd, let him finish his</li> </ul>
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	Page 225		Page 227
1	about which data points go into that concentration	1	in the soil drives how much a child takes into
2	in your analysis; correct? Because you didn't do	2	
3	the AOIs?	3	Q. No. I'm not asking that. I'm asking
4	A. Well, I worked with the areas that had	4	how much dosage he gets from that soil that gets
5	been established by Mrs. Levert.	5	in his mouth?
6	Q. Which are not AOIs under RECAP; right?	6	A. Well, dose is a function of how much
7	A. I don't know the distinction to make	7	soil and the concentration of the constituent in
8	^there.	8	the soil.
9	Q. So you can't sit here today and tell	9	Q. So the higher the concentration of the
10	this panel that those areas of interest that have	10	soil that the kid is encountering, the higher dose
11	been identified in the ERM report are actually	11	they're going to get because they're eating the
12	AOIs under RECAP?	12	same amount of soil under your scenario; right?
13	A. What I can tell the panel is that I	13	A. Assuming the same ingestion rate.
14	looked at all the data from those individual areas	14	Q. But yet and where's the barium on the
15	in my assessment.		site?
16	Q. Including the data points that would be outside the AOI?	16 17	A. Barium is in the upper most of it's in the upper couple feet of soil.
17	A. Well, it would depend on which way.	17	Q. Upper 2 feet; right?
18	Again, I looked at site maxes, I looked at	19	A. Yes.
19 20	location averages and averages for those areas.	20	Q. How many data points did you use in your
20	So I looked at again, a number of different	21	concentration beneath 2 feet? All of them; right?
22	ways to look at those those data.	22	All the way down to 50 feet?
23	Q. Okay.	23	A. Not all the way down to 50 feet, no.
24	And when you do your analysis for soil	24	Q. You didn't?
25	ingestion under a child scenario which is what	25	A. No. The barium data are limited to the
	Dago 226		Dago 228
	Page 226		Page 228
1	did you; correct?		top 12 feet. And like when we look at soil max,
2	did you; correct? A. Yes.	2	top 12 feet. And like when we look at soil max, for example, that's typically in the zero to
2 3	<ul><li>did you; correct?</li><li>A. Yes.</li><li>Q. That's one of the analysis that you did.</li></ul>	2 3	top 12 feet. And like when we look at soil max, for example, that's typically in the zero to 2-foot range.
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	Page 229		Page 231
1	potential highest exposure regardless of what	1	property?
2	depth that was here. It happened to be zero to	2	A. The intended future use that I saw was
3	2 feet, so we still have that level of	3	more of the same, agricultural and potential
4	protectiveness there.	4	recreational use as a hunting camp or fishing
5	Q. But conveniently, RECAP lets you average	5	camp.
6	that down with all the zeros at 10 to 12 feet?	6	Q. Do you have any idea if any of
7	A. RECAP says that that is how you	7	Mr. Henning's children or grandchildren want to go
8	calculate that concentration for the AOI.	8	live at this property?
9	Q. Speaking of the 200 milligrams a day,	9	A. They may or may not. But again, I did
10	since you didn't talk about pica in your report or	10	my assessment assuming that was a possibility when
11	in your deposition and I don't know what you're	11	I did that nonresidential
12	going to say, I'm going to ask you about it.	12	Q. You just assumed that a pica child
12	How much soil does a pica child ingest	12	wouldn't live there?
13	on a daily basis?	14	A. Again, pica is not a standard
14	A. Well, it's not really a daily basis. It	15	occurrence, so that is not a standard assumption
15	tends to be episodic events of a couple times a	15 16	when doing health risk assessment.
17	year. What I've seen, the literature shows 500 to	10 17	Q. So let's just get this straight. You
18	1,000 milligrams, even maybe a couple thousand		didn't do the work to say it would be safe for a
10	milligrams at a time.	18 19	pica child to live there; is that correct?
20	Q. Are you talking acute pica or	19 20	A. Again, I didn't include that
20	sub-chronic pica?	20 21	specifically in my analysis because that is not
21	A. I think what the literature would show	21	it's not something that is common or works its way
	is that tends to happen on acute episodic bases.	22	into human health risk assessment.
23 24	Q. Do you know what RECAP has to say about	23 24	MR. WIMBERLEY: Scott, will you put up
	pica children?	24 25	Exhibit GGG 75. This is RECAP.
23		23	Exhibit 000 75. This is RECAL.
	Page 230		Page 232
1	A. I did look at that. I don't remember	1	Blow it up.
2	exactly what it says. I think it says that's a	2	(Discussion off record.)
3	site-specific type of parameter approach.	3	MR. WIMBERLEY: Can I put this on the Elmo?
4	Q. But you didn't so explain to me why	4	Zoom in on the acute health risk part.
5	you didn't consider pica children in your	5	BY MR. WIMBERLEY:
6	analysis.	6	
7		0	Q. Did you know that RECAP asks you to look
0	A. Well, again, pica is something that you	7	at pica and possibly low its threshold based on
8	A. Well, again, pica is something that you think about when you approach a site, but if you	-	at pica and possibly low its threshold based on that?
1	think about when you approach a site, but if you don't have any specific reason to include that,	7	<ul><li>at pica and possibly low its threshold based on that?</li><li>A. Again, I think pica is considered a</li></ul>
1	think about when you approach a site, but if you don't have any specific reason to include that, it's a site-specific parameter and that's	7 8	<ul><li>at pica and possibly low its threshold based on that?</li><li>A. Again, I think pica is considered a site-specific potential, and if it's there, then</li></ul>
9	think about when you approach a site, but if you don't have any specific reason to include that, it's a site-specific parameter and that's typically or actually almost never included in a	7 8 9 10 11	<ul><li>at pica and possibly low its threshold based on that?</li><li>A. Again, I think pica is considered a site-specific potential, and if it's there, then you would consider it.</li></ul>
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	Page 233		Page 235
1	Q. And how much did you say you used for	1	guidance?
2	milligrams per kilogram per day for the child or	2	A. Again, pica is acute. It's not a daily
3	200 milligrams	3	dose like what we're talking about there, so it
4	A. It's 200 milligrams of soil per day.	4	would be a different type of exposure scenario.
5	Q. How much does RECAP ask you to use?	5	Q. This would be minus 150 percent?
6	A. I don't think RECAP's asking you to use.	6	A. Again, that would not be a valid
7	They mention the potential of up to 25 to 60 grams	7	comparison to make.
8	per day.	8	Q. But you didn't do that analysis? You
9	Q. So that's five times 60. So what's that	9	didn't analyze whether the property was safe for a
10	math? 300 times higher than what you're using?	10	pica child?
11	A. It's I haven't done the math, but	11	A. Again, there's no evidence of pica.
12	it's so it would be a half a gram per day,	12	Pica is a rare event. It's not something that is
13	or	12	considered in site risk assessments like this
13	Q. No. 23 to 60?	14	unless there's specific information related to
15	A. 200 would be	15	that. So no, I did not.
16	Q. And you're using a fifth of a gram per	16	Q. So under your professional opinion,
17	day?	10	making a concession or a concern or a change to
17	A. Would be 200.	18	your analysis to evaluate for pica children should
19	Q. I think it's 300 times higher	19	only happen if there's a pica child on the
20	A. Yes.	20	property? Will you disregard the future and the
20	Q than what you assumed?	20	possibility that there might be a pica child on
22	A. Again, that pica assumes a higher level.	21	the property in the future?
22	But you only use that when you have evidence that	22	A. Again, you're looking at what the
23	that's occurring.	23	typical user of a property would be. Pica is a
25	Q. Since I didn't see this until you walked	25	rare occurrence, and if you have specific
25		23	
			Dama 226
	Page 234		Page 236
1	up onto the stand, I'm going to ask your colleague	1	information, you would include that. But again,
2	up onto the stand, I'm going to ask your colleague here: If you could pull up Slide No. 24 from his	2	information, you would include that. But again, that is not standard practice for a human health
2 3	up onto the stand, I'm going to ask your colleague here: If you could pull up Slide No. 24 from his presentation on the board.	2 3	information, you would include that. But again, that is not standard practice for a human health risk assessment, to just assume there would be a
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2 3	up onto the stand, I'm going to ask your colleague here: If you could pull up Slide No. 24 from his presentation on the board. Now, you have a column here that says that your calculations show that these doses that	2 3 4 5	information, you would include that. But again, that is not standard practice for a human health risk assessment, to just assume there would be a pica child in the future on the property. MR. WIMBERLEY: Take that down, please.
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	Page 237		Page 239
1	MR. GREGOIRE: Mr. Wimberly's going to have	1	sense.
2	to let the witness speak. I've heard him	2	Q. Is there a safe level of benzene in
3	interrupt the witness on at least 20	3	groundwater, drinking water?
4	occasions, and we've tried to be flexible on	4	A. From what I've seen, the EPA has an MCL
5	it, but please let him give his answer.	5	of 5 micrograms per liter, which is which is
6	A. Because the pathway was not complete, I	6	that drinking water standard. When you look at
7	did not proceed with that health analysis because	7	the scientific literature, the levels that
8	there's no exposure; and if there's no exposure,	8	would well, levels that low don't cause actual
9	there can be no risk.	9	harm. But again, that is a conservative
10	BY MR. WIMBERLEY:	10	health-based value related to protection of public
11	Q. You did not proceed. Okay. I think I	11	water sources anyway.
12	got it there.	12	Q. So 5 micrograms per liter?
13	So you have a number of reasons you	13	A. That is the maximum contaminate level
14	think that the groundwater pathway is incomplete.	14	set by the US EPA.
15	And they all look to me like kind of your present	15	MR. WIMBERLEY: I think that's all the
16	assessment of the facts. What makes you think the	16	questions I have. Thank you.
17	groundwater pathway won't be complete in the	17	MR. GROSSMAN: No redirect, Your Honor.
18	future?	18	JUDGE PERRAULT: Does the panel have any
19	A. Well, again, it's based on multiple	19	questions?
20	lines of reasoning. One is there have never been	20	PANELIST OLIVIER: Can we take like a 10- or
21	drinking water wells completed in that shallow	21	15-minute break?
22	zone on the property. There aren't any in those	22	JUDGE PERRAULT: You need 10 or 15?
23	shallow zones within a mile of the property. The	23	PANELIST OLIVIER: Ten.
24	water is of natural poor quality and yield. And	24	JUDGE PERRAULT: Ten-minute break.
25	there's already a deeper well on the property.	25	(Recess taken at 2:39 p.m. Back on record
	Page 238		Page 240
	Page 238	1	Page 240
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2	There's deeper wells in the region, and there's municipal water going to the area as well.	2	at 2:56 p.m.) JUDGE PERRAULT: Today's date is February 6.
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	Page 241		Page 243
1	least her direct, will last more than an	1	REPORTER'S CERTIFICATE
2	hour. I know that this day ends at 4:00 p.m.	2	I, Dixie Vaughan, Certified Court
3	We propose, that is, Chevron, we propose that	3	Reporter (Certificate #28009) in and for the State
4	we start her first thing in the morning.	4	of Louisiana, as the officer before whom this
5	This proceeding has gone a lot more	5	testimony was taken, do hereby certify that on
6	efficiently than we anticipated. We've gone	6	Monday, February 6, 2023, in the above-entitled
7	over four witnesses today, but we do not want	7	and numbered cause, the PROCEEDINGS, after having
8	to break up her direct. So we would ask,	8	been duly sworn by me upon authority of R.S.
9	it's at your pleasure, however you want to	9	37:2554, did testify as hereinbefore set forth in
10	handle it.	10	the foregoing 242 pages;
11	JUDGE PERRAULT: I want to do whatever helps	11	
12	y'all present your case. Any objection to	12	That this testimony was reported by me
13	that?	13	in stenographic shorthand, was prepared and
14	MR. CARMOUCHE: I would just ask that the	14	transcribed by me or under my personal direction
15	same rules apply, Your Honor.	15	and supervision, and is a true and correct
16	JUDGE PERRAULT: I'm going to treat everybody	16	transcript to the best of my ability and
17	the same. If I forget to do so, you let me	17	understanding;
18	know.	18	
19	Any objection to that, starting in the	19	That the transcript has been prepared in
20	morning?	20	compliance with transcript format guidelines
21	PANELIST OLIVIER: No.	21	required by statute or by rules of the board;
22	JUDGE PERRAULT: All right. We'll start at	22	
23	9:00 o'clock tomorrow. And if there's	23	That I have acted in compliance with the
24	nothing further, this hearing is adjourned.	24	prohibition on contractual relationships, as
25	(Hearing adjourned at 2:57 p.m.)	25	defined by Louisiana Code of Civil Procedure
	Page 242		Page 244
1		1	Page 244 Article 1434 and in rules and advisory opinions of
1 2	REPORTER'S PAGE	1 2	-
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2 3	REPORTER'S PAGE I, DIXIE VAUGHAN, Certified Court Reporter in and for the State of Louisiana, (CCR	2 3	Article 1434 and in rules and advisory opinions of the board; That I am not of Counsel, nor related to any person participating in this cause, and am in
2 3 4	REPORTER'S PAGE I, DIXIE VAUGHAN, Certified Court Reporter in and for the State of Louisiana, (CCR #28009), as defined in Rule 28 of the Federal	2 3 4 5 6	Article 1434 and in rules and advisory opinions of the board; That I am not of Counsel, nor related to
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