

SOAH DOCKET NO. 582-15-2082

TCEQ DOCKET NO. 2015-0069-MSW

APPLICATION OF	)	BEFORE THE STATE OFFICE
130 ENVIRONMENTAL PARK,	)	
LLC, FOR PROPOSED	)	OF
PERMIT NO. 2383	)	
	)	ADMINISTRATIVE HEARINGS

HEARING ON THE MERITS

Tuesday, August 23, 2016

BE IT REMEMBERED THAT at 9:15 a.m., on Tuesday, the 23rd day of August 2016, the above-entitled matter came on for hearing at the State Office of Administrative Hearings, William P. Clements, Jr., Building, 300 West 15th Street, Room 404, Austin, Texas, before KERRIE JO QUALTROUGH and CASEY BELL, Administrative Law Judges, and the following proceedings were reported by Jodi Cardenas and Dalia F. Inman, Certified Shorthand Reporters.

## 1 PROCEEDINGS

2 TUESDAY, AUGUST 23, 2016

3 (9:15 a.m.)

4 (Exhibit Applicant Nos. 40 through 43  
5 marked)6 JUDGE BELL: Good morning. We are back on  
7 the record continuing with the Protestants' case in  
8 chief.9 Ms. Perales, are you ready to call your  
10 next witness?

11 MS. PERALES: We are.

12 JUDGE BELL: All right. Go ahead.

13 MR. ALLMON: And, Your Honor, Protestants  
14 TJFA and EPICC would call Robert D. Hardin as our next  
15 witness.

16 (Witness Hardin sworn)

17 JUDGE BELL: Thank you very much. Go  
18 ahead, Mr. Allmon.

19 PRESENTATION ON BEHALF OF PROTESTANTS (CONTINUED)

20 ROBERT HARDIN,

21 having been first duly sworn, testified as follows:

22 DIRECT EXAMINATION

23 BY MR. ALLMON:

24 Q Good morning, Mr. Hardin. Do you have  
25 Protestants' Exhibits 9, as well as 9A through 9F in

1 front of you there?

2 A Yes, I do.

3 Q Do you recognize these exhibits?

4 A Yes. It's my prefiled testimony.

5 Q Do you have any corrections to your testimony?

6 A Yes. I have two corrections.

7 Q Okay. Would you turn first to Page 5?

8 A (Witness complies).

9 Q And looking at Line 13?

10 A Yes. It says, "Protection off." That should  
11 be "protection of."

12 Q And could you mark that on the copy there in  
13 front of you, please?

14 A (Witness complies).

15 Q And now could you turn to Page 20?

16 A (Witness complies).

17 Q And look with me on Line 8.

18 A The word "site stability" should be "site  
19 instability."

20 Q Okay. Could you please mark that as well on  
21 the page in front of you?

22 A (Witness complies).

23 Q With those corrections, would this testimony be  
24 the same as your answers to the questions if you had  
25 been asked them orally here today?

1           A       Yes, they would be.

2                   MR. ALLMON: Your Honor, Protestants would  
3 offer Exhibit 9 and 9A through 9F at this time.

4                   JUDGE BELL: Thank you. Any objections to  
5 Protestants' Exhibits 9 or 9A through 9D?

6                   MR. RYAN: No.

7                   JUDGE BELL: All right. Exhibit -- excuse  
8 me. Protestants' Exhibit 9 and Exhibits 9A through 9D  
9 are admitted.

10                  MR. ALLMON: And I think it's through 9F.

11                  JUDGE BELL: All right. 9A through 9F.

12 No objections?

13                  MR. RYAN: No, Your Honor.

14                  JUDGE BELL: Those exhibits are admitted.

15                           (Exhibit Protestants Nos. 9 and 9A through  
16 9F admitted)

17                  MR. ALLMON: And with that, Your Honor, we  
18 pass the witness.

19                  JUDGE QUALTROUGH: E and F are not on your  
20 exhibit list.

21                  MR. ALLMON: We will correct that.

22                  JUDGE QUALTROUGH: Yeah, they're in our  
23 book.

24                  JUDGE BELL: All right. Any  
25 cross-examination for Mr. Hardin from Plum Creek?

1 MR. WILSON: No, Your Honor.

2 JUDGE BELL: All right. How about from  
3 (indicating)?

4 MR. MAGEE: No, Your Honor.

5 JUDGE BELL: Caldwell County has no cross.  
6 How about OPIC?

7 MR. TUCKER: No cross.

8 JUDGE BELL: How about the Executive  
9 Director?

10 MR. TATU: Just a few questions.

11 JUDGE BELL: Okay. Go ahead.

12 CROSS-EXAMINATION

13 BY MR. TATU:

14 Q Good morning, Mr. Hardin. Anthony Tatu on  
15 behalf of the Executive Director.

16 I wonder if I could just ask you a few  
17 questions about your prefiled testimony as it relates to  
18 drainage. I understood -- when I went through your  
19 prefiled testimony, looking at the drainage issues, I  
20 identified three -- at least three issues. And I want  
21 to see if you can just confirm for me that one issue  
22 that you raised in your testimony is that the Applicant  
23 does not provide a unit hydrograph that was used in  
24 drainage calculations. Is that right?

25 A Yes. That's correct.

1 Q And another concern you have is the application  
2 does not provide a peaking factor that was used in the  
3 same drainage calculations?

4 A Yes. That would be part of the unit hydrograph  
5 analysis.

6 Q And the Applicant did not appropriately  
7 calculate the time of concentration for certain  
8 watersheds in post-development conditions. Is that also  
9 right?

10 A I think that's in both pre-development and  
11 post-development.

12 Q Okay.

13 A Yes.

14 Q So pre- and post-development. So are those all  
15 factors when we talk about -- sorry. When we talk about  
16 doing the HEC-1 analysis, are all those factors that are  
17 input into that analysis? How does that work?

18 A As a design engineer, some of those inputs have  
19 to be evaluated as to what we feel is appropriate to  
20 utilize and properly characterize the site based on the  
21 issues at hand.

22 So the application indicates that the  
23 document TR-55 is the justification or lists the  
24 assumptions that the analysis was conducted with and,  
25 for instance, the unit hydrograph method isn't described

1 in TR-55. There's a wide range of results one can get  
2 depending on which unit hydrograph one selects and other  
3 things. So you really have to go through an analysis to  
4 determine what is the appropriate input factors to use  
5 in this situation.

6 Q And once those input factors are selected, it's  
7 then modeled, I guess, as part of the HEC-1 analysis.  
8 Is that accurate?

9 A That's correct.

10 Q Okay. And let me ask if you could just look at  
11 one of the Applicant's exhibits that I asked Mr. Traw  
12 about earlier. This would be Applicant's Exhibit  
13 130EP-2, Page 79.

14 A Can you give me the number again?

15 Q Sure. It's 130EP-2, Page 79.

16 A Yeah, I'm not sure how to find page 79.

17 JUDGE BELL: There's page numbers in the  
18 upper right-hand corner that should give you the exhibit  
19 number and the page number.

20 THE WITNESS: I got you. Okay. I'm  
21 there.

22 Q (BY MR. TATU) Okay. And this is an exhibit  
23 that I was asking Mr. Traw about earlier. There's three  
24 separate tables there. Is that correct?

25 A Yes, there is.

1 Q And the first one would be the 25-year peak  
2 discharge or CFS?

3 A The 25- and 100-year peak discharge, yes.

4 Q All right. And so, yeah, I guess the Applicant  
5 modeled both the 25-year and 100-year, but I guess I'm  
6 just going to ask you about the 25-year right now.

7 A Okay.

8 Q And then the second table talks about a 25-year  
9 volume. Is that right?

10 A Yes.

11 Q And then the last table talks about the 25-year  
12 velocity. Is that correct also?

13 A Correct.

14 Q Okay. So did I understand your testimony --  
15 your prefiled testimony that -- well, let's just take  
16 time of concentration. If we had a different time of  
17 concentration that was used as an input, which of these  
18 factors would change or could potentially change? Let  
19 me put it that way.

20 A The peak discharge would change. The runoff  
21 volume wouldn't.

22 Q So did you do a separate HEC-1 analysis with --  
23 with a different time of concentration or using a  
24 different peaking factor?

25 A No, I did not.



1 Q Okay. I appreciate you clearing that up for  
2 me. No further questions. Thank you.

3 JUDGE BELL: All right. Thank you.

4 Cross-examination for Mr. Hardin from the  
5 Applicant?

6 MR. RYAN: Thank you, Your Honor.

7 CROSS-EXAMINATION

8 BY MR. RYAN:

9 Q Mr. Hardin, have you been to the proposed  
10 landfill site?

11 A Yes. I've been there once.

12 Q Did you walk the stream channels that were  
13 involved in the drainage analysis?

14 A Not all of them.

15 Q Which ones did you walk?

16 A We walked in and around Reservoir Site 21. And  
17 there might have been other stream or drainage areas  
18 that were in between the different groundwater  
19 monitoring wells.

20 Q When you say "groundwater monitoring wells," do  
21 you mean the piezometers?

22 A That's correct.

23 Q Okay. So where did you walk in the area near  
24 the reservoir? Down by the dam?

25 A That's correct.

1 Q Over on the east side of the dam where the --  
2 that shed is? Do you remember?

3 A I think we walked across the dam embankment and  
4 looked downstream from the discharge of the reservoir,  
5 and we observed the reservoir site on the -- I think  
6 it's the south side.

7 Q Okay. If you would turn to Page 9 of your  
8 prefiled testimony, please.

9 A (Witness complies).

10 Q And your answer that begins on Line 17 on  
11 Page 9, you refer to a unit hydrograph, and in the  
12 second sentence, you describe a unit hydrograph as a  
13 graph of flow rate and gallons per minute or cubic feet  
14 per second that occurs over the duration of the runoff.  
15 Do you see that?

16 A Yes.

17 Q Now, if you look over at your Exhibit 8B, is  
18 that an example of a unit hydrograph?

19 A Yes, it is.

20 JUDGE BELL: This is 9B. Correct? Just  
21 to confirm.

22 MR. RYAN: Yes. I'm sorry.

23 JUDGE BELL: That's okay.

24 MR. RYAN: 9B.

25 Q (BY MR. RYAN) That's an example of unit

1 hydrograph. Right?

2 A Yes.

3 Q So time is plotted on the horizontal axis  
4 here?

5 A That's correct.

6 Q Okay. But on this unit hydrograph on the  
7 vertical axis, it says that that's dimensionless.  
8 Right?

9 A That is correct.

10 Q So a unit hydrograph is not a plot of flow rate  
11 and gallons per minute or cubic feet per second, is it?

12 A In its strict form, no. A unit hydrograph is  
13 used to transform certain units to flow rates, and those  
14 are -- and flow rate can be expressed as volume per  
15 time.

16 Q Well, but a unit hydrograph is not volume over  
17 time, is it?

18 A A unit hydrograph is dimensionless. That's  
19 correct.

20 Q Okay. So to say that it refers to a flow rate  
21 would be incorrect, wouldn't it?

22 A In -- literally, I guess you could say, that,  
23 but it is used to transform rainfall into a flow rate.

24 Q I thought you said a unit hydrograph is  
25 dimensionless.

1 A It is.

2 Q Okay. So it doesn't show flow rate, does it?

3 A It shows a ratio of flow with time to a -- to a  
4 peak flow rate of the unit hydrograph.

5 Q Okay. But the unit hydrograph itself doesn't  
6 show a flow rate. It's dimensionless. Right?

7 A It shows a ratio of a flow rate.

8 Q Okay.

9 A A ratio by necessity is dimensionless.

10 Q Okay. Do you believe that the unit hydrograph  
11 shown in Exhibit 9B should have been used throughout the  
12 modeling that was done for this permit application?

13 A Could you repeat that first couple of words?

14 Q Yeah. Do you believe that the unit hydrograph  
15 shown in Exhibit 9B should have been used throughout the  
16 calculations and modeling that were done for this permit  
17 application?

18 A I don't have any -- I don't believe that this  
19 particular unit hydrograph should have been used. This  
20 is an example of what a unit hydrograph looks like.

21 Different unit hydrographs have different shapes  
22 depending on the watershed characteristics, so I can't  
23 say that this is the one that should have been used.

24 Q Okay. And is that because you don't know  
25 enough about the watershed?

1           A       I didn't conduct an analysis to try to  
2 determine what would be the appropriate unit hydrograph  
3 to use.

4           Q       Okay. So you're not saying that the one that  
5 was used was the appropriate one or that it wasn't the  
6 appropriate one. You just don't know?

7           A       I know that the justifications for using the  
8 one that was specified, the justifications specified  
9 were not clear and didn't specify what was used.

10          Q       So you don't know what unit hydrograph was  
11 used?

12          A       No, I do not.

13          Q       What is a rainfall hydrograph?

14          A       A rainfall hydrograph is the rate of rain that  
15 occurs over a designed storm or a precipitation event.  
16 It's -- you know, inches per minute or inches per hour,  
17 that kind of thing.

18          Q       Showing -- showing rainfall over the duration  
19 of a storm?

20          A       Yes. It would show in separate time  
21 increments. Like if a storm is 24-hours long, how much  
22 rain occurred in the first 5 minutes, how much occurred  
23 in the next 5 minutes, how many inches occurred in each  
24 one of these time increments.

25          Q       Do you see the -- the big blue marker there on

1 the table, and behind you there on that easel is a  
2 drawing pad? Would you draw just a generic rainfall  
3 hydrograph?

4 A (Witness complies).

5 Q Okay. So on the horizontal axis you've got  
6 time, and on the vertical axis you've got rainfall?

7 A That's correct.

8 Q And that would generally be in units of what?

9 A It could be in different units. It's -- time  
10 is time and rainfall would be in length.

11 JUDGE BELL: Sir, could you make sure  
12 you're speaking into the microphone just so everybody  
13 can hear? Thank you.

14 THE WITNESS: Rainfall is like inches.

15 Q (BY MR. RYAN) Okay.

16 A And time is whatever units of time you're  
17 using.

18 Q Okay. Hours, minutes?

19 A Yeah.

20 Q Okay. If you look on -- at your prefiled  
21 testimony on Page 11, up at -- your answer that begins  
22 on Line 2, you're talking about the selection of unit  
23 hydrograph. Right?

24 A That's correct.

25 Q And then you identify certain factors that you

1 believe should be considered in selecting unit  
2 hydrograph. Is that right?

3 A Yes.

4 Q One is the watershed area?

5 A Correct.

6 Q One is the watershed -- sorry -- the watershed  
7 shape?

8 A Yes.

9 Q One is the potential for downstream hazards?

10 A Sure.

11 Q And one is safety considerations?

12 A Yes.

13 Q How -- how do you factor in the potential for  
14 downstream hazards and safety considerations in  
15 selecting a unit hydrograph?

16 A If you do not have downstream safety or hazard  
17 issues, that are pertinent or directly applicable, then  
18 the selection of the unit hydrograph that you're picking  
19 is less critical and you're not quite as concerned as to  
20 what exact peaking factor is used in the unit  
21 hydrograph.

22 If you have a site that has greater  
23 downstream concerns, then you're very concerned about  
24 the peaking factor and the shape of that unit hydrograph  
25 because your result can vary 25, 50 percent based on

1 just the selection of the unit hydrograph.

2 Q I tell you what that sounds like to me. It  
3 sounds like you're saying if you're not concerned about  
4 downstream safety hazards, you can be pretty sloppy in  
5 selecting a unit hydrograph. But if you do, you need to  
6 be pretty careful when you do it. Is that a pretty good  
7 summary of your thoughts on downstream hazards and  
8 safety considerations?

9 A I wouldn't characterize it that way.

10 Q Okay. Well, is it your testimony that if you  
11 don't have downstream hazard and safety considerations,  
12 you don't have to be as careful in selecting your unit  
13 hydrograph?

14 A That's correct.

15 Q So is it your opinion that the appropriate unit  
16 hydrograph to use for a particular analysis -- and let's  
17 say we have two watersheds that are identical in terms  
18 of their area and their shape. If one of them has  
19 downstream safety hazards and safety considerations and  
20 the other one doesn't, are you saying that you would  
21 select different unit hydrographs?

22 A I'm not saying I would necessarily select  
23 different unit hydrographs. I am saying I would take a  
24 lot more effort in analysis and sensitivity of my  
25 assumptions in the case where there's downstream



1 hazards.

2 Q But if you were equally careful in choosing  
3 your unit hydrograph in each of those circumstances, you  
4 would end up choosing the same one?

5 A If you spent the same amount of time and effort  
6 in analyzing it, yeah, you should probably come out with  
7 the same one.

8 Q Okay. Because there's nothing about downstream  
9 hazards or safety considerations that actually change  
10 the appropriateness of the unit hydrograph?

11 A I wouldn't say that. I think that the presence  
12 of downstream safety or hazard necessitates that one be  
13 more conservative in their design and their analysis.

14 Q So if you are evaluating two identical  
15 watersheds, one that had downstream safety  
16 considerations, you would choose a different unit  
17 hydrograph to evaluate that one?

18 A No, I didn't say I'd choose a different one. I  
19 would say I would take a lot more care in that analysis  
20 in the selection and determination of which unit  
21 hydrograph I was using.

22 Q Okay. If you turn to Page 14 of your prefilled  
23 testimony...

24 A (Witness complies).

25 Q Now, beginning, I guess, on Page 13 and

1 continuing over here onto Page 14, you discuss the  
2 appropriateness of using shallow concentrated flow  
3 methodologies in various areas. Right?

4 A Yes.

5 Q And in your answer that begins on Page 10 on  
6 Line 14, you talk about blue lines representing creeks  
7 or channel flow conditions on USGS maps. Right?

8 A Yes.

9 Q And at the end of that answer beginning on Line  
10 13, you say the dashed blue lines in this map upstream  
11 of the landfill site represent intermittent streams and  
12 that the Applicant has improperly treated these areas as  
13 shallow concentrated flow. Right?

14 A Yes.

15 Q So if you'll turn back to Exhibit 9D...

16 MR. RYAN: May I approach, Your Honor?

17 JUDGE BELL: Yes, you may.

18 Q (BY MR. RYAN) So, Mr. Hardin, do I understand  
19 your testimony correctly that you believe that every  
20 channel upstream from the proposed landfill site that is  
21 depicted with a blue line on this topographic map should  
22 be evaluated using open-channel flow methodologies and  
23 not shallow concentrated flow?

24 A No. I would have to go back to the time of  
25 concentration calculations and see where the

1 delineations of the watersheds are, that sort of thing  
2 to figure out which exact ones are, but I couldn't just  
3 categorically say every blue line on this is channel  
4 flow.

5 Q Okay. So some portion of the blue lines. Is  
6 that -- would that be more accurate?

7 A I guess it would be better to say where did the  
8 Applicant assume shallow concentrated flow when they  
9 should have assumed channel flow.

10 I don't know which of these blue lines  
11 exactly it is. I'll have to go back into their time and  
12 concentration calculation.

13 Q Well, do you know that shallow concentrated  
14 flow was used to evaluate any of those areas?

15 A I don't -- I -- I do believe they did, yes.

16 Q Okay. Can you take that yellow highlighter and  
17 mark the areas of -- shown with blue lines here where  
18 the modeling done by Mr. Traw assumes shallow  
19 concentrated flow?

20 A No, I can't do that right now.

21 Q Why not? Because you don't know where that  
22 is?

23 A I don't know where the watersheds are. I don't  
24 know where the time and concentration assumptions are on  
25 these lines and the distances involved. I just remember

1 my analysis of looking at his time and concentration  
2 table and seeing where assumptions of shallow  
3 concentrated flow were along these lengths of these blue  
4 creeks upstream of the run-on portion, if you will, of  
5 the site.

6 Q Okay. But you don't know which portions of  
7 those particular blue lines on here were evaluated using  
8 shallow concentrated flow?

9 A I'm just going by memory, so I don't really  
10 have specifics that I can draw.

11 Q Okay.

12 A But the one on the northwest entering the site  
13 on the very northwest, my memory seems to say that  
14 that -- portions of that one was quantified using  
15 shallow concentrated flow.

16 Q Okay. But you don't know which portions?

17 A Well, starting with the portion -- the permit  
18 boundary or the site boundary, I -- and it goes upstream  
19 from there, but I'm not sure exactly where -- up and  
20 downstream from there it was.

21 Q Okay. Any others?

22 A I think there were a couple of others, but I  
23 can't remember right now.

24 Q Okay. Isn't it true that in order to perform  
25 calculations using open-channel flow methodology, that

1 you have to know the channel geometry?

2 A You have to have a channel geometry that you're  
3 using to conduct the estimation, yes.

4 Q Okay. And that -- what -- what do you need to  
5 know about channel geometry to do that?

6 A The -- the profile of the channel and estimate  
7 of the profile and an estimate of the covered  
8 characteristics of the -- is it rock? Is it trees? You  
9 know, what kind of vegetation or geology is involved  
10 with the channel.

11 Q Okay. And then in terms of channel geometry,  
12 what do you need to know?

13 A Well, you need to know the width and the height  
14 of the channel profile, the channel cross section. And  
15 then you need to know the slope of the channel upstream  
16 to downstream.

17 Q And when you say the width and the height, do  
18 you just need to know those two things, or do you need  
19 to know anything else about the cross-sectional  
20 geometry?

21 A I think that's it.

22 Q Okay. Now, on Page 14 of your prefiled  
23 testimony, Exhibit 9, the portion of your answer between  
24 Lines 3 and Line -- Line 3 and Line 5, you refer to  
25 shallow concentrated flow equations and open-channel

1 flow equations. Right?

2 A Yes.

3 Q And isn't it true that open-channel flow  
4 equations, in order to do those calculations, you use  
5 what's referred to as Manning's equation?

6 A That's the typical way, yes.

7 Q Okay. Well, isn't -- isn't Manning's equation  
8 also used in calculations that assume shallow  
9 concentrated flow?

10 A It can be, yes.

11 Q And isn't that the typical way it's done?

12 A That's correct.

13 Q So what's the difference?

14 A The difference is the factors involved, the  
15 assumption of area, that sort of thing.

16 Q Well, if the calculations for shallow  
17 concentrated flow and open-channel flow both used  
18 Manning's equation, why do you refer here in your  
19 testimony to shallow concentrated flow equations and  
20 open-channel flow equations as two different things?

21 A It's the way it's itemized out in TR-55 of the  
22 reference document.

23 Q Okay. What do you mean itemized out?

24 A In TR-55 it describes open-channel flow and  
25 shallow concentrated flow.

1 Q Well, what -- what's the difference in the  
2 equations that are used for -- for evaluating those two  
3 different conditions. Isn't it the same equation?

4 A It might be the same Manning's equation. There  
5 might be differences in cross sectional area, the  
6 profile of the drainage channel, that sort of thing.

7 Q Okay. But you could have differences in cross  
8 sectional area and profile of the drainage channel in  
9 two places where you're evaluating open-channel flow.  
10 Right?

11 A Right.

12 Q Or in two places where you're evaluating  
13 shallow concentrated flow?

14 A That's correct.

15 Q So that's not a difference between channel  
16 concentrated flow evaluation and open-channel flow  
17 evaluation, is it? I mean, that depends on -- on the  
18 geometry of where you are, not which method you're  
19 evaluating. Right?

20 A The geometry is important, that's correct.

21 Q Okay. But they both use geometry.

22 A Yes, they do.

23 Q And they both use Manning's equation?

24 A Yes, they do.

25 Q So when you talk about how the Applicant used

1 shallow concentrated flow equations rather than  
2 open-channel flow equations, aren't those the same  
3 equations?

4 A Well, it's reported in the application that  
5 it's just all used shallow concentrated flow, and the  
6 application also says that it uses TR-55 as a reference  
7 document for its assumptions, and TR-55 says use  
8 open-channel distinctions when you have blue lines on  
9 the topographic map. And they have not itemized it out  
10 in different segments between shallow concentrated flow  
11 and open-channel flow.

12 Q Okay. But the equations that are used to  
13 evaluate both of those two conditions are the same  
14 equations, right, Manning's equation?

15 A Yeah. I'd like to turn to this page so I can  
16 answer your question.

17 Q Sure.

18 A Okay. We misspoke earlier that the  
19 calculations were shallow concentrated flow are Equation  
20 3-1 on Page 29 of Exhibit 9-C.

21 Q Which equation?

22 A Equation 3-1.

23 Q Well, that's a travel time calculation. Right?

24 A That's how you calculate time and concentration  
25 is the travel time through the watershed.



1 Q Well, but isn't the point of the exercise in  
2 running the calculation for either shallow concentrated  
3 flow or open-channel flow, isn't the point of that  
4 exercise to determine a velocity?

5 A That's correct.

6 Q Okay. And that would be -- in this Equation  
7 3-1, that would be the velocity that's used in the  
8 denominator there?

9 A Well, the point of the calculation is to  
10 calculate a certain amount of time which is distance and  
11 velocity.

12 Q Okay. But to get there, you have to first  
13 calculate velocities. Right?

14 A That's correct.

15 Q And that's what you use Manning's equation for.  
16 Right?

17 A Not in the shallow concentrated flow case.  
18 That's not correct.

19 Q Okay. Manning's equation is not used in  
20 evaluating shallow concentrated flow. Is that your  
21 testimony?

22 A It says -- the TR-55 says, "For slopes less  
23 than 0.005, use equations in Appendix F for Figure 3-1."

24 Q Okay.

25 A And for other ones, you can use the graph on

1 Page 30.

2 Q Okay. Figure 3-1?

3 A Yes.

4 Q And that's Page 30 of Exhibit 9-C?

5 A That's correct.

6 Q Well, isn't -- doesn't that graph, doesn't it  
7 graph two -- two equations that are based on Manning's  
8 equation?

9 A Well, it has an assumption of roughness here  
10 that may not be applicable in the open-channel case. If  
11 this graph was calculated using the Manning's equation,  
12 there's assumptions of a friction factor as being  
13 applied, and that friction factor in an open-channel  
14 calculation is likely different than the shallow  
15 concentrated flow.

16 Q Okay. But -- but Figure 3-1 is a chart from  
17 which you can select points to use for input data that  
18 will get you velocities. Right?

19 A Yes.

20 Q And isn't it true that Figure 3-1 is based on  
21 Manning's equation?

22 A I'm not sure if Figure 3-1 is or not. I  
23 presume it is.

24 Q Okay. If it is, then isn't it also true that  
25 for both shallow concentrated flow and open-channel

1 flow, the equation that's used to determine velocity is  
2 Manning's equation?

3 A That's correct. And Figure 3-1 doesn't  
4 consider variations in the friction factor which the  
5 open-channel flow calculations would.

6 Q Okay. Would you characterize the part of  
7 Caldwell County where this landfill is proposed to be  
8 located as a coastal area?

9 A No, I would not.

10 Q Do you know what TxDOT recommends as the  
11 appropriate storm to use in designing frontage roads?

12 A No, I do not.

13 Q Do you know if it's the 100-year storm or  
14 something less than that?

15 A I -- I don't know.

16 Q Okay. Do you know if the floodplain modeling  
17 that was done for the permit application considers the  
18 effect of the detention ponds that are proposed to be  
19 constructed and that would store water coming off of the  
20 landfill area?

21 A Yes. I believe that it does.

22 MR. RYAN: I'll pass the witness.

23 JUDGE BELL: All right. Thank you.

24 Redirect for Mr. Hardin?

25 MR. ALLMON: Yes.

## 1 REDIRECT EXAMINATION

2 BY MR. ALLMON:

3 Q You were asked several questions regarding the  
4 different use of shallow concentrated flow and  
5 open-channel flow. Conceptually, does water move more  
6 quickly with shallow concentrated -- does water move  
7 more quickly with open-channel flow than with shallow  
8 concentrated flow?

9 A Yes. There's less friction.

10 Q And generally, why would there be less  
11 friction?

12 A If you think about the contact of the water  
13 with the surface that it's flowing on, that plain -- you  
14 know, that interface right there is where the friction  
15 is developed. And with shallow concentrated flow, it  
16 has a -- a greater area in contact with friction than it  
17 does in the depth of the water that is just flowing  
18 across -- like unfrictioned or less turbulent in just  
19 the water portion of it.

20 So when you're flowing with -- as water  
21 transgresses from these tiny flows that are just a cross  
22 sheet flow that's the slowest movement. As you get into  
23 shallow concentrated flow, it starts speeding up a  
24 little bit. Then in the open-channel flow, it flows the  
25 fastest.

1 Q And to step back, we've been talking about time  
2 of concentration. How is time of concentration defined  
3 hydrologically?

4 A It's the time that it takes the most distant  
5 but -- be careful with that word, but I'll come back to  
6 it in a second. It's the time it takes for the most  
7 distant point of the watershed to contribute outflow at  
8 the watershed outlet --

9 THE REPORTER: I'm sorry. The watershed?

10 THE WITNESS: Outlet. It's not  
11 necessarily, though, the lateral distance that's the  
12 longest because we're getting into velocities of flow.  
13 So it's the -- it's the longest, considering the flow  
14 times in all portions of the watershed.

15 Q (BY MR. ALLMON) And why is it that our time of  
16 concentration is important, say, for the calculation of  
17 peak flows?

18 A Because peak flows vary almost linearly with  
19 time of concentration. If the time of concentration  
20 decreases, the peak flow will decrease accordingly. And  
21 in doing that, you're going to have lower flood levels,  
22 smaller ponds, that sort of thing.

23 Q And to be clear, as time of concentration  
24 increases, does peak flow increase?

25 A Yes. It's a linear relationship between -- you

1 said time and concentration increases -- that would  
2 decrease the peak flow.

3 Q Okay. And now if we treat -- well, does your  
4 critique of the different characterization of shallow  
5 concentration flow versus open channels, based in part  
6 on some of this guidance in TR-55?

7 A It's -- it's based on that the Applicant said  
8 they utilized TR-55 as their justification for their  
9 assumptions and the descriptions in TR-55 for  
10 calculating time and concentration.

11 Q Do you have TR-55 there in front of you?

12 A Yes, I do.

13 Q Is shallow concentrated flow -- well, could you  
14 turn with me -- and that's Protestants' Exhibit 9C?  
15 Could you turn with me to Page 31 of that exhibit?

16 A Yes.

17 Q Do you see where open channels -- there's a  
18 heading in the lower right-hand corner there?

19 A Yes.

20 Q Does that address the proper assumption for,  
21 I'll, say, blue lines on the USGS map?

22 A Yes. That's what it says.

23 Q And what does that say -- what type of water  
24 body does that say should be assumed if you have -- on  
25 this upper blue line the USGS map?

1           A       It's a stream.

2           Q       Well, with regard to calling a shallow  
3 concentrated flow versus an open channel, what does this  
4 guidance say should be -- that a blue line should be  
5 treated?

6           A       Open channel.

7           Q       And did the Applicant treat all blue lines as  
8 open channels?

9           A       I don't believe they did, no.

10          Q       So in that way, their calculations were  
11 inconsistent with this guidance?

12          A       That's correct.

13          Q       There was discussion of Manning's equation.  
14 And I think what I understood you to say, there would be  
15 different amounts of friction if you have shallow  
16 concentrated flow versus open-channel flow?

17          A       That's correct.

18          Q       Is that friction an input in the Manning's  
19 equation?

20          A       Yes, it is.

21          Q       So in a sense, if we've assumed shallow  
22 concentrated flow, we're using a different assumption  
23 going into the equation than if we use open-channel  
24 flow?

25          A       That is correct.

1 Q So in that sense, they would be two different  
2 equations?

3 A Two different results of calculation, yes.

4 Q With two different assumptions; one assumption  
5 that we use one, and another one that uses another?

6 A That is correct.

7 Q You were asked whether this is a coastal  
8 environment. Now you're looking at this from a  
9 hydraulic viewpoint. Is that correct?

10 A Yes, I am.

11 Q So you not making any type of geologic comment?  
12 You're not a geologist?

13 A If I use the word hydrologic, I say okay.

14 Q You're not a geologist?

15 A That's correct.

16 Q So you're not making a geological judgment?

17 A That's correct.

18 Q And quickly, if you could look at the  
19 hydrograph behind you that you drew conceptually, is  
20 that a cumulative hydrograph?

21 A Yes, it is.

22 Q Could you explain what cumulative means?

23 A It just means over the course of the rainfall  
24 event, we're going to express our total rainfall in a  
25 cumulative fashion versus a discrete rainfall hydrograph



1 that just shows the amount of rain during each time  
2 interval but independent of all the other time  
3 intervals.

4 Q So if we were to draw a hydrograph just with  
5 the amount of rain falling at any particular point in  
6 time, it might be more of a bell curve?

7 A That's correct.

8 Q And you were asked questions regarding the  
9 unitless nature of a hydrograph. Is a hydrograph  
10 essentially a convergent factor?

11 A Would you repeat that? I'm sorry.

12 Q You had some questions on the unitless  
13 nature of a hydrograph. Is a hydrograph essentially a  
14 conversion factor?

15 A You say is a unit hydrograph a conversion  
16 factor?

17 Q Yeah.

18 A A unit hydrograph is used to convert rainfall  
19 to runoff, so it is a converting tool.

20 Q So when we use -- our input is essentially a  
21 flow over time. Correct?

22 A I'm sorry.

23 Q What units are we using for the input?

24 A It -- it is rainfall, which are units of inches  
25 per a time interval.

1 Q And is that a volume over time, in essence?

2 A It's a volume in a time increment, yeah.

3 Q Because of the -- kind of our context, an inch  
4 isn't a measurement of length, it's a measurement  
5 effectively of volume?

6 A That is correct.

7 Q And so if we have a volume over time and then  
8 we apply something that's unitless, do we then get still  
9 a volume over time?

10 A Yes, we do.

11 Q So our units are still appropriate?

12 A Well, we're trying to calculate flow rate,  
13 which is volume over time.

14 Q And we've got an input of volume over time, and  
15 we've got a result of volume over time?

16 A That is correct.

17 Q And in that way, it's appropriate for a unit  
18 hydrograph to be unitless?

19 A That's just its -- an ordinance, yes.

20 Q It's a tool that we use?

21 A That's correct.

22 Q Could you turn with me to Exhibit -- the --  
23 well, you looked in the Applicant's application,  
24 Exhibit 130EP-2, Page 79?

25 A Yes.

1 Q And the first -- you were asked some questions  
2 regarding this from the Executive Director. Do you  
3 recall?

4 A Yes, I do.

5 Q Is the first -- the first table listed here,  
6 what does it set forth?

7 A It's for the existing and post-developed peak  
8 discharge rates.

9 Q And could the time of concentration impact  
10 this, these numbers?

11 A It would, yes.

12 Q How could it impact these numbers?

13 A Having a calculation that is longer -- a longer  
14 time concentration would result in a lower peak flow  
15 rate.

16 Q And you were asked questions regarding whether  
17 you knew what unit hydrograph the Applicant used. Did  
18 the Applicant ever provide or identify the unit  
19 hydrograph that was used?

20 A No, they didn't.

21 Q Did the TCEQ rules require that an Applicant  
22 provide the justification for its assumptions?

23 A Yes, they did.

24 Q But the Applicant never provided that  
25 assumption?

1 A It --

2 Q Is a unit hydrograph one of the assumptions  
3 that goes into your drainage calculations?

4 A It's one of the most important.

5 Q And that assumption wasn't -- that particular  
6 assumption used for that factor was not provided?

7 A That is correct.

8 MR. ALLMON: Your Honor, could I have just  
9 a minute?

10 JUDGE BELL: Yes.

11 Q (BY MR. ALLMON) Do you know whether the  
12 Applicant did two analysis, one with shorter reaches of  
13 shallow concentrated flow versus one with longer  
14 reaches?

15 A I'm not sure of the question right now.

16 Q Was there material submitted to Caldwell County  
17 in this case?

18 A I -- if there was, I'm not aware of it.

19 Q Okay. Would the velocity of discharge change  
20 depending on the unit hydrograph used?

21 A Yes, it could.

22 Q Now, in -- the Executive Director walked  
23 through three issues, one with the unit hydrograph, one  
24 with the peaking factor and one with the time of  
25 concentration as your critiques.

1                   Now, did you also express concern  
2 regarding the relationship of this discharge to the  
3 downstream reservoir?

4           A       He didn't ask specifically about that, but I do  
5 have a concern about that, yes.

6           Q       And so that's a separate concern from those  
7 three?

8           A       It's -- it's related to the runoff analysis,  
9 but the concern itself is unique.

10          Q       And you were asked questions regarding the  
11 selection of the unit hydrograph depending on that type  
12 of downstream circumstance. Do you recall that?

13          A       Yes.

14          Q       Earlier in this hearing you may not have been  
15 present, but there was a discussion of safety factors.  
16 What's a safety factor?

17          A       A safety factor is a relationship between -- I  
18 use two terms -- loading and capacity, and we have a --  
19 an input or a stress, and then we have a capacity to  
20 handle or withstand or accept that stress, so it's the  
21 relationship of capacity and loading.

22          Q       And I -- and that's kind of our geotechnical  
23 look at it. As a bigger picture concept, what is a  
24 safety factor?

25          A       Well, that --

1 Q If we have a safety factor of 1.0, are we right  
2 on the edge of having a problem?

3 A Yes, very much so.

4 Q And if we have a safety factor of 1.5, have we  
5 added some conservativeness to our evaluation?

6 A Absolutely.

7 Q And as you discuss the selection of a unit  
8 hydrograph and the care with which you do that, is that  
9 essentially a -- similar to the use of a safety factor?

10 A Absolutely.

11 MR. ALLMON: Your Honor, that's all my  
12 questions. I pass the witness.

13 JUDGE BELL: Thank you.

14 Any recross from Plum Creek?

15 MR. WILSON: No, Your Honor.

16 JUDGE BELL: How about Caldwell County?

17 MR. MAGEE: No, Your Honor.

18 JUDGE BELL: OPIC?

19 MR. TUCKER: No, Your Honor.

20 JUDGE BELL: Executive Director?

21 MR. TATU: No questions.

22 JUDGE BELL: And 130EP?

23 MR. RYAN: Yes. Thank you, Your Honor.

24 May I approach to pull out a couple  
25 earlier exhibits?

1 JUDGE BELL: Yes.

2 RECROSS-EXAMINATION

3 BY MR. RYAN:

4 Q Mr. Hardin, do you have what have been marked  
5 as Exhibits 130EP-24 and 25?

6 A Yes.

7 JUDGE QUALTROUGH: Okay. What volume is  
8 that in?

9 MR. RYAN: Oh, it's one of our new  
10 exhibits, one of our hearing exhibits.

11 MR. ALLMON: Your Honor, on that note, I  
12 asked no questions regarding the floodplain, and these  
13 are floodplain depictions. I'm going to object to  
14 floodplain questions.

15 MR. RYAN: I'm going to tie this to the  
16 shallow concentrated flow discussion, and he did ask him  
17 if Caldwell County had asked to have any modeling run  
18 with different shallow concentrated flow lengths.

19 JUDGE BELL: I recall that.

20 JUDGE QUALTROUGH: He said he didn't know.  
21 Let's look at the map.

22 JUDGE BELL: Yeah. Hold on. Let's hear  
23 the question first. Give me one second.

24 (Pause in proceedings)

25 JUDGE BELL: All right. Go ahead.

1 Q (BY MR. RYAN) Mr. Hardin, if I understand your  
2 testimony correctly, that in your opinion, use of  
3 various shallow concentrated flow lengths could affect  
4 floodplain delineation?

5 A Yes, it could.

6 Q And are you aware that Tracy Bratton, a witness  
7 for Caldwell County in this case, has expressed  
8 criticism similar to yours related to shallow  
9 concentrated flow lengths that were used in the modeling  
10 for the -- for this municipal solid waste permit  
11 application?

12 A Yes, I'm aware of that.

13 Q Are you also aware of the fact that Mr. Bratton  
14 or someone in his office requested that revised  
15 floodplain modeling be done that used shorter, shallow  
16 concentrated flow lengths?

17 A No, I'm not aware of that.

18 Q Would you agree that the floodplains delineated  
19 on Exhibit EP130-24 and 25, differ very little, if at  
20 all?

21 A I mean, I -- visually, I would say they don't  
22 differ, but I would have to get into the details of  
23 analyzing each one at different points and different  
24 items of consideration to reach a conclusion whether or  
25 not they differ or not.



1 Q Okay. And in particular, isn't it true that  
2 the area identified as the landfill footprint on both of  
3 those exhibits is outside of the area shown as the  
4 floodplain?

5 A Yes, it is.

6 MR. RYAN: I'll pass the witness.

7 JUDGE BELL: All right. Thank you.

8 Any redirect?

9 MR. ALLMON: No redirect.

10 JUDGE BELL: Thank you, Mr. Hardin. We  
11 appreciate your time.

12 Are Protestants ready to call their next  
13 witness?

14 MS. PERALES: I am, and, Your Honors, I'm  
15 going to have a few replacement pages for the exhibits,  
16 so I'll hand those out now.

17 JUDGE BELL: All right. We can go off the  
18 record.

19 (Recess: 10:21 a.m. to 10:44 a.m.)

20 JUDGE BELL: We are back on the record  
21 after a short morning break.

22 I understand, Ms. Perales, you are ready  
23 to call your next witness?

24 MS. PERALES: That's right, our next  
25 witness for TJFA and EPICC is Michael Rubinov.

1 (Witness Rubinov sworn)

2 JUDGE BELL: All right. Thank you.

3 Mr. Rubinov, would you raise your right  
4 hand, please?

5 MICHAEL RUBINOV,  
6 having been first duly sworn, testified as follows:

7 DIRECT EXAMINATION

8 BY MS. PERALES:

9 Q Good morning, Mr. Rubinov.

10 A Good morning.

11 Q So in front of you, you should have a binder  
12 that includes Protestants' exhibits, and in particular  
13 Protestants' Exhibit 6. Do you see that?

14 A Yes.

15 Q Can you speak into the microphone?

16 A Yes.

17 Q Okay. Can you flip through Protestants'  
18 Exhibit 6 and see if you recognize this as your prefilled  
19 testimony?

20 A Yes. That's correct.

21 Q Do you have some changes you need to make to  
22 the prefilled testimony?

23 A I do have some changes.

24 Q Okay. Let's start with the index of exhibits  
25 on Page 2.

1 A Yes.

2 Q Are there any changes you need to make there?

3 A I believe I need to change the date on  
4 Exhibit 6B.

5 Q Okay.

6 A I'm not exactly sure how to proceed because  
7 we've got new exhibits here.

8 Q Well, the prefiled testimony is not going to be  
9 replaced. So you can make changes with a pen onto the  
10 prefiled testimony.

11 A Okay. So that should actually state the date  
12 for boring logs instead of February 24th through 26th,  
13 2016, I believe that should be June 24th.

14 Q Do you have a pen up there with you? Can you  
15 make the change onto that document?

16 A (Witness complies).

17 Q And then can you turn to Page 4 of your  
18 prefiled testimony?

19 A Yes.

20 Q And look at Line 11.

21 A Yes. The word "filed" should actually be  
22 "field."

23 Q Okay. Can you -- can you cross the word  
24 "filed" out and replace that with "field"?

25 A (Witness complies).

1 Q Line 14 "cross-section layout," should that be  
2 a plural?

3 A Yes.

4 Q So it should say "cross-section layouts?" Is  
5 that right?

6 A That's correct.

7 Q And then on Page 7, Line 16.

8 A Yes. Tactically should actually read  
9 tactilely.

10 Q Can you spell that for us?

11 A Sure. It's T-A-T-I-L-E-L-Y.

12 Q Is it T-A-C-T-I-L?

13 A Yes. T-A-C-T-I-L-E-L-Y.

14 Q Okay. On Page 8, Line 15, it looks like  
15 there's a verb missing there.

16 A Yes. That should say it is also.

17 Q Page 12, Line 17, there's another --

18 A Yes. Again, that tactically should be  
19 tactilely.

20 Q Tactilely. I think that was an auto correct.  
21 And then there's -- on page 21 --

22 A Yes.

23 Q -- Line 5 --

24 A "45 to 50" should read "40 to 45."

25 Q Were you here for Dr. Ross' testimony.

1 Yesterday?

2 A I was.

3 Q So does this correspond to the change that she  
4 made, as far as you understand?

5 A Yes.

6 Q Okay. Then attached to your exhibit -- or  
7 attached to your prefiled testimony, you have a number  
8 of exhibits.

9 And let's start with Exhibit 6B. So there  
10 should be a replacement page in front of you that's been  
11 marked 6B.

12 A Yes.

13 Q Can you describe what the differences are  
14 between what's in the binder and the new one that's been  
15 marked?

16 A Yes. There's three changes.

17 Q What -- are you on 6B?

18 A Oh, I'm sorry. I'm on 6D. Okay. I'm on 6B.

19 Q Okay.

20 A I have included my signature and my seal.

21 Q Okay. And does the new 6B also have margins  
22 that extend a little bit farther?

23 A Yes.

24 Q Okay. Then you should have 6D, a replacement  
25 page for 6D?

1           A       Yes.

2                   MS. PERALES:  And first let me just note  
3 for the parties and for the ALJs that the replacement  
4 pages for 6D will have to be replaced yet again because  
5 the margin cut off on the logs on the replacement pages  
6 so it's not showing the entire -- the entire  
7 spreadsheet.

8           Q       (BY MS. PERALES)  But there are also changes  
9 that you've made.  Is that right?

10          A       Yes.

11          Q       Okay.  And what changes have you made to 6D?

12          A       I've included a cover page with my signature  
13 and my seal.

14          Q       Okay.

15          A       Furthermore, I've made two changes --

16          Q       Okay.

17          A       -- to the logs.  If you turn to Page 9 of  
18 Exhibit 6B and in the integral 40 to 46.5, the last line  
19 now reads "40 to 45" where it originally read "45 to  
20 50."

21          Q       What page was that again?

22          A       This was Page 9.

23          Q       So the Page 9 on the replacement page is a  
24 little bit different from --

25          A       Oh, I'm sorry.

1 Q That should correspond to Page 8. Is that  
2 right?

3 A Yes.

4 Q Because you added a page with your signature?

5 A Right. Right.

6 Q Okay. So what was Page 8 is now Page 9.  
7 Right?

8 A Correct.

9 Q And that's where you've made the change?

10 A Yes.

11 Q Okay. Is --

12 MS. PERALES: Do I need to go over that  
13 again?

14 JUDGE QUALTROUGH: Did the pagination  
15 change because you added a cover page?

16 MS. PERALES: Because we added a cover  
17 page.

18 JUDGE QUALTROUGH: Okay. So on -- on the  
19 replacement pages, where's the change?

20 MS. PERALES: So if we compare Page 9 of  
21 the replacement pages --

22 JUDGE QUALTROUGH: Eight of the old --

23 MS. PERALES: Correct.

24 JUDGE QUALTROUGH: All right.

25 Q (BY MS. PERALES) And then do you want to go

1 over that one more time, the change that you made?

2 A Sure. So in my original prefiled, on Page 8,  
3 an interregal 40 to 46.5 the last line reads "abundant  
4 throughout 45 to 50," whereas that should read  
5 "throughout 40 to 45."

6 Q Okay. And then you said there were two  
7 changes?

8 A Yes. The next change is on Page 10 of the  
9 original prefiled, Page 11 of the new exhibit.

10 Q Okay.

11 A In interval 4.3 to 35, I've added the word  
12 "silty" in front of the word "fat clay" in the first  
13 line where you see "silty lean clay to fat clay," should  
14 now read "silty lean clay to silty fat clay."

15 Q Okay. And so when you say that you've done  
16 that, you've added the silty to the fat -- done that  
17 throughout that particular log. Is that right?

18 A On that -- that is the -- that is the one word  
19 that I added.

20 Q Okay. Any other changes to 6D?

21 A No.

22 Q What change have you made, if any, to 6B?

23 A I have included my seal and signature.

24 Q Okay. Any other changes?

25 A There may be some bolder lines. That's about



1 it.

2 Q And no substantive changes?

3 A No.

4 Q Okay. And take a look at 6G.

5 A Yes.

6 Q Have you made any changes to 6G?

7 A I've also added my signature and seal.

8 Q Okay. And no substantive changes?

9 A No.

10 Q If I were to ask you the questions that are  
11 included in Exhibit 6 to your prefiled testimony here  
12 today, would your responses be the same as you provided  
13 in -- in your prefiled?

14 A Yes, they would be.

15 MS. PERALES: At this time, Your Honor, I  
16 would offer Protestants' Exhibit 6 with the corrections  
17 to the prefiled, then Protestants' Exhibit 6A,  
18 replacement 6B, 6C, replacement 6C, replacement 6E, 6F,  
19 and replacement 6G.

20 JUDGE BELL: All right. Any objections to  
21 any of those exhibits?

22 MR. RYAN: Your Honor, I don't think I  
23 have -- I didn't get a copy of that last one, whatever  
24 it was.

25 MS. PERALES: 6G?

1 MALE SPEAKER: I got two by accident.

2 MS. PERALES: Okay.

3 MR. RYAN: No objection.

4 JUDGE BELL: All right. Thank you.

5 Protestants' Exhibit 6 and 6A through 6G with the  
6 changes made by Mr. Rubinov are admitted.

7 (Exhibit Protestants Nos. 6 and 6A through  
8 6G admitted)

9 MS. PERALES: One other thing, 6F, those  
10 are offered in photos, but the originals of what's  
11 depicted in the photos are here today for observation,  
12 and, I guess, for the demonstrative evidence.

13 JUDGE BELL: All right.

14 MS. PERALES: And I'll pass the witness.

15 JUDGE QUALTROUGH: Just real quick, are  
16 you going to get us the new Exhibit 6D?

17 MS. PERALES: It should be on its way.

18 JUDGE QUALTROUGH: Okay. All right.

19 JUDGE BELL: Thank you.

20 Any cross-examination for Mr. Rubinov from  
21 Plum Creek?

22 MR. WILSON: No, Your Honor.

23 JUDGE BELL: All right. How about from  
24 Caldwell County?

25 MR. MAGEE: I have a few questions.

1 JUDGE BELL: All right.

2 CROSS-EXAMINATION

3 BY MR. MAGEE:

4 Q Mr. Rubinov, can you find the Applicant's  
5 Exhibit 5? It's a white notebook that looks like this.

6 A Volume 5?

7 Q Yes.

8 JUDGE QUALTROUGH: Is it Volume 5 or  
9 Exhibit 5?

10 MR. MAGEE: It's Volume 5, but I believe  
11 it's Exhibit 6.

12 Well, hold on for just a second. I have  
13 the wrong binder. It's Volume 4.

14 JUDGE BELL: Exhibit 5.

15 MR. MAGEE: Yes. Thank you. I think I've  
16 done that the whole hearing. I got the numbers wrong.

17 Q (BY MR. MAGEE) First, I wanted to ask you some  
18 questions about your prefiled. Then we're going to move  
19 on to Exhibit 4. On page 16 of your prefiled,  
20 Protestants' Exhibit 6 --

21 A Okay.

22 Q -- the very beginning, it says that part of  
23 your opinion is that the application presents an  
24 inadequate and inaccurate characterization of subsurface  
25 geology, an overall simplistic characterization. And

1 then when you go down to Lines 5 and 6, it says the  
2 application identifies the sediment underneath the site  
3 consisting solely of silty flat -- fat clay in  
4 Stratum 1, and then we go on.

5 A Yes.

6 Q So if you look at -- I don't know if you were  
7 here when I questioned Mr. Adams, but I think we were  
8 referring to 130EP-4, Page 176.

9 A Okay.

10 Q And I think this was an exhibit that he showed  
11 us that was a summary of all the lab samples that they  
12 took. And so I think it summarizes all the pages that  
13 continue on through all the boring logs that also  
14 included the samples after it. And there's -- there was  
15 a bunch of those that we went through. So when you look  
16 at the left-hand column on 176 and 177, that shows you  
17 the stratum that you're looking at, right, one, two, and  
18 three?

19 A Yes.

20 Q And then the next column is CH. Right?

21 A Correct. Well, the next column is the -- the  
22 classification.

23 Q Okay. The USCS?

24 A Right.

25 Q What does that mean?

1 A Unified Soil Classification System.

2 Q And all of the samples that were taken showed  
3 CH. Correct?

4 A Yes. That's what it appears to be.

5 Q If you can just look on Page 76 and 77.

6 A Yes.

7 Q 176 and 177.

8 A (Witness complies).

9 Q And that's what you're referring to here in  
10 Lines 5 and 6 where it says that the site that they  
11 identify consisting solely of the silty fat clay.  
12 Right?

13 A And also the boring logs.

14 Q Right. And those were the ones -- I think we  
15 looked at -- we spent a lot of time going over those.  
16 And I think they began on Page EP-4, Page 51 and  
17 continued all the way through page 149. Actually, I may  
18 have misspoke because some of those are piezometers. So  
19 I think the boring logs are EP-4, 51 through EP-4, Page  
20 126.

21 A Okay. Yes. That looks correct.

22 Q And then I think you continue on your prefiled  
23 testimony on Page 16, looking at Lines 9 through 12, it  
24 says that the Applicant's and Protestants' settlement  
25 samples from the 2016 field investigation show the

1 presence of lean clays, which you indicate as CL.

2 Right?

3 A Yes.

4 Q And then silts as ML; and fat clays, CH; clay  
5 sands, SC; as well as gravel, gravels intermixed with  
6 clay, which you indicate as GC; sandstone and siltstone  
7 in the subsurface?

8 A Yes.

9 Q Okay. So then if we looked back to EP-4,  
10 Page 176, this portion of the application would actually  
11 look somewhat different now because we have laboratory  
12 results that show different things, right, other than  
13 CH?

14 A They would include -- if they included the  
15 laboratory analyses from 2016, yes.

16 Q And the same thing on those boring logs that we  
17 were looking at at EP-4, 51 through 126, the ones that  
18 had lab results on them -- like, for example, I think we  
19 talked about one during Mr. Adams' testimony, it was on  
20 EP-4, Page 123.

21 A Yeah. That's right.

22 Q And there was a lab sample out there that would  
23 have indicated it could have been CL instead of CH.

24 A Yes. The -- the liquid limit is below 50,  
25 which would classify it as a CL.

1 Q Okay. So you observed something different than  
2 these boring logs indicated in the application during  
3 the Applicant's and Protestants' 2016 borings. Right?

4 A The lab results and -- and some of my  
5 observations show the materials that were not  
6 exclusively fat clays.

7 Q And when you say "your observations," were you  
8 actually on site during the 2016 --

9 A I was.

10 Q Drilling and boring samples?

11 A I was on site for a majority of the Applicant's  
12 borings and for all of the Protestants' borings.

13 Q And tell me about that process. What -- what  
14 does that mean you were "on site" during this drilling?  
15 Is there a certain type -- what's the process there?

16 A For the Applicant's borings, I was there as an  
17 observer. I took notes of operations. I took some  
18 notes of -- of the -- the geology, but just only what I  
19 could see because I was not allowed to actually touch  
20 the samples.

21 For the Protestants' borings, I was there  
22 as the geologic logger as well as an observer, so I  
23 logged the geologic samples in the field. I was there  
24 during the borings, and I was the one who created the  
25 boring logs.

1 Q Do you indicate the type of like drilling  
2 methods that's occurring at the site when you're there  
3 observing this?

4 A Yes. I try to -- during our borings, my boring  
5 logs indicate our drilling methods. I took notes on the  
6 Protestants' drilling methods -- I'm sorry -- the  
7 Applicant's drilling methods.

8 Q When you say "drilling methods," what does that  
9 mean?

10 A Well, I'm referring to the general procedures  
11 and also the sampling methods, the way that the sediment  
12 material is sampled where -- I guess collected in the  
13 subsurface and brought to the surface.

14 Q Can you describe for us those methods that were  
15 used by the Applicant?

16 A I believe the -- the Applicant used  
17 predominately the Shelby tube method. That involves  
18 pushing a thin-walled Shelby tube into the subsurface  
19 about two feet, recovering the sample, bringing it up to  
20 the surface, pushing -- extruding that sample out of  
21 that thin-walled tube and then cleaning out the whole  
22 pod that's reaming down to the next sample interval,  
23 which is typically directly below the -- the sample that  
24 you're looking for -- and then continuing on with the  
25 Shelby tubes.



1 Q I don't know if you were there the other day,  
2 but somebody asked a question of one of the experts or  
3 one of the witnesses in this case about somebody losing  
4 circulation or something like that?

5 A Yes.

6 Q Were you present during a loss of circulation?

7 A I was. Yes.

8 Q What does that mean?

9 A At a certain point during the drilling process,  
10 when it's no longer possible to drill without using  
11 fluids, fluid is introduced into the bore hole. They've  
12 got a trough and fluid kind of flows in there. I'm  
13 sorry -- the fluid is kind of circulated through pipes  
14 and the drill pipes down into the hole, and then it's  
15 pushed out in the annulus of that hole as the drilling  
16 commences down that hole.

17 And during the loss of circulation,  
18 typically what happens is there is -- there's a kind of  
19 break in the flow and the water is evacuated. In this  
20 case the water was evacuated down the hole in the  
21 subsurface, and that's -- that's essentially what loss  
22 of circulation is.

23 Q I just want to make sure I'm giving the right  
24 visual. So you're adding water down there to continue  
25 this drilling process?

1 A Right.

2 Q And then the drilling process somehow ceased at  
3 one point or stopped. Right?

4 A The water that's used in the drilling process.

5 Q Okay.

6 A It evacuated into -- into the subsurface at, I  
7 think, if I recall correctly, a depth of maybe 30 feet,  
8 although I'd have to look back at my notes.

9 Q So the water that was being used to aid in that  
10 drilling process just disappeared or went somewhere  
11 else?

12 A Right. It disappeared into the subsurface.

13 Q Okay. Do you know who Mr. Snyder is?

14 A I am familiar with Mr. Snyder, yes.

15 Q Was he present during your observations of the  
16 Applicant's drilling?

17 A I don't believe he was. I'm sorry -- could you  
18 repeat that question?

19 Q Yeah. When you were observing the Applicant's  
20 drilling process, was he present?

21 A He was present for part of the time.

22 Q Okay. And what about during the Protestants'  
23 drilling process?

24 A Also he was there for part of the time.

25 Q Okay. Do you know Mr. Adams?

1 A Yes.

2 Q And was he present?

3 A He was present during certain times.

4 Q When Mr. Adams wasn't present, was Mr. Snyder  
5 present or were there times when neither one of them  
6 were present?

7 A There was -- there was times that neither one  
8 of them were present.

9 Q Okay. If you would look at Page 21 of your  
10 prefiled Protestants' Exhibit 6, Page 21 --

11 A I'm there.

12 Q -- at Line 5, you made a correction there, and  
13 it now reads, "Abundant gypsum fissures were observed  
14 between 40 and 45 feet below ground level at this site  
15 indicating a possible presence of a fault plain  
16 exemplified by abundant fractures."

17 Did I read that correctly?

18 A Yes.

19 Q And I think we heard some testimony yesterday  
20 from Dr. Ross about what a fracture is and what a  
21 fissure is. Can you help me out with that again? A  
22 fracture is a what?

23 A A fracture is the plain -- the plain of, I  
24 guess, movement. A fissure material is a material, I  
25 believe, that -- the definition is that leaves

1 fractures. In here, fissures -- I use fissures as a way  
2 to describe cracks essentially that are typically filled  
3 with some kind of mineral deposit or some kind of  
4 deposit.

5 Q And --

6 A And they're typically -- I think I should say  
7 that they're typically -- they are secondary features  
8 like Dr. Lauren described where they are -- they're  
9 formed after initial deposit.

10 Q And so are these the types of secondary  
11 features that you would anticipate that movement -- like  
12 that water loss would be moving through as a  
13 possibility?

14 A That's one possibility that water is lost  
15 through these fractures.

16 Q And what's another possibility?

17 A Another possibility -- and it's connected -- I  
18 know I say that in my testimony -- that there may be a  
19 larger pour space, like a fault horizon where there's a  
20 significant offset in the materials creating large pour  
21 space for that water to move through. That is just  
22 indicated to me from that loss of circulation and the  
23 other pieces of evidence that I had.

24 Q So we've talked about these different types of  
25 materials that are sampled at different depths through

1 these borings. And then I think we've heard a lot of  
2 testimony about the different possible formations, like  
3 the Wilcox, the Carrizo, the Midway, those types of  
4 things.

5 Do you have any opinion about the Wilcox  
6 formation and if there's a possibility that it could be  
7 under this permit boundary or the landfill site?

8 A Well, the BEG, the Bureau of Economic Geology,  
9 maps the Wilcox formation, I think, in the property  
10 boundary. Furthermore, I noted silts, sands, and clays  
11 that could be indicative of a deltaic deposit which is  
12 the Midway formation. Especially because we're on the  
13 contact, it's possible that -- that the materials are a  
14 transitional material from the Midway to the Wilcox. We  
15 also have a well -- or we noted water in piezometer NP1  
16 that we had completed and that's next to P32 which was  
17 completed by the Applicant which has -- had water in the  
18 well pretty much through the whole time that it's been  
19 sampled or it's been observed.

20 Q So when you say transitional materials between  
21 the Wilcox and the Midway, what are you -- can you tell  
22 me what you mean by transitional or transition?

23 A Sure. I guess the -- there is a map boundary,  
24 but that boundary approximates the depositional -- the  
25 change in depositional environment. We don't have a

1 nonconformity here which is erosional at time of  
2 erosion. And so it's a continual process of  
3 sedimentation and deposition. So if you can imagine,  
4 you have a shallow C and then the deltaic deposits begin  
5 to encroach from -- from geologic processes. And so  
6 these deltaic deposits will be laid down on top of this  
7 material through a long period of time. And during this  
8 transition, you may have interbedded materials of -- of  
9 marine origin and deltaic deposits as the delta  
10 propagates through time to that particular area.

11 Q So I guess thinking about all that, I want to  
12 understand. Do you have an opinion about the -- at this  
13 particular site, the permit boundary and the proposed  
14 landfill site, whether there's a transition between the  
15 Wilcox and the Midway?

16 A I believe there may be one.

17 Q So I think in Exhibit -- your Exhibit F, it's  
18 photos of samples, and I think you brought them in right  
19 here?

20 A Yes.

21 Q I'm just curious what the significance is of  
22 these samples and why you brought them in. Can you  
23 describe why you added them to your prefiled testimony  
24 and brought it here?

25 A Sure. They're just a general way to showcase

1 the different kinds of materials at the site. Certain  
2 features -- so --

3 Q So were there features in the samples that you  
4 noted that were either left out or not present in the  
5 application?

6 A In the Applicant's original borings, they did  
7 not note any -- I believe they did not note any  
8 fractures, fissures of gypsum.

9 Q And so did you bring a sample that shows the  
10 difference between the application and then subsequent  
11 borings?

12 A I'm sorry. Can you repeat that?

13 Q In these samples, is that what that is, a  
14 sample that will show the difference between it not  
15 being noted in the application and the subsequent  
16 borings?

17 A These samples are from Protestants' borings and  
18 they show some of these features.

19 Q Can you just give me an example of one?

20 A Sure. Like a gypsum-filled fissure --

21 Q Okay.

22 A -- I have a piece of sediment that showcases a  
23 gypsum-filled fissure.

24 Q If you can pull that one for me, which one of  
25 these photos in your Exhibit F would that one indicate?

1           A       Those would be photos from my Exhibit F, 6F,  
2 Page 8 and 9.

3           Q       And you have that sample that you can pull for  
4 us to --

5           A       I do.

6           Q       Do you mind doing that?

7           A       Sure. I'm not sure if you want to take a look.

8                   MR. MAGEE: May I -- may I approach?

9                   JUDGE BELL: Yes.

10          Q       (BY MR. MAGEE) So what are you looking at in  
11 the sample, that would show me what you're referring to  
12 as the gypsum. Is that correct?

13          A       Yeah. So if you see these crystalline deposits  
14 here, this -- the orientation of the bore hole was like  
15 this (indicating). And you've got these fissures coming  
16 through, and you can see these crystals right here.

17          Q       Uh-huh.

18          A       And you can see how it's actually kind of a  
19 plain that crisscrosses or is vertical under the  
20 orientation. Then you have other fissures kind of going  
21 the opposite direction perpendicular to this fissure  
22 here. And you can tell there's -- there's a number of  
23 these fissures in the sample.

24          Q       So both going horizontal and vertical?

25          A       No. I'm sorry. They're going vertically but



1 just east west.

2 Q Okay. I see what you're saying. And so these  
3 samples and these photographs are the type of things  
4 that were shown by the subsequent borings but that are  
5 not indicated in the application. Correct?

6 A This particular gypsum fissure, I believe it  
7 wasn't in the original borings.

8 Q Okay.

9 A The remainder of these, they are -- they are  
10 sediments that were found in the site during our -- in  
11 the subsurface during our investigation, silts, clays,  
12 fat clays, and also I got some examples of iron oxide  
13 filled fissures.

14 Q And which ones will those be the iron oxide  
15 fissures?

16 A Page 1 of Exhibit 6F, Page 2, Page 3, and  
17 Page 4 as well.

18 Q And that's in Exhibit F of yours. Right?

19 A Yes.

20 Q And so then you're concerned about all these  
21 fissures and fractures. I believe in your prefiled  
22 testimony, starting on page 21 and 25, is that they are  
23 evidence or direct evidence of migration pathways in the  
24 subsurface at the site. Correct?

25 A These features do indicate that there's

1 migration pathways.

2 MR. MAGEE: I don't have any further  
3 questions.

4 JUDGE BELL: All right. Thank you.

5 Any cross-examination for Mr. Rubinov from  
6 OPIC?

7 MR. TUCKER: Yes.

8 CROSS-EXAMINATION

9 BY MR. TUCKER:

10 Q Good morning, Mr. Rubinov.

11 A Good morning.

12 Q My name is Aaron Tucker with the Office of  
13 Public Interest Council. I just have a few questions  
14 for you. If we could stick with these samples, which is  
15 your Exhibit 6F, I just want to link these samples to, I  
16 guess, what are called -- where the -- lithology logs?

17 A Okay. Sure.

18 Q So if we also get out Protestants'  
19 Exhibit 6D -- so let's start with your first -- with the  
20 sample on Page 1 of 6F, if we look, there's a label  
21 above the picture of the sample. And the first line  
22 says "Bore Hole IV3." Correct?

23 A I'm sorry.

24 Q So starting on Page 1 of --

25 A Of 6F?

1 Q -- of 6F.

2 A Yes.

3 Q We have a label that says -- no card, I guess.  
4 And the top line says, "Bore Hole IV3."

5 A Correct.

6 Q So we could turn to the lithology logs to bore  
7 hole -- to -- to site IV3.

8 JUDGE QUALTROUGH: What exhibit is that?

9 MR. TUCKER: Sorry. Exhibit 6D.

10 JUDGE QUALTROUGH: D as in depot.

11 MR. TUCKER: Yes.

12 Q (BY MR. TUCKER) To see how you described it in  
13 the bore hole logs. Correct?

14 A Yes.

15 Q And so if we go to interval -- the second line  
16 of the card above the sample says "interval 24 to  
17 25 feet," and that corresponds to the depth on the  
18 boring log. Right?

19 A Yes. That -- that corresponds to the depth of  
20 the sample.

21 Q Okay. And so if we then turn to 60 -- Page 16;  
22 we see how you -- the -- the description that you  
23 provided.

24 A Yes.

25 Q So this description -- so the sample picture --

1 I'm sorry -- the sample says an interval from 24 to  
2 25 feet. So if we go to Protestants' Exhibit 6D, we see  
3 that that sample was described -- had -- came from  
4 between depths 7 feet to 30. Those were all sort of a  
5 similar sample.

6 A I'm sorry. Could you repeat that?

7 Q Sorry. Okay. So to find how you described it,  
8 we take interval number 24 and 25 feet and go to that  
9 depth. Right?

10 A Yes. This is contained within these -- an  
11 entire section that I described from 6.5 to 30 feet.

12 Q Okay. And so that description applies to that  
13 whole length of the depth?

14 A Yes.

15 Q Okay.

16 A This is part of that -- part of that sediment.

17 Q And so we can see that it says -- in your  
18 description on page 6D you described iron oxide filled  
19 fissures at 25 feet?

20 A Right.

21 Q And that's what we're looking at right here?

22 A Yes.

23 Q And so the samples that you have and the  
24 pictures here allow to us sort of double check your  
25 work. Is that correct?

1           A       That's one of the ways that you could use it,  
2     yes.

3           Q       Okay.  And is it your company's policy to -- to  
4     preserve samples in a manner like this?

5           A       In what manner?

6           Q       To keep the samples?

7           A       We do keep samples, yes.

8           Q       Okay.  How long do you keep samples for?

9           A       Typically we keep them through the end of a  
10    project, and then we'll keep them for a period of time  
11    that -- typically, our samples are kept after the  
12    product is finished and whatever it is that -- that  
13    we're -- whatever project it is that the geologist --  
14    geologic descriptions are supposed to be for is  
15    completed.  And -- and then we give some time for the  
16    samples to stay in our storage facility.  And at some  
17    point, there's a -- a decision is made.

18          Q       Okay.  And so if we sort of did a similar thing  
19    where we look at the description of the samples in  
20    Exhibit 6F, we could go back to these descriptions in  
21    Protestants' Exhibit 6D to check just like we did a  
22    second ago?

23          A       I'm sorry.  Would you repeat that?

24          Q       Okay.  So Exhibit 6F, you have the description  
25    iron oxide filled fissure.  And on Exhibit 6D it says,

1 "iron oxide filled fissures at 25 feet."

2 A Right.

3 Q We could do this sort of check for each of  
4 these samples, taking the picture and the description  
5 you have on 6F and then looking in each of the boring  
6 logs to do a check. Correct?

7 A Yes.

8 Q And we would see a similar description?

9 A Yes.

10 Q Okay. If I can get you to turn to your  
11 prefiled testimony, I just have a few more questions.

12 If you could turn to Page 10, you were  
13 talking with Mr. Magee about loss of circulation?

14 A Yes.

15 Q And just so I'm clear, you said that the water  
16 from the trough evacuated down the -- the boring hole.  
17 That's how you could tell that there was a loss of  
18 circulation?

19 A Yes. Typical -- the trough is filled with  
20 water.

21 Q Okay.

22 A And then the water is contained in the  
23 subsurface in the hole as well, and it's typically  
24 circulated. And if there's no pathways for that water  
25 to evacuate, then it will stay at a similar level in the

1   trough and the bore hole.  And a -- a bit of water may  
2   be added during the drilling as the hole progresses and  
3   it needs a little bit more volume of water or drilling  
4   fluid.  But typically, when the fluid is evacuated  
5   from -- or is no longer in a trough, that indicates that  
6   there's a -- that is a loss of circulation.

7           Q     And so when we're talking about a trough, we're  
8   just talking about an open vessel of water above the  
9   hole.  Is that right?

10          A     Yes.  They typically have -- sometimes in the  
11   drilling business, they'll dig a trench and they'll  
12   actually circulate the water through the trench.  In  
13   this particular example, it was a portable trough that  
14   stood over the hole -- over the bore hole, kind of  
15   surrounding it with sides to keep the water from  
16   obviously spilling out onto the -- onto the ground.

17          Q     So you can see all the water in the trough, and  
18   then when it evacuated, it's empty?

19          A     Right.

20          Q     Okay.  There was no water in the trough?

21          A     Right.

22          Q     Or just a few remnants?

23          A     Yes.  There's -- essentially the water was  
24   gravity fed down to --

25          Q     Okay.

1 A -- somewhere.

2 Q Next, if you could move to Page 8 of your  
3 prefiled testimony where you're talking about the  
4 sampling methods that you observed by -- by  
5 Mr. Stamoulis, the Applicant's logger. Is that the  
6 correct -- or driller. Is that the correct term?

7 A I think he called himself a driller.

8 Q Okay. So a Shelby tube is just a hollow metal  
9 tube that's about two feet long?

10 A It -- yes.

11 Q Okay.

12 A One and half to three feet depending on what  
13 they used, but it's a thin, long tube.

14 Q And so once you've put the Shelby tube down and  
15 you've extracted it --

16 A Right.

17 Q -- you have a Shelby tube full of soil or rock?

18 A Yes. Subsurface materials.

19 Q And is it correct from your testimony that  
20 there's kind of three ways to determine what's there?  
21 Just give me a second.

22 Okay. So you can extract all the material  
23 from the Shelby tube, right, that's one way?

24 A Yeah. That's typically what happens is the  
25 material is extracted from the Shelby tube.



1 Q And then you also talked about two other ways.  
2 You said Mr. Stamoulis -- let's see. This is on Page 9.  
3 He did cuttings at the end of the sample?

4 A That's -- that's more for his descriptions of  
5 the material.

6 Q Okay.

7 A Once -- once the Shelby tube is brought up to  
8 the surface and the material is extracted, it was placed  
9 on a table -- and from what I observed, Mr. Stamoulis  
10 would cut the ends off of this core to sort of expose  
11 those ends, and then use them as -- for his  
12 descriptions.

13 Q That --

14 A For his, I guess, sediment descriptions.

15 Q So are you saying he didn't push out material  
16 from the Shelby tubes, he just used the cuttings to form  
17 his descriptions?

18 A No. The -- he used the materials that were  
19 pushed out of the Shelby tube. The -- the drilling  
20 method and recording observing the sediment, those are  
21 two separate things --

22 Q Okay.

23 A -- in the way that I'm talking about here.  
24 Typically, the driller -- well, Mr. Stamoulis was -- he  
25 wasn't the -- I guess he wasn't directly the driller.

1 He was kind of the overseer of the drilling operations.  
2 There was actually somebody manning the rig itself and  
3 doing the mechanical work. And so they would push  
4 the -- the Shelby tube down to the ground. They would  
5 extract it --

6 Q Okay.

7 A -- bring it up to the surface. They have a  
8 machine on their rig, kind of a -- a pushrod where they  
9 can place the Shelby tube, keep it steady and then have  
10 the pushrod actually push the material out from one side  
11 of the Shelby tube. They would push that material  
12 either onto a trough or just take it by hand and then  
13 move it to the table.

14 Q Okay.

15 A So now that Shelby tube material or just the  
16 sediment core is on the table. And at that point,  
17 Mr. Stamoulis would cut off the ends and then describe  
18 it.

19 Q Okay.

20 A But he's --

21 Q So the cutting happens after the material has  
22 been extracted from the Shelby tube. Correct?

23 A Right.

24 Q Okay. And are you saying he didn't -- he kept  
25 the sample intact except for the cuttings. Right?

1 A Could you define what you mean by cuttings?

2 Q Well, so you described that he made these  
3 cuttings. How do you -- I'm trying to use your words.

4 A I guess what I'm referring to the cuttings is  
5 the ends of the tube that's --

6 Q Okay.

7 A -- the core. So if you can imagine, it's just  
8 a long core. And then he takes a knife and just cuts  
9 maybe somewhere at an inch or less off of the end of one  
10 side and off of the end of the other side, and those two  
11 end pieces he kind of -- he either moves them to the  
12 side for -- for later examination, or he does that while  
13 the driller is getting the next Shelby tube sample. He  
14 takes that, and then he looks at the ends basically of  
15 the core samples, from what I observed and -- and  
16 those -- those two cut pieces -- those two inches that  
17 are cut at the ends and then describes that.

18 Q Okay. And his observations -- this is your  
19 opinion. His observations of those cuttings formed the  
20 basis for his initial notes on his geological  
21 descriptions. Is that correct? In his field notes?

22 A He created field notes based off of that.

23 Q Okay. And so when I was saying that there were  
24 three sort of sampling methods, I'm coming to the third  
25 now.

1 A Okay.

2 Q Okay. In your prefiled testimony, you talk  
3 about that he did not scrape the length of the core to  
4 expose fresh materials between the ends. Is it correct  
5 to say this is like a third method? So you're not -- a  
6 third method to --

7 A I think that we have to separate the -- the --  
8 the methods of describing the sediment and the methods  
9 of extracting the sediment from the subsurface.

10 Q Okay.

11 A Shelby tube is the way to extract the sediment  
12 from the subsurface.

13 Q Okay.

14 A And then once -- once the -- he has the sample  
15 on the table, then he can -- he's got freedom to do two  
16 different tests or -- or examinations of the material.

17 Q Okay.

18 A And so he chose to cut the ends off of -- off  
19 of the -- the cores for his descriptions and his field  
20 notes.

21 Q Uh-huh.

22 A But he did not scrape the length of the core  
23 the majority of the time.

24 Q Okay. When we're talking about the core,  
25 that's the material that's been extracted from the

1 Shelby tube?

2 A Right.

3 Q And so what instrument do you use to --

4 A You could use a knife.

5 Q Okay. And it just sort of --

6 A Anything to expose fresh material --

7 Q Okay.

8 A -- from basically the interior of that core.

9 You have to understand the core is --  
10 it's -- it's up and down in the bore hole. It's brought  
11 to the surface. It's laid on the table, and so now it's  
12 in front of you. So when you cut off one end or the  
13 other, you're cutting off the top and the bottom.

14 Q Okay.

15 A And then what I'm referring to here is scraping  
16 the middle of -- from top to bottom of the core.

17 Q And the reason you scrape is because the  
18 outside of the core doesn't give you an idea of some of  
19 the other features?

20 A Right.

21 Q Okay.

22 A As the core is pushed in, the -- just the --  
23 the outside may be smeared, as you can imagine --

24 Q Okay.

25 A -- by a core just being pushed into the ground.

1 And so you may not be able to see features like bedding  
2 or fractures or anything like that without exposing the  
3 fresh material.

4 Q Okay. And so it's your testimony that scraping  
5 the length of the core gives you a better -- allows you  
6 to better observe the sample?

7 A Yes.

8 Q Okay.

9 A Yes.

10 Q Okay. Is it your practice to -- to scrape the  
11 length of all the cores that you extract when you're  
12 doing -- when you're observing cores in the field?

13 A For the sake of geologic descriptions.

14 Q Uh-huh.

15 A When using the core for my -- for my geological  
16 descriptions, I try -- yes. I do expose the material.  
17 Typically either scraping or cutting the core lengthwise  
18 in two.

19 Q Okay.

20 A That way, I expose all the material inside of  
21 that core, and it gives me a good idea of what's there.

22 Q And when you -- are there any -- professional  
23 standards that we can look to or that describe the best  
24 way to do these types of observations in the field?

25 A I think there are some ASTM standards for this.

1 But it's typical practice for geologists to expose  
2 material that you're looking at. So without -- without  
3 exposing the material, you're not able to describe or  
4 observe any of those features. So it's -- it's -- it's  
5 best to do that.

6 Q Okay. So it's typical practice to do the  
7 scraping?

8 A Yes.

9 Q That's what you're saying?

10 A Yes.

11 Q Okay. So someone that was just taking cuttings  
12 to describe the samples would not be following the  
13 typical practice of a geologist or a --

14 A For creating the lithologic logs --

15 Q Okay.

16 A -- it's difficult, if not impossible, to  
17 describe the in situ materials if you can't see them  
18 essentially.

19 MR. TUCKER: Okay. I have no more  
20 questions. Thank you.

21 JUDGE BELL: Thank you.

22 Any cross-examination for Mr. Rubinov from  
23 the Executive Director?

24 MR. VARGAS: Yes.

25

## CROSS-EXAMINATION

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BY MR. VARGAS:

Q Hi. My name is Aaron Vargas. I'm with the Executive Director.

A Good morning.

Q So if we could turn to Page 7 of your prefiled testimony.

A (Witness complies).

Q On Line 4, you're asked a question about your initial review, and then your answer begins on Line 7 -- or 6. Sorry. In that answer on Line 8 you state that, "The permit application logs appear to be inconsistent with published data about the subsurface."

Can you kind of explain a little bit about what you mean by inconsistent?

A The application noted exclusively fat clays. Again, this was just a general research before I started the project. I think it's in groundwater resources of Caldwell County at -- the Texas Water Development report has a short description of the Wilcox materials, and it described them as silt, clay, and sand with evidence of sandstone and limestone.

Q Okay. So in your opinion, should the permit application logs always be consistent with public data? I guess should they perfectly match? Is that what



1 you're saying?

2 A No, not necessarily. It cites specifically  
3 there may be clays, and there may be silts. This --  
4 this description is a general description of the entire  
5 formation.

6 Q So, then, is it possible for there to only be  
7 clays and it still be the Midway?

8 A Yes. It's possible.

9 Q Okay. So then on page -- on that same page,  
10 you say you want to tactilely handle the samples.  
11 Right?

12 A Yes.

13 Q Why? What's the difference -- I guess what's  
14 the difference between that and just being able to  
15 visually observe? Can you kind of describe that for me  
16 real quick?

17 A Sure. It's difficult to distinguish between --  
18 it can be difficult to distinguish between a silt and a  
19 clay -- and a lean clay and a fat clay without actually  
20 touching the sample. There are certain tests that can  
21 be done in the field to determine silt, silt content or  
22 determine what the material could be.

23 And that's done through touching the  
24 material. How the material smears, how classic the  
25 material is, how -- how crumbly the material is, that

1 can give you an indication.

2 Q So things like fissures and gravels, other  
3 sediments. Right?

4 A Those are -- those are easier to observe  
5 without exposing the -- the cores, the middle of the  
6 core -- it's difficult to observe those.

7 Q Sorry. Those --

8 A Those are -- those are easier to observe.  
9 Without exposing the cores, the middle of the cores,  
10 it's difficult to observe those.

11 Q Sorry.

12 A Those are easier to observe visually. Large  
13 cobbles or fissures of gypsum, they're identified  
14 visually -- they're easy to identify -- easier to  
15 identify visually.

16 Q Okay. I guess what I'm trying to get at is how  
17 your -- your samples and analysis were so different from  
18 the Applicant's. Do you think it was more the type of  
19 analysis that was performed? Because you state that in  
20 the Applicant's 2016 bore, you were able -- oh, I'm  
21 sorry.

22 On Page 9 of your prefiled testimony,  
23 Line 8, you're talking about the Applicant's 2016  
24 borings. And you state that you were able to observe  
25 clays, silts --

1 A I'm sorry. Could you repeat where that is?

2 Q Sorry. Page 6 or Page 9 of your prefiled  
3 testimony on Line 8.

4 A Uh-huh.

5 Q So you state you were able to observe all of  
6 these features and descriptions. Right?

7 A Materials. Yes.

8 Q So how come -- I guess do you have an opinion  
9 as to why the Applicant's logs weren't -- none of this  
10 was included?

11 A I'm -- I'm not sure.

12 Q Okay.

13 A I observed those materials on site.

14 Q And then you observed those same kind of  
15 features in the Protestants' borings and drillings.  
16 Correct, generally?

17 A The observations, the observed samples, I'm  
18 talking mostly about the Protestants' samples because I  
19 was able to fully -- fully observe those.

20 Q So they -- the answer that we were just looking  
21 at, you were talking about Protestants' examples?

22 A Mostly, but I did note -- I did note those  
23 materials possibly in the Applicant's borings, but  
24 again, I wasn't able to actually touch the samples.

25 Q Okay. Could -- could you look at Line 6?

1           A       I'm sorry. Yes. Okay. I did observe those  
2 just from my observations. I guess that's what I mean  
3 here by observe the samples.

4           Q       So I did note the silts, and you can see that  
5 in my field notes.

6           A       Uh-huh. That was my mistake.

7           Q       Okay. So on -- so now getting to the  
8 Protestants' examples on Page 14, so Line 7, you're  
9 talking about your observations and you state that you  
10 find lean and fat clays, silts, sandstones, and that  
11 these were all present. Is there a -- is there a  
12 threshold amount that you need to find in order to say  
13 that these materials were present or these sediments  
14 were present, or is it just, I guess, like a trace or  
15 any minute kind of amount? Do you understand the  
16 question?

17          A       Yes. It's -- I think -- I'm just trying to  
18 figure out the answer to this. I noted bead materials,  
19 so interbedded laminated silt layers, for example. I'm  
20 not sure if there's -- there's a definition of what, if  
21 it's silt grain or not. But typically there's -- I did  
22 note materials significant enough for me to be able to  
23 observe it.

24          Q       Okay. Tell me if -- we're talking about, like,  
25 a two-foot core. Right? Would that be, you know, a few

1 inches or half the core or --

2 A It may be anywhere from a tiny sliver to half  
3 the core.

4 Q Okay. And then just kind of a follow up, so  
5 when you're examining the Protestants' samples, did you  
6 attempt to recreate the same kind of procedure that the  
7 Applicant used to see if you could get the same results  
8 and -- I guess when I mean "procedure," I mean, like the  
9 cutting that he does before you did the scraping?

10 A I'm sorry. Could you repeat that?

11 Q So when you were analyzing the Protestants'  
12 examples, at any point, did you try to recreate the same  
13 method or procedure that the Applicant would use when  
14 analyzing their samples?

15 A My methods involved exposing the inner part of  
16 the core to observe the material, scraping the core or  
17 cutting the core in half to -- to -- lengthwise to  
18 observe the material inside of those cores.

19 Q Okay.

20 MR. VARGAS: That's all I have. Pass the  
21 witness.

22 JUDGE BELL: Thank you.

23 I'm assuming you've got quite a bit of  
24 cross for Mr. Rubinov, Mr. Ryan?

25 MR. RYAN: Yes.

1 JUDGE BELL: All right. Let's go ahead  
2 and take our lunch break now. We'll come back at 1:00  
3 and start your cross-examination.

4 MR. RYAN: Thank you.

5 JUDGE BELL: All right.

6 (Lunch Recess: 11:51 a.m. to 1:07 p.m.)  
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1 AFTERNOON SESSION

2 TUESDAY, AUGUST 23, 2016

3 (1:07 p.m.)

4 PRESENTATION ON BEHALF OF PROTESTANTS (CONTINUED)

5 JUDGE BELL: All right. Are we ready to  
6 go back on the record?

7 MR. RYAN: Yes, Your Honor.

8 JUDGE BELL: All right. Back on the  
9 record after a lunch break, and I believe it is now time  
10 for cross-examination of Mr. Rubinov by the Applicant.

11 MR. RYAN: Thank you, Your Honor.

12 MICHAEL RUBINOV, P.G.,  
13 having been previously duly sworn, continued to testify  
14 as follows:

15 CROSS-EXAMINATION

16 BY MR. RYAN:

17 Q Mr. Rubinov, have you ever prepared a geology  
18 report for a municipal solid waste permit application?

19 A I have not.

20 Q And isn't it also true that you have never  
21 conduct a fault study?

22 A I have looked at maps where I have looked for  
23 faults, so I have done some research on faults.

24 Q Okay. And the extent of experience that you  
25 have in connection with fault studies is what you

1 learned in school. Right?

2 A And some experience while I've been employed.

3 Q Is that experience that you've had since the  
4 time your deposition was taken in April?

5 A No.

6 Q Do you remember, during your deposition on  
7 April 20th, being asked if you have any experience  
8 conducting fault studies and you said not a significant  
9 amount?

10 A Yes.

11 Q And the next question was: "How about an  
12 insignificant amount?" And your answer was: "I -- what  
13 I learn in school"?

14 A I believe I -- I must have mistaken -- I went  
15 on to say that I looked for map -- faults on maps, map  
16 faults.

17 Q Okay. So you've done that before?

18 A Yes.

19 Q You've looked at maps to see if --

20 A Yes.

21 Q -- faults are shown on maps?

22 A Right. Looking for faults on maps, that's part  
23 of the experience I have.

24 Q Okay. And that's the extent of your experience  
25 conducting fault studies?



1           A       Essentially.

2           Q       Well, is it or isn't it?

3           A       Yes.

4           Q       Okay. Isn't it true that most of the  
5 experience that you have logging sediments was done in  
6 connection with projects related to investigations for  
7 water supply?

8           A       I'm sorry. Could you repeat the first part  
9 again?

10          Q       Yeah. Isn't it true that most of the  
11 experience you have logging sediments was done on  
12 projects that are related to investigations for water  
13 supply?

14          A       I have also done sediment analysis for core  
15 analysis or lignite coring, overburden lignite coring.  
16 I also have experience with geotechnical coring in one  
17 project.

18          Q       Okay. Let me ask you again here. Isn't it  
19 true that most of the experience you have logging  
20 sediments has been done on projects related to  
21 investigations for water supply?

22          A       I do have a lot of experience with logging  
23 samples for water supply, yes.

24          Q       And isn't that most of your experience, logging  
25 sediments has been done in connection with water supply

1 investigations?

2 A I guess -- I've done a lot of investigations on  
3 water supply, so that -- that part is a big -- big part  
4 of my work over the last nine-something years. But I  
5 have had experience with overburden coring on at least  
6 two projects.

7 Q Okay.

8 A And geotechnical coring on at least -- I know  
9 on one.

10 Q Okay. How many feet of coring was involved in  
11 those overburden and geotechnical projects?

12 A I know I looked at this. I think it was  
13 somewhere around 3- to 4,000 feet, I believe.

14 Q Okay. And I think in your prefiled testimony  
15 you say that you have experience logging more than  
16 30,000 feet of sediments?

17 A Correct.

18 Q So if 3- to 4,000 feet of it involved  
19 overburden or geotechnical investigations, then that  
20 would be, 26- or 27,000 feet of it was involved with  
21 groundwater investigations?

22 A Yes, that's -- that's correct.

23 Q Okay.

24 A If I had done less -- if I have done 3,000 feet  
25 of water, then it would be 50/50, but as it stands, it's

1 whatever that number is.

2 Q Okay. And when you -- when you log sediments  
3 in connection with a groundwater investigation, that is  
4 not logging of cores. Right? That's logging of  
5 cuttings?

6 A Yes, that's true.

7 Q Would you explain the difference in logging  
8 from cuttings and logging from corings?

9 A Sure. Cuttings are typically brought to the  
10 surface along with fluid. Because of -- because of the  
11 depth of investigation for aquifers, it's pretty much  
12 impossible to core through 3,000 feet. So it's -- mud  
13 rotary is used for that or other equal, sort of,  
14 drilling methods. And then the samples are brought up  
15 to the surface with fluid. Then they are essentially  
16 sieved out, or there's methods to get the cuttings out  
17 of the fluid, and then we look at the cuttings to  
18 describe it.

19 Q Okay. And what's a cutting? When you say  
20 "cuttings," what are you talking about?

21 A Cuttings, in that sense, is lithologic  
22 material, and because it's being cut by the bit, I guess  
23 that's why they call them -- they call them cuttings.

24 Q Okay. And what do they look like when they  
25 come to the surface?

1           A       It's like a -- it's in a pile essentially.  
2 Well, depends on how much you get out of the fluid,  
3 because it's suspended in the drilling fluid. Once it  
4 comes out, it's individual, I guess, sand grains or  
5 pieces of shale, pieces of clay, things like that.

6           Q       So it's a pile of loose particles?

7           A       Of lithologic -- it's a lithologic material  
8 that's in a pile, yes.

9           Q       Okay. And it's -- it's like a pile of dirt?

10          A       I guess you could say that it's a pile of dirt.

11          Q       Okay. And in contrast, what's a core?

12          A       A core is cohesive material that's brought to  
13 the surface essentially undisturbed, I guess, if I could  
14 use that term. It's not really a technical term the way  
15 I'm using it here. But it's essentially continuous, and  
16 it's continuous in its natural state --

17          Q       Okay.

18          A       -- or as close as possible.

19          Q       So in this case, where cores were being taken  
20 using, say, a 2-inch Shelby tube, a core would be a  
21 continuous solid piece of material 2 inches around and  
22 about 2 feet long.

23          A       The Shelby tube, I would describe it as a core  
24 of material, yes.

25          Q       And it's a solid piece of material with the

1 diameter of the device that's being used to collect the  
2 sample?

3 A Although it's -- it may be disturbed on the  
4 outside, the inside is fairly solid, yeah. And it  
5 depends on -- you know, if it's silty material, it may  
6 be broken up --

7 Q Okay.

8 A -- or something like that.

9 Q But you can take this piece that's  
10 approximately 2 inches around and 2 feet long, you can  
11 pick it up and carry it around with you. It's like a  
12 piece of a baseball bat or something?

13 A It depends on the material. If it's --  
14 typically, clay materials are more cohesive, but, you  
15 know, you may not be able to push out a silt material  
16 out of a core and keep it like a baseball bat. It will  
17 be --

18 Q Okay.

19 A -- it may fall apart, so you may need to have a  
20 trough or something.

21 Q But in this case, most of the cores that were  
22 recovered were solid pieces. Right?

23 A I remember there -- and you're talking about --  
24 which investigation are you talking about?

25 Q All of them.

1           A       So during the Applicant's borings and the  
2 Protestants borings, is that what you mean?

3           Q       Yes.

4           A       Yeah, mostly they were fairly solid.  There  
5 were cores that were disturbed for different reasons.  
6 Maybe --

7           Q       But most of them were in --

8           A       -- a particle --

9           Q       -- intact pieces of material?

10          A       And if you had a break of silt or something  
11 like that, it would be broken up --

12          Q       Okay.

13          A       -- in between.

14          Q       Sir, do you recall in your deposition where you  
15 described yourself as a geologist with a specialization  
16 in hydrology?

17          A       Yes.

18          Q       So does that make you a groundwater  
19 hydrologist?

20          A       I'm a hydrogeologist.  I went to school for  
21 geology.  I've got a geology background.  Our firm  
22 specializes in geology and hydrology, and I think a lot  
23 of the work we do is hydrology related.

24          Q       Okay.  So if you're a hydrogeologist, that  
25 means that you specialize in groundwater.  Right?

1           A       Hydrogeology is a specialization of geology and  
2 dealing in groundwater.

3           Q       Okay. Do you have an opinion as to whether  
4 there is an aquifer located within the proposed facility  
5 boundary for the 130 Environmental Park landfill?

6           A       There may be aquifer materials present.

7           Q       Okay. But my question is, do you have an  
8 opinion as to whether or not there is an aquifer there?

9           A       There may be an aquifer present on the site.

10          Q       But you don't know?

11          A       I cannot definitively say.

12          Q       Okay. So I take it that as a hydrogeologist,  
13 you do work for clients that are interested in finding  
14 and producing groundwater. Is that right?

15          A       We work with clients who hire us to help them  
16 find, yes, groundwater.

17          Q       And figure out how to produce it?

18          A       Engineer the wells or the systems and, you  
19 know, determine how much water they may have and how  
20 much they can produce.

21          Q       Okay. And so you help identify the particular  
22 locations in the subsurface where groundwater is present  
23 and methods for removing it, for instance, how deep to  
24 drill wells and where to screen them, things like that?

25          A       That's part of it. Typically the client has a

1 piece of property that they want us to look at and give  
2 them an answer as to how much water they can get.

3 Q Okay. And you do that by identifying  
4 subsurface zones where groundwater's present?

5 A We do research to figure out, yeah, where  
6 aquifers might be present for the use of the client --

7 Q Okay.

8 A -- that may -- that work for the use of the  
9 client.

10 Q And then do you estimate or calculate available  
11 volumes of groundwater that could be produced?

12 A We do that.

13 Q If you had a client that was interested in  
14 producing groundwater in the area of Caldwell County  
15 where this landfill site is located, would you recommend  
16 that they consider this site?

17 A I guess that depends on how much groundwater  
18 they need.

19 Q Well, let's say more than a hundred gallons.

20 A More than 100 gallons.

21 Q Ever.

22 A Ever?

23 Q Yeah.

24 A You know, I think that it's possible, and this  
25 is sort of a guesstimation from what I saw in the



1 piezometer well 32. It might be possible to get  
2 100 gallons of water out of that well over a course of  
3 some time.

4 Q But it may not be possible. Right?

5 A I can't really say one way or the other. I  
6 don't enough data to really say that.

7 Q Do you have an opinion as to whether enough  
8 groundwater could be produced from a well at this site  
9 to supply the needs for one house?

10 A It's possible. I'm not sure.

11 Q But it's also possible that there's not that  
12 much water, isn't it?

13 A Again, I'd have to do some more investigative  
14 studies to figure that out. But I know that there's  
15 some groundwater at that site, as seen in those  
16 piezometers.

17 Q How many piezometers have you observed water  
18 in?

19 A I believe when I was on site we observed water  
20 in -- well, two piezometers. One was the Applicant's  
21 P-32, and one was our piezometer at MP-1. I think there  
22 was some water in two piezometers at some point during  
23 the application, during the Applicant's investigations,  
24 but it has since dried up.

25 Q Okay. Do you have your prefilled testimony and

1 exhibits there?

2 A Yes.

3 Q Would you turn to Exhibit B in your prefiled  
4 testimony?

5 A Okay. I'm there.

6 Q Protestants Exhibit 6B.

7 A I think it may be better to use the replacement  
8 exhibit because this one doesn't have the sides cut off.

9 Q Okay. That's fine. And let's do this. If I  
10 ask you about one of your exhibits, can you assume that  
11 I'm asking you about the replacement versions?

12 A Okay.

13 Q All right. So if you look on Exhibit 6B, where  
14 is it that you said you observed groundwater in  
15 piezometers?

16 A At site MP-1 and P-32.

17 Q Okay. And those are both down near the  
18 southern permit boundary?

19 A Yes.

20 Q Outside the landfill footprint?

21 A That's what it appears to be, yes.

22 Q Okay. While we're looking at this Exhibit, I  
23 see over here at the bottom of the legend it says  
24 "surface geology" and then it has -- is shows three  
25 colors --

1 A Yes.

2 Q -- that's shown on the exhibit there?

3 A Right.

4 Q What's the source of that information?

5 A That's the BEG groundwater atlas of Texas. I  
6 believe that's the source of that information.

7 Q So it comes from the Bureau of Economic  
8 Geology?

9 A Oh, I'm sorry. I believe so.

10 Q Okay. And would it be the Bureau of Economic  
11 Geology's map of surface geology?

12 A Yes.

13 Q Okay. And that's the sole basis for the  
14 representations of surface geology on this Exhibit, is  
15 it not?

16 A Yes. That's what was used, right, those maps,  
17 the BEG maps.

18 Q More than one?

19 A No.

20 Q Okay.

21 A BEG information.

22 Q Okay. A single BEG map was used. Right?

23 A I believe these are probably digital layers  
24 created by the BEG. But yes, a single map was used.

25 Q Okay. And no other information went into the

1 depiction of the surface geology on Exhibit 6B. Right?

2 A I believe that's true.

3 Q So what's represented on Exhibit 6B by the red  
4 dots?

5 A Those were locations where the Protestant  
6 explored the site in 2016.

7 Q Okay. And five of those were shallow surface  
8 trenches?

9 A That's correct.

10 Q And those are identified as T1 through T5?

11 A Yes.

12 Q And how were those -- how was that work done?

13 A I'm sorry. Could you rephrase that?

14 Q Yeah. How was the trenching work at those five  
15 locations done?

16 A How was it conducted?

17 Q Yeah.

18 A It was conducted by the use of a backhoe.

19 Q Okay.

20 A It was dug, I think, up to 5 feet deep,  
21 although I wasn't present at most of the sites where it  
22 was --

23 Q Okay. So that would've excavated a small  
24 trench --

25 A Right.

1 Q -- say, about 2 feet wide and 4, 5 feet deep?

2 A I think that's the correct way of putting it.

3 Q Okay. And then the other red dots, the ones  
4 that don't have T's by them, what are those?

5 A Those are borings.

6 Q So some of them say IV with a number next to  
7 them. Some of them say MP with a number next to them,  
8 and then one of them says AR with a number next to it.  
9 Right?

10 A Yes.

11 Q What does IV mean?

12 A I believe it was originally in -- I may screw  
13 this up, but --

14 Q Take a shot at it.

15 A Intensity and veracity. I'm not sure if  
16 "intensity" is the right word to use.

17 Q Okay. And how about MP?

18 A That was migration potential.

19 Q And then down in the lower right-hand corner of  
20 this Exhibit, there's what's identified as AR2. What's  
21 AR?

22 A That was aquifer reconnaissance.

23 Q Okay. And you prepared logs of each of these  
24 borings. Right?

25 A I did.

1 Q You did -- you prepared field logs out in the  
2 field. And then at some later time, you prepared final  
3 logs for each boring. Right?

4 A Yes.

5 Q Would you look at -- turn back in Exhibit 6D to  
6 the last of that exhibit, Page 17.

7 A Okay.

8 Q And is that --

9 A 17 or 18?

10 Q Oh. 18. Sorry.

11 And is that -- that's your final log of  
12 the boring at AR2. Is that right?

13 A Yes.

14 Q Did you find any sand in that boring?

15 A I'm just looking through it just to make sure.

16 Q Okay.

17 A Does not appear to be that I found any sand,  
18 no.

19 Q Did you find any shale in that boring?

20 A No, I don't believe so.

21 Q Did you find any lignite in that boring?

22 A No, no lignite.

23 Q Okay. Now I want to ask you about the location  
24 of AR2, and I want you to compare the location of AR2 as  
25 map on your Exhibit 6B with the location -- with the

1 drill site locations shown on Mr. Feathergail Wilson's  
2 Protestants Exhibit 8, Page 72.

3 Do you see his --

4 A Yes.

5 Q Okay. And my question to you is, isn't it true  
6 that the location at which AR2 was drilled is in between  
7 the two drill sites that are shown on Protestants  
8 Exhibit 8, Page 72?

9 A It's difficult to tell. It's in the vicinity  
10 of one of those two.

11 Q Well, do you see -- do you see -- on  
12 Exhibit 6B, down in the very lower right-hand corner, do  
13 you see that red line that makes --

14 A Yes.

15 Q -- essentially a 90-degree angle --

16 A Yes.

17 Q -- which represents a -- an interior corner of  
18 the Hunter tract?

19 A Yes.

20 Q And do you see that same corner on Exhibit 8,  
21 Page 72?

22 A Yes.

23 Q And do you also see represented on each of  
24 those exhibits the southeast permit boundary line, the  
25 facility boundary. On your Exhibit 6B, it's a green

1 line.

2 A Oh, yes, okay.

3 Q And there's a line that runs from northeast to  
4 southwest?

5 A Right. Yes.

6 Q Okay. And do you see where that line is  
7 represented on Exhibit 8, Page 72?

8 A Yes.

9 Q So using those for orientation, isn't it true  
10 that the location of AR2 is in between the two drill  
11 sites shown on Exhibit 8, Page 72?

12 A It may be. They're in the vicinity of each  
13 other I would say. The drill site located on this map  
14 is fairly large.

15 Q Okay. Well, let's assume the drill site is the  
16 center of each of those circles. Okay?

17 A Okay.

18 Q Wouldn't you agree that AR2 was drilled at a  
19 location that is approximately halfway between those two  
20 drill sites?

21 How about this. Let's do it this way. If  
22 we drew a third drill site circle the same size as the  
23 two on Exhibit 8, Page 72 --

24 A Sure.

25 Q -- if we drew a third one halfway between the



1 two that are shown here, okay, assume that there was a  
2 third drill site shown there --

3 A Okay.

4 Q -- isn't it true that AR2 would be within that  
5 third circle?

6 A I would -- I would say it's -- the AR2 is  
7 closer to the drill site to the south. I don't know if  
8 it's exactly in the middle.

9 Q Well, but my question was, if you drew another  
10 circle the same size as these two --

11 A I see.

12 Q -- wouldn't AR2 be inside that third circle?

13 A Might be close, might be a little to the south,  
14 but somewhere in there.

15 Q Okay. It would be very near that location.  
16 Right?

17 A Yes, it would be proximal.

18 Q And at the time the decision was made to drill  
19 a boring at AR2, you were aware of Mr. Wilson's  
20 suggested drill sites, as shown on Exhibit 8, Page 72,  
21 were you not?

22 A I don't exactly remember where the -- it came  
23 from. It's possible, but I don't -- I don't recall  
24 seeing this map before Mr. Wilson's deposition.

25 Q Okay. But you had talked to Mr. Wilson about

1 potential locations --

2 A I hadn't talked to Mr. Wilson before.

3 Q You had not?

4 A I had never met him before.

5 Q Okay. So as far as you know, it may just be  
6 happenstance that AR2 was drilled over there in between  
7 his two drill sites?

8 A Maybe or maybe not.

9 Q Who would know that?

10 A I'm not sure. But I believe that it may have  
11 been Mr. Wilson's desire to drill there.

12 Q Okay. Who would know if that's the case for  
13 sure? Well, let me strike that question.

14 Who made the decision about where to  
15 locate AR2?

16 A Again, I can't -- I can't recall. I know that  
17 we made the decisions together. I wasn't always part of  
18 the decision-making process. I came in, in January,  
19 right before the borings were being done. And so who --  
20 where it is, I can't remember exactly.

21 Q Okay. So you may or may not have been involved  
22 in the decision about where to locate AR2?

23 A I was present and that was one of the  
24 suggestions made by somebody in our group, and I can't  
25 remember who it was. And I'm not sure who relayed that

1 information. I can't remember exactly.

2 Q Who are the people that were involved in the  
3 decision about where to locate the Protestants' borings?

4 A I believe it was Lauren, Dr. Lauren Ross, Scott  
5 Courtney, myself. I believe Marisa was there. That --  
6 that was who made the decisions. I believe Dennis Hobbs  
7 was there as well.

8 Q So it was the five of you that decided where to  
9 locate borings?

10 A Essentially. Yes. I don't remember anybody  
11 else being involved.

12 Q Okay. Looking at your boring for AR2 in  
13 Exhibit 6D, back at Page 18, isn't it true that at a  
14 depth of approximately 27 and a half feet that boring  
15 encountered dark-greenish, gray, silty clay?

16 A I'm sorry. At 27 and a half? Is that what you  
17 said?

18 Q Yes.

19 A We did. There is also -- in my interval 27.5  
20 to 35, there's some notes of stratified light and  
21 dark-greenish gray layers within that zone.

22 Q Okay.

23 A But, yes, the greenish -- the dark-greenish  
24 gray clay started at 25 -- 27.5 feet.

25 Q Okay. And isn't it true that you encountered

1 that dark-greenish gray clay in every boring you drilled  
2 at this site?

3 A We did.

4 Q And isn't it true that that dark gray --  
5 greenish or greenish gray clay was encountered in every  
6 boring that the Applicant drilled at the site?

7 A From what I observed during 2016 investigation,  
8 I believe that it was encountered in every one of the  
9 borings as well.

10 Q And isn't it also shown as having been  
11 encountered in each of the 2013 borings on the logs of  
12 those borings?

13 A Those logs do show that; although, I don't have  
14 any information -- underlying information to verify  
15 that.

16 Q Okay. If you'll turn over to your boring for  
17 MP3. It's on Page 8 of Exhibit 6D.

18 A I'm there.

19 Q So in the -- I'm curious about this. The --  
20 over in the third column there where it says 2.4 ...

21 A Yes. Are you referring to the interval of 2 to  
22 10 feet?

23 Q No. I'm asking you about in the third column  
24 of the exhibit, under a heading "Sample Recovery," it  
25 says 2.4.

1 A Sure. I'm there with you.

2 Q Okay. Does that mean that you recovered a  
3 sample that started at the surface and went down to  
4 2.4 feet?

5 A Yes.

6 Q How do you measure the depth of a sample to the  
7 tenth of a foot?

8 A Well, I have a tape that's taped to the table,  
9 and I lay the sample out, and then I line it up with  
10 the -- with the tape. And then I -- I pick where the  
11 sample ends. And it's not precisely 2.4. It may be 2.3  
12 or 2.5, something like that.

13 Q But if it was 2.3, you'd write down 2.3.  
14 Right?

15 A Yes. You know, the samples come out, and they  
16 may be cleaved, and there's -- there's undulations in  
17 the sample. They're not exactly clear-cut on either  
18 side. So there may be some variation there. And it's  
19 kind of -- in the field, that's -- I log that down as  
20 precisely as I can for the environment that I'm in.

21 Q Okay. And in that -- and then going over to  
22 the right, under "Lithologic Description," you have a  
23 description for zero to 2.0. Right?

24 A Yes.

25 Q So does that mean that the bottom four-tenths

1 of a foot of that sample was different than the top  
2 2 feet of it?

3 A In my observation, I noted a difference that I  
4 thought was significant.

5 Q Okay. And from reading these two descriptions,  
6 the primary difference is a color change. Right?

7 A The color change, I think, did drive my  
8 decision there.

9 Q Okay. To differentiate between the top 2 feet  
10 and then what was below that?

11 A Yes.

12 Q Okay. Because the clay went from dark brownish  
13 gray to light greenish gray to brown?

14 A Right.

15 Q Okay. So then in the top 2 feet, you talk  
16 about dark brownish gray, silty fat clay to organic soil  
17 with gravel.

18 A Right.

19 Q Does that mean that interspersed throughout  
20 that clay and organic soil there were pieces of rock?

21 A Yes, I noted pieces of gravel material. By  
22 definition, I guess, it's larger than about a No. 4  
23 sieve, I think. But it's from maybe, you know, half an  
24 inch or a little bit less, quarter of an inch and going  
25 up.

1 Q Okay. I was going to ask you for the rest of  
2 us, if you would describe that -- what a No. 4 sieve  
3 size is. It's something a little smaller than half an  
4 inch?

5 A I believe so.

6 Q Okay. So the rock material that was observed  
7 in here was pieces larger than that?

8 A Right.

9 Q Okay.

10 A That's the definition of gravel, is something  
11 larger than that.

12 Q But if it was smaller than that, what would you  
13 call it?

14 A I would likely call that sand.

15 Q Okay. Anything up to pieces that were almost a  
16 half an inch?

17 A No. It's not -- it's -- maybe it's -- and I  
18 can't remember exactly, but it's probably actually a  
19 couple of millimeters, really, is a coarse sand, so  
20 maybe above that is a gravel.

21 Q Okay.

22 A But I noted pieces that were about --

23 Q About a half inch?

24 A -- half inch or three quarters of an inch and  
25 above.

1 Q Okay. And that gravel was present within the  
2 soil matrix of clay and organic soil?

3 A Yes, that's what I observed.

4 Q Okay. Did you find gravel mixed in with the  
5 soil matrix near the surface in most of the borings that  
6 you did on the site?

7 A I'd have to look back.

8 Q Okay. Will you take a look.

9 A Yes, at MP1. Yes, at MP2. Yes, at MP3. Yes,  
10 at IV-1A or IV-1. Yes, at IV-2. Yes, at IV-3 and yes  
11 at AR4.

12 Q Okay. So it sounded like a lot of yeses?

13 A Yes. Right. So it looks like it's in all of  
14 them.

15 Q Okay. And was the deepest depth at which you  
16 identified that gravel, was that 11 feet -- a minute  
17 ago -- oh, 11 feet in AR2?

18 A Let me just review.

19 Q Okay.

20 A I've got it somewhere in my prefiled. But I  
21 just want to make sure.

22 I think that's correct. I think 11 feet  
23 was the deepest that I saw.

24 Q Gravel?

25 A That I -- that I noted gravel, yes. Let me



1 just finish looking at this.

2 Q Okay.

3 A Yes.

4 Q So in every one of the holes that you drilled  
5 at the site, you found gravel embedded in the  
6 surrounding soil matrix up near the surface, down to  
7 depths as much as 11 feet. Right?

8 A Yes.

9 Q And in every boring that you drilled at the  
10 site, you found dark gray or dark-greenish gray clay at  
11 depths somewhere between -- somewhere greater than  
12 25 feet?

13 A Yeah, it could be deeper than that, but some --  
14 some were much deeper than 25 feet. Some were closer to  
15 25.

16 Q All right. But every hole eventually  
17 encountered that dark gray clay?

18 A Yes.

19 Q And would you agree that the material in  
20 between those two zones was predominantly weathered  
21 clay?

22 A I did note silt in a lot of the borings and --  
23 let me look at MP1. I would say it was a predominant  
24 amount of clay in the samples, yes.

25 Q Okay. And would you agree that the clay above

1 the dark gray or the dark-greenish gray clay is  
2 weathered clay?

3 A Yes, I believe it is weathered clay.

4 Q And isn't it true that most of the gravel that  
5 you observed near the surface was embedded in material  
6 that you would also describe as weathered clay?

7 A Well, you know, I think I noted that it's  
8 weathered clay and organic soil.

9 Q Okay. And when you say "organic soil,"  
10 topsoil?

11 A Yes. Possibly, but it could also be a certain  
12 kind of soil. It's kind of spongy. It's very highly  
13 plastic.

14 Q Okay. But isn't it true that most of the  
15 places that you show gravel, it's embedded in clay?

16 A Well, there is organic soil in it as well. I  
17 mean, I can collate which logs have organic clay -- or  
18 I'm sorry -- organic soil.

19 Q Well, let's talk about that, then. Let's start  
20 at MP1.

21 A So I noted --

22 Q So the gravel there is from 3 feet --

23 A Yes. Right. And that's --

24 Q From 2 feet to 9 feet. Right?

25 A That's in clay.

1 Q And that's in clay.

2 MP-1A, that's --

3 A We skipped the top part.

4 Q Skipped the top part. Okay.

5 A MP2 we've got some gravel and organic soils  
6 followed by gravel and clays.

7 Q Okay. So you got gravel and clay and organic  
8 soil --

9 A Right.

10 Q -- in the first half a foot?

11 A Yes.

12 Q Right?

13 And then you got gravel in silty fat clay  
14 down to 7 feet -- down to -- down to 6 feet. Right?

15 A I'm sorry. Let me go back to that.

16 Yes, MP2, it's to 6 feet.

17 Q Okay. MP3, there's gravel in silty fat clay to  
18 organic soil down to 2 feet. Right?

19 A Yes.

20 Q And then there's a little bit of gravel noted  
21 in the top of the next interval, right, down to  
22 2.4 feet?

23 A Right.

24 Q And that's in clay?

25 A Yes.

1 Q And then boring IV-4, gravel in silty fat clay  
2 to organic soil in the top foot?

3 A Yes -- well, that's --

4 Q I'm sorry. IV-1?

5 A That's all we recovered.

6 Q Okay. And then IV-1A, same thing, plus gravel  
7 in clay from 2 feet -- well, from 3 feet to 4.3 feet.

8 A Right.

9 Q So when we look at that one and it says 3 to  
10 4.3, is the top of that interval at 3 feet or 2 feet  
11 below the ground surface?

12 A That's at 3 feet.

13 Q So up at the top, we start at zero?

14 A Right.

15 Q And then we go down to the bottom of the block  
16 that's shown as one, and now we're a foot below the  
17 surface. Is that right?

18 A Right.

19 Q And then we go down to the bottom of the block  
20 that says two in it, and we're 2 feet below the surface?

21 A Yes. That may be mistaken to where it is. I'd  
22 have to go back and look at my notes.

23 Q Okay. Anyway, it's 2 or 3 feet where it  
24 starts?

25 A Right.

1 Q But that's gravel in clay?

2 A Right.

3 Q And then on IV-2, we got gravel in clay and  
4 organic soil in the top 0.8 feet?

5 A Yes.

6 Q And then down to 1.1 feet, we've got gravel in  
7 clay?

8 A Right.

9 Q And then between 2.5 and 10.3 feet, we've got  
10 gravel in clay?

11 A Right. And we didn't recover past 10.3 to, I  
12 think, 14 feet.

13 Q Okay. And then in 2A, you didn't --

14 A Did not sample the top part.

15 Q Didn't sample the top part. Okay.

16 And then in IV-3, gravel in clay and  
17 organic soil in the top half a foot?

18 A Yes.

19 Q And then gravel in clay for the next 6 feet?

20 A Right.

21 Q And then we've already talked about AR2 --  
22 well, the very top of AR2, no gravel in the top half a  
23 foot. Right?

24 A That's what it looks like.

25 Q But then there's gravel in clay down to

1 11 feet?

2 A Yes.

3 Q Okay. Did you identify -- did you identify any  
4 gravel in any of your borings below those upper zones  
5 that we talked about in each of them?

6 A I don't believe we did.

7 Q Okay. So if you turn to Page 9 in your  
8 prefiled testimony, at line -- give me just a minute  
9 here. I can't read my own writing.

10 Page 9, the sentence in Line 8, "Generally  
11 I observed samples that included clays, silts, and  
12 interbedded gravels." And that's a reference to your  
13 observations of the boring work done by the Applicant in  
14 2016?

15 A Yes.

16 Q Isn't it true that the predominant material  
17 that you observed was clay?

18 A I did observe silts in these borings, but I  
19 also observed a large amount of clay; although, again,  
20 this is based on visual observations.

21 Q Didn't you observe a lot more clay than silt?

22 A From my visual observations, I'd have to go  
23 back and look. You know, I wouldn't say it's 50/50.  
24 I'd say that it's more clay than it is silt.

25 Q Okay. And isn't that true in all of the

1 borings that you did there was much more clay than  
2 anything else in those borings?

3 A Clay was a predominant matrix.

4 Q And there was a lot more of it than anything  
5 else, wasn't there?

6 A Silty, lean clays and fat clays, there was more  
7 of that in the borings. I'm just distinguishing  
8 between -- I'm saying that there's fat and lean clays  
9 there, distinguishing between the two, but those are all  
10 under the umbrella of clay.

11 Q Yeah, they're both clay. Right?

12 A Right.

13 Q And there was a lot more clay in all of your  
14 borings than there was anything else. Right?

15 A Yes, there was more clay than there was silt.

16 Q Vastly more clay. Right?

17 A I'm not sure what, I guess, you mean by "vastly  
18 more."

19 Q Well, give the judges an estimate of what  
20 percentage of the material in your borings was clay as  
21 opposed to -- let's have clay in one category and  
22 everything else in another. What percentage was clay?

23 A And everything else? With interbedded silt  
24 layers, I would say maybe -- it's hard -- it's hard to  
25 say, but 70 to 80 percent is clay.

1 Q You think 20 to 30 percent of the material  
2 encountered in your borings was something other than  
3 clay?

4 A I think there was -- it might be 10 percent,  
5 15 percent.

6 Q It might be 2 or 3 percent, might'n it?

7 A It's hard for me to say, but I'm not -- I  
8 wouldn't say that it's 2to 3 percent, might be a bit  
9 more with gravels and the interbedded silt layers that I  
10 saw.

11 Q In your prefiled testimony, you talk about  
12 cross sections. Did you do any cross sections as part  
13 of your work here in an effort to identify discrete  
14 layers of material in the subsurface?

15 A I did not.

16 Q So you did logs in the field during the  
17 drilling of the Protestants' borings. Right?

18 A Yes.

19 Q And is that -- is there any difference in those  
20 logs you did in the field and the logs that appear in  
21 Exhibit 6D?

22 A There are some differences. Things I may have  
23 called a CO in my original logs may have been changed.  
24 The classifications may have changed. It was an  
25 iterative process.



1 Q Okay. So you did some field logs, and then  
2 you're the one who did these logs that are in 6D.  
3 Right?

4 A Yes.

5 Q So you did both sets of work, the field logs  
6 and these final logs?

7 A Yes.

8 Q And yet there are many differences between the  
9 field logs and the final logs, aren't there?

10 A There are differences. They're qualified.  
11 It's -- the way that I complete final logs, it's an  
12 iterative process. Once there's lab results, I  
13 incorporate those. I've gone back and looked at  
14 sediment that was stored to prove up what I had in my  
15 original field logs.

16 Q To prove it up or to change it?

17 A To properly classify it.

18 Q Okay. Sometimes to prove it up, sometimes to  
19 change it?

20 A Well, it's to class -- I guess it would be  
21 to -- to -- I wouldn't call it change it. I'd say it's  
22 to verify it.

23 Q So you didn't change any of the classifications  
24 between your field logs and your final --

25 A I believe there's changes.

1 Q Okay. So when you went back to prepare the  
2 final logs, you would either keep what you had in the  
3 field log or you would change it. Right?

4 A The process of making the final logs is  
5 interpretive based on where I classify, where I put  
6 brakes. And so when I go back, you know, in the field  
7 you're kind of going with the pace of the drilling, and  
8 so it's important to go back and verify information  
9 that's in the field logs using soil sediment and lab  
10 results.

11 Q Okay. And I'm -- I understand all that. I'm  
12 not challenging that. I'm just asking you that for  
13 everything you put in your field log, when you went back  
14 to do your final log, for every entry in the field log,  
15 you either kept it the same or you changed it. Right?

16 A I suppose you could say there were some changes  
17 between the two.

18 Q Well, is there anything you did with those  
19 entries other than keep them the same or change them?

20 A I don't know what else I could do.

21 Q Okay. So some you kept the same and some you  
22 changed?

23 A Right.

24 Q Okay. And would you agree that you made well  
25 over a hundred changes on these logs between your field

1 logs and your final logs?

2 A I think it depends on what you classify as a  
3 change.

4 Q Something that's different.

5 A Something that is different. I'm not sure how  
6 many changes I made, but there are -- there are some  
7 changes, yes.

8 Q You don't think there are more than a hundred?

9 A I don't -- I'm not sure.

10 Q Do you think there are more than five?

11 A Yes.

12 Q Do you think there are more than 50?

13 A There may be more than 50 changes, and it  
14 depends on what it is that I changed.

15 Q No, it doesn't. My question to you has to do  
16 with the number of changes that you made between your  
17 field logs and your final logs. I'm not asking you what  
18 they are. I'm just asking you how many you made.

19 A There are some -- there are changes to the  
20 logs, yes.

21 Q You don't think there are more than a hundred?

22 A I really can't classify that. I mean, I can't  
23 quantify that.

24 Q Okay. Do you think that is a problem that you  
25 made changes from your field logs to get your final

1 logs?

2 A No.

3 Q Is that something that you would expect would  
4 happen in a logging program between field logs and final  
5 logs?

6 A Yes.

7 Q Now, you did -- when you were preparing your  
8 field logs, you actually included soil classifications  
9 in your field logs, didn't you?

10 A I did.

11 Q And that's a very unusual practice, isn't it?

12 A I don't think it's unusual. I think it's -- if  
13 it helps me to gauge, then that's something that I can  
14 include in the field logs. I'm trying to -- I'm trying  
15 to record as much information in sort of any initial  
16 observations as possible, and those end up changing,  
17 depending on a number of things.

18 Q How did you differentiate -- well, first, what  
19 is CH material?

20 A That's fat clay.

21 Q Okay.

22 A Highly plastic clay.

23 Q And what's CL clay?

24 A That's lean clay.

25 Q How did you distinguish between CL clay and CH

1 clay while you were preparing your field logs in the  
2 field?

3 A I would -- I would tactilely manipulate the  
4 material. There is a number of things you can do to,  
5 sort of, gauge, approximate whether it's a silty --  
6 whether it's a fat clay. It can be difficult to do that  
7 in the field without lab results, but you can  
8 approximate based on plasticity.

9 You can roll up the sediment in your hand  
10 and, sort of, create a little thread. And the more it  
11 threads out, the finer you can make the thread, the more  
12 plastic the material is. If you smear the material and  
13 it smears in a waxy kind of sheen, then it's also likely  
14 a more plastic clay.

15 Q Isn't it true that there are quite a few places  
16 in your logs where you changed a CL classification on  
17 your field log to a CH classification on your final log?

18 A I changed -- I changed some of those  
19 classifications, yes.

20 Q Did you change any the other way?

21 A I may have.

22 Q You don't recall doing that, though?

23 A I -- I can't -- I can't remember exactly. I  
24 would really have to go back and compare.

25 Q Mr. Rubinov, we're going to turn to Exhibit

1 130EP-40, which it's got this on the cover.

2 MR. RYAN: Your Honor, may I approach?

3 JUDGE BELL: Yes, you may.

4 Q (BY MR. RYAN) So. Mr. Rubinov, do you have  
5 there what's been marked as Exhibit 130EP-40?

6 A Yes.

7 Q And these pages are numbered down in the lower  
8 right-hand corner, Rubinov 620 through Rubinov 662. Do  
9 you see those page numbers?

10 A Yes.

11 Q Okay. So as we're going through here, talking  
12 about these, let's use those page numbers. Okay?

13 A Okay.

14 Q And the first page, Rubinov 620, that's a map  
15 that is similar to your 6B. Right?

16 A Yes.

17 Q Okay. And then from 621 through 662, what are  
18 those pages?

19 A Those are my field lithologic logs.

20 Q Okay. It's got your field logs and also your  
21 recovery logs. Right?

22 A Yes.

23 Q So if we talk about 621, 622, and 623, that is  
24 the field log --

25 A Right.

1 Q -- for boring MP1?

2 A Yes.

3 Q And then Page 624 and 625, that's the recovery  
4 log for that boring?

5 A Right.

6 Q Okay. Why don't we start with the recovery  
7 log. Using the recovery log for MP1, would you explain  
8 what that is?

9 A It's -- I documented the amount of material  
10 that we sampled in an interval and the amount we  
11 recovered. And I've also documented where samples --  
12 where the sediment was bagged at the discrete intervals  
13 for preservation.

14 Q Okay. And how did you identify where the  
15 sample was bagged for preservation?

16 A If you see "Sample Interval" in the last column  
17 on the right, in each one of those sets of columns --

18 Q Okay.

19 A -- the sub column, it says "Sample Interval,"  
20 so if I -- let's just say, for example, zero to one  
21 here, I've got zero to one sample interval, and I've got  
22 an X there. That would indicate that we put that sample  
23 in one bag.

24 Q Okay. And then you went down to 2 feet to  
25 3 feet, and you put a sample in another bag?

1 A Right.

2 Q And then 3 feet to 3 and a half feet, you put  
3 that sample in a separate bag?

4 A Yes.

5 Q Okay. So on this Page, Rubinov 624, we've  
6 actually got four columns, and each has three sub  
7 columns in it. Right?

8 A Yes.

9 Q And the first column is zero to 10 feet, then  
10 10 to 20 feet, 20 to 30 feet, 30 to 40 feet?

11 A Right.

12 Q Okay. So we've talked about the sample  
13 interval column. What does the REC percent column --  
14 what does that tell us?

15 A Really, that percentage symbol shouldn't be  
16 there. It's just the recovery. Here I've got it noted  
17 as -- and again, taking example from zero to one. Zero  
18 to one is recovered, and one to two is not recovered.  
19 And --

20 Q And two --

21 A So it includes a sample interval -- we were  
22 recovering zero to one there.

23 Q Okay. And then the next recovery that you had  
24 was from 2 to 3 and a half feet?

25 A Right.



1 Q And that 2- to 3-and-a-half-foot interval, you  
2 divided that into two discrete samples and bagged those  
3 separately.

4 A Right.

5 Q That's what we can tell from looking at this.  
6 Right?

7 A Yes.

8 Q So if you'll sort of keep a finger there and  
9 then turn back over to Rubinov 621, the first page of  
10 the field log for boring MP1, if I look in the column  
11 that says "SANP" at the top, what does that column show  
12 me?

13 A That's the interval that we intended to sample  
14 through one particular, I -- guess, I don't know if  
15 you'd call it push or continuous operation of recovering  
16 a sample.

17 Q Okay. So that was a recovery effort?

18 A Right.

19 Q Okay.

20 A So we intended to go from zero to 2 feet and  
21 recover that sample.

22 Q Okay. And is that a decision that's made  
23 before you start drilling, or is that a decision that's  
24 made as you're out in the field and you say, well, let's  
25 go 2 feet here --

1           A       It's typically controlled by the sampling  
2 method.  So a Shelby tube of 2 feet would be pushed  
3 about 2 feet, and a continuous core, 5 feet, would be  
4 pushed 5 feet.

5           Q       Okay.  Other than that, can we tell by looking  
6 on here what the sampling method was?

7           A       Yes.  I've got the sampling method recorded in  
8 the header there.  You see zero to 10, I've got Shelby  
9 tube, and then 10 to 50, I have continuous core.

10          Q       Okay.  Just up above the date?

11          A       Right.

12          Q       Okay.  Would you turn over to MP2, the boring  
13 log for MP2 that starts on Rubinov 630?

14          A       Okay.

15          Q       So the first column is depth.  The next column  
16 you've testified about; that's your intended sample  
17 collection intervals.  Right?

18          A       Right.

19          Q       What's the next one?

20          A       The next one is the footage of sample  
21 recovered.

22          Q       Okay.  So where it says -- what does that say?  
23 Four-point --

24          A       4.8.

25          Q       Okay.  So that means that you had intended to

1 get a 5-foot sample, and you managed to recover 4.8 feet  
2 from that interval?

3 A Right. Typically that I -- that I measured  
4 4.8 feet on the core when it was brought up to the  
5 surface.

6 Q Okay. How about the next column?

7 A That's 5 to 10. And it looks like 2 feet.

8 Q Oh, no. The next column.

9 A I'm sorry. The next column is my preliminary,  
10 I guess, classification of the type.

11 Q Well, the column that says "SUBINT."

12 A Oh, I'm sorry. I'm running in front of you.

13 Q What does that mean?

14 A Sub interval. I typically use that column to  
15 sort of delineate where I thought a change in lithology  
16 was for some reason.

17 Q Okay. Then the next column says "type"?

18 A Right.

19 Q And what are you doing there?

20 A Again, it's a sort of preliminary  
21 classification of what I think the material is.

22 Q Okay. And so there, because your sub interval  
23 shows 0.5, does that mean that you got silty soil and  
24 clay from the surface down to half a foot?

25 A That's what I -- that's what I had originally

1 thought, yes.

2 Q Okay. And then down below that is silty clay?

3 A Yes.

4 Q Okay. And then the next column you note the  
5 color of the material?

6 A Right.

7 Q And then in the next column is your field  
8 classification of the material?

9 A Right.

10 Q And right here you show CL in the first sub  
11 interval there. Right?

12 A Right.

13 Q And then CH?

14 A Right.

15 Q All right. And then the next column -- you've  
16 got a big, wide column with several headings. You've  
17 got "density"?

18 A Right.

19 Q What does that reference?

20 A How dense the sample is and kind of used a  
21 pocket penetrometer to give me some indication of how  
22 dense the sample is.

23 Q And a pocket penetrometer is a little handheld  
24 instrument that's got a spring and a gauge, and you can  
25 shove it up against something?

1           A       Right.  You shove it into a material, and if  
2 the material has less density, the spring will sort of  
3 launch or push the button into there, and you get a  
4 certain reading off of that pocket penetrometer.

5           Q       Okay.  And so the higher the number under  
6 density, the harder the material is?

7           A       The more dense it is, I suppose, yes.

8           Q       It just means you can't push the device in as  
9 far?

10          A       Right.  You push it all the way in and it  
11 doesn't really give, and that's what I'm doing there.

12          Q       So here, up near the surface, you had a 3.5 and  
13 a 2.5 reading up in your silty soil and silty clay.

14          A       Right.

15          Q       But then as you get deeper into the hole,  
16 you've got 4.5s and 4.5-plus?

17          A       Right.

18          Q       Is -- 4.5 or 4.5-plus, is that the highest  
19 reading that you're going to get from a pocket  
20 penetrometer?

21          A       Yes.

22          Q       Okay.  Then you made notes about plasticity of  
23 the material?

24          A       Right.

25          Q       A note about its moisture?

1 A Right.

2 Q And then you've got some other general  
3 descriptions of the material.

4 A Yes. I may or may not have followed those  
5 columns when I was describing the sediment. I may have  
6 followed them to some extent and then had some other  
7 notes in that column.

8 Q Okay. For instance, here, once you get down to  
9 about the one, two, three, fourth or fifth line, you're  
10 no longer following the sub columns up there; you're  
11 just putting general descriptions of the material?

12 A Right. I followed it at the beginning, so I've  
13 got, you know, high plasticity, moist to dry, and then  
14 below that, for the same interval, I've got some  
15 descriptions.

16 Q Okay. I'll tell you what I want to do next. I  
17 want to go through this boring from top to bottom.

18 A Sure.

19 Q And I want you to identify things that you  
20 changed between your field log and your final log. And  
21 I think probably -- well, let's see. Let me see if I've  
22 got another copy of your logs here. Rather than asking  
23 you to mark on -- oh, do you have another copy?

24 A This is the replacement.

25 Q The final replacement or the middle

1 replacement?

2 A I think this is the final replacement.

3 Q Does it have -- does it include everything all  
4 the way over the entire columns?

5 A Yes. Yes. It's not cut off.

6 Q Okay.

7 MR. RYAN: Well, Your Honor, I guess what  
8 I would propose to do, instead of having him mark on  
9 that one, I've got another copy, and if I could just  
10 mark this as a separate exhibit, then that can be  
11 preserved as it is, and I'll just have him mark on this  
12 one, and then I can get copies made of this after he  
13 marks it up.

14 JUDGE BELL: I think that's fine. Does  
15 anybody have a problem with that?

16 MS. PERALES: No.

17 JUDGE BELL: What about this final  
18 revision? Did it actually make it into the record yet?  
19 Judge Qualtrough was just mentioning that we need to  
20 make sure that it is.

21 MS. PERALES: It's up there. We just need  
22 to make sure that it's in the binder. I can either do  
23 it during a break, or I can do it after he's done. I'll  
24 just go and make sure all of the pages have been  
25 replaced in the binder. But they are all in there.

1 MR. RYAN: I'll tell you what, why don't  
2 we do that now.

3 MS. PERALES: Okay.

4 MR. RYAN: Because one of the things I  
5 will do is, I'd like to ask him, is this an actual copy  
6 of what's shown on those.

7 MS. PERALES: Okay. That makes sense.

8 MR. RYAN: If that's okay with y'all?

9 JUDGE BELL: That's fine.

10 Do you want to just take a break then now,  
11 for 10 minutes, and come back at 2:30?

12 MR. RYAN: Sure. Okay. All right.

13 Thanks.

14 JUDGE BELL: Let's do that.

15 (Recess: 2:22 p.m. to 2:39 p.m.)

16 (Exhibit Applicant No. 130EP-44 marked)

17 JUDGE BELL: All right. We are back on  
18 the record after a short break. And we were  
19 straightening out an exhibit situation. Ms. Perales,  
20 we've now made a second replacement for Protestants  
21 Exhibit 6D?

22 MS. PERALES: That's right.

23 JUDGE BELL: All right. And I'm assuming  
24 there aren't any objections to that replacement 6D from  
25 any party?



1 MR. RYAN: No objection.

2 JUDGE BELL: All right. So 6D is  
3 readmitted with the corrected version. And I guess we  
4 can continue with cross-examination.

5 MR. RYAN: Thank you, Your Honor.

6 Q (BY MR. RYAN) Mr. Rubinov, do you see  
7 Exhibit 130EP-40 -- no, you don't, because I have it in  
8 my hand.

9 Mr. Rubinov, do you have Exhibit 130EP-44?

10 A Yes.

11 MR. RYAN: And that's an exhibit that  
12 nobody else has because that's the one I'm going to get  
13 him to mark on.

14 JUDGE BELL: All right.

15 MR. RYAN: And after he is finished with  
16 that, we'll have copies made but --

17 Q (BY MR. RYAN) The first thing I want you to  
18 do -- and I came up with an idea during the break,  
19 unless you spent all that time poring over the log for  
20 MP2, I noticed that the log for AR2 is shorter. So if  
21 it's okay with you, let's look at that one. Okay?

22 A Okay.

23 Q First of all, what I'd like you to do is to  
24 confirm that the log for AR2, on the last page of  
25 Exhibit 130EP-44, is identical to the log of AR2 in

1 Exhibit 6D.

2 A Yes.

3 Q Okay. Is there a yellow highlighter up there?

4 A Yes, there is.

5 Q Okay. All right. So what I'd like you to do,  
6 let's start with Exhibit 130EP-44, and let's start with  
7 the recovery log for AR-2, which is the last two page --  
8 the last page of Exhibit 130EP-40.

9 A Okay.

10 Q So looking at that recovery log, in the first  
11 10 feet, are there any differences in the first two  
12 columns -- in the second and third column on 130EP-44  
13 from what is shown on the recovery log in 130EP-40?

14 A You know what? There is.

15 Q Okay. Would you -- maybe on these, I think it  
16 might be easier if maybe you just put a little diagonal  
17 yellow mark on each place where there's a difference  
18 between the field log and the final log.

19 A You know, looking at this, it seems that  
20 there's just an editing error here. If you look at IV-3  
21 and AR2, those recovery -- sample recovery intervals,  
22 they're the same. I believe that that was a copy error.

23 Q Okay. Well, whatever it is, let's go through  
24 and mark the differences. Okay?

25 A Sure.

1 Q So does that mean, for instance, in the second  
2 column on 130EP-44 where there are one, two, three,  
3 four, five, six, seven, eight blue rectangles. Isn't  
4 that right? Eight blue rectangles there?

5 A Yes.

6 Q And those are all different from the field log  
7 to the final log, aren't they?

8 A I'm just checking to see --

9 Q Sure.

10 A -- what happened here.

11 They are slightly different.

12 Q Okay. So would you just put a little diagonal  
13 yellow line in each one of those blue rectangles to show  
14 that those changed.

15 A (Complies.) Do you want me to use the blue  
16 one?

17 Q Well, is that yellow one not showing up?

18 A I'm sure it won't.

19 Q Okay. Let's use the blue one.

20 JUDGE QUALTROUGH: Yellow typically  
21 doesn't copy.

22 MR. RYAN: Oh, okay.

23 Q (BY MR. RYAN) Yeah, use the blue one.

24 JUDGE BELL: Just so I'm understanding  
25 what he's marking, he's marking in the sample intervals

1 to show that the sample intervals changed from the  
2 recovery log on Rubinov 662 to the final field log which  
3 is going to be --

4 MR. RYAN: 130EP-44.

5 JUDGE BELL: Okay. Is that right  
6 Mr. Rubinov?

7 THE WITNESS: Yes.

8 JUDGE BELL: All right. Thank you.

9 Q (BY MR. RYAN) So Mr. Rubinov, would you put a  
10 dark blue line in each of those eight light blue  
11 rectangles.

12 A They're not all -- they're not all different.

13 Q Oh, okay. So let's just start at the top of  
14 the column and we'll go down and you tell us which ones  
15 you marked.

16 Did you mark the first one?

17 A Sure. Yes. The first one, the second one.

18 Q The third one?

19 A Let me just go back to my geologic notes.

20 Not the third one. The fourth one needs  
21 to be changed.

22 Q Okay. Did you put a mark in it?

23 A Yes.

24 And the rest seem to be correct.

25 Q Okay. So, I guess, here's the problem I'm

1 having. I'm looking at the recovery log on Page Rubinov  
2 662 of Exhibit 130EP-40, and if I look at the sample  
3 interval column there, if I start at 5 feet, it looks  
4 like it shows there was a sample from five to six, one  
5 from six to seven, seven to eight, eight to nine, and  
6 that's not what's shown on the final log for AR2, is it?

7 A No. That's because the -- that's that sample  
8 interval there is the samples that I bagged, so there's  
9 a bag that's marked zero to .5, .5 to 1, 1 to 2, 2 to 3.

10 Q Uh-huh.

11 A It's essentially -- it's not what's recovered,  
12 but it's what -- it's how the interval was split between  
13 bags of samples.

14 Q Okay. And you're saying that that's not  
15 intended to be shown in any way --

16 A Right.

17 Q -- on the final log?

18 A Right.

19 Q Okay.

20 A That is recorded in here.

21 Q Okay.

22 A In my field notes.

23 Q What is recorded here?

24 A The samples, the sample intervals, the ones --  
25 the way that they were bagged.

1 Q Okay. So on the final log for AR2, even though  
2 there's a column that says "Sample Interval," that's not  
3 really what that is supposed to represent?

4 A Right. That represents how much was intended  
5 to be sampled from that interval in terms of drilling.  
6 So --

7 Q Okay. And --

8 A -- that would be on the lithologic log itself.  
9 And again, it looks like it was an editing error in here  
10 where AR2 was actually reflecting what looks like IV-3.

11 Q Okay. All right. What about the column that  
12 says "Sample Recovery" at the top of it on the final log  
13 for AR2, is it --

14 A I'm sorry. The sample recovery?

15 Q Yeah. Is that any different --

16 A Yes. I'd like to go to a different -- a  
17 different log.

18 Q Yeah, I bet you would.

19 A So it's less confusing.

20 Q No. We're going to do this one.

21 A Okay.

22 Q Would you put a -- can you just put, maybe, a  
23 little dark blue tick mark so that you don't cover up  
24 the value that's in the light gray squares?

25 A Sure.

1 Q Do you see what I'm saying?

2 A Sure.

3 Q Put a dark blue mark somewhere inside each of  
4 those light gray rectangles under the sample recovery  
5 column to show which ones changed from field to the  
6 final log.

7 A Okay.

8 Q Same three?

9 A No. Actually it's the first one, the second  
10 one, and the fourth one.

11 Q Okay. Oh, I thought those were the three you  
12 marked in the blue columns too?

13 A Right. Well, as you can see from 11 -- or 10  
14 to 15, I have sample recovery 4.5, whereas it's actually  
15 5.

16 Q Okay.

17 A But the push was 5 originally.

18 Q Okay. So just to try and keep up here, am I  
19 right that you've now put six blue marks --

20 A Yes.

21 Q -- on there? Okay.

22 Okay. Then the next column says  
23 "Sampler," that says "Hollow Stem Core Barrel."

24 A Right.

25 Q And is that a reference to the same type of

1 sampling method that is identified on the field log?

2 A Yes.

3 Q Okay. And what does the field log call it?

4 A It says "Continuous Core."

5 Q Okay. But that means a hollow-stem core  
6 barrel?

7 A Yes.

8 Q Okay. Then let's go over to the column that  
9 says "USCS." What is that?

10 A Again, it's a unified soil classification  
11 system.

12 Q Okay. So the first interval shown on the final  
13 log says "CH/OH." Right?

14 A Oh, in the final log, yes.

15 Q And on the field log, it says "CL"?

16 A Right.

17 Q Let's make a test case out of this one, since  
18 we can't hardly read that CH/OH anyway. Is there any  
19 way you can -- just try marking that with a blue marker.  
20 Does it completely obscure that thing?

21 A No. I put a dot in there.

22 Q Okay. All right.

23 All right. Then after that, from a half a  
24 foot to 20 feet, you've got CH. Right?

25 A Right.



1 Q And if we look on the field log, from a half a  
2 foot to 20 feet, you've got one, two, three -- you've  
3 got four classifications. Right?

4 A Right.

5 Q The first one is CL/CH, then CL/CH, then CL/CH,  
6 and then CL. Right?

7 A Right.

8 Q So that's four changes there between the field  
9 log and the final log. Right?

10 A I wouldn't say that.

11 Q Okay.

12 A Because I was identifying these in the field  
13 according to sample interval, rather than to the  
14 entire -- I wasn't making the final field log. I'm  
15 sorry -- the final log in the field. So what I do when  
16 I go back to the office is I look through the entire log  
17 and I sort of classify materials into intervals. And so  
18 the interval here, I've got 5 to 11, 11 to 20. So these  
19 classifications here on my field logs are really things  
20 that I thought that that sample interval from zero to 5,  
21 and 5 to 10 may be. So I wouldn't call those two  
22 different changes.

23 Q Well, on your field log, don't you classify the  
24 material from 0.5 feet to 5 feet as CL/CH?

25 A Right.

1 Q And on your final log, you classify that  
2 material as CH. Right?

3 A Sure.

4 Q So that's a change?

5 A That's -- right. That would be one change.

6 Q Okay. Will you put a change somewhere up in  
7 that cross hatched CH under the USCS column on the final  
8 log?

9 A Okay.

10 Q All right. And then on the field log from 5 to  
11 11 feet, you show CL/CH?

12 A Right.

13 Q And on the final log, you show CH?

14 A Yes. And because I classified the interval  
15 from 5 to 11 -- .5 -- I'm sorry -- to 11 as a CH, that  
16 interval -- that's only one change.

17 Q Well, let's talk about that.

18 Your field log, you have a classification  
19 for the material from 0.5 feet to 5 feet. Right?

20 A Right.

21 Q And then you have another -- then you  
22 classified the material from 5 feet to 10 feet.

23 A So if you imagine out in the field, I receive  
24 the first sample interval from zero to 5 feet, and I  
25 take a look at it and I note what I think that material

1 is, without having knowledge of what's to come after  
2 that. So when I sample -- so I'll put down CL/CH if I  
3 think that may be -- that's a ballpark, something to  
4 review later.

5 Q Okay.

6 A Then we sample 5 to 10; that comes up. And  
7 then I do the same thing there. So what -- I'm not  
8 trying to classify an entire interval like I would in  
9 the final log there. I'm really -- it's kind of a  
10 step-by-step process.

11 Q Yeah, you're just doing each sample at that  
12 point?

13 A Right. So it's possible that, you know,  
14 eventually I would go back and I would say that those  
15 two look similar enough that they're actually one  
16 interval. And then I would make a classification of  
17 that.

18 Q Okay. I understand that. But on your field  
19 log, you classified the material from 5 to 10 feet as  
20 CL/CH?

21 A Right.

22 Q And in your final log you changed it to CH?

23 A Right.

24 Q That's a change?

25 A That's already -- I believe that that change is

1 already reflected in the dot that I put in the CH.

2 Q The dot that you already put there, that's for  
3 0.5 to 5 feet. Right?

4 A I guess I --

5 Q Didn't you change that from CL/CH to CH?

6 A Again, if this is counted as one interval, if I  
7 had said CL/CH a few times, it would still be one  
8 interval. I agree that there's a change there. I guess  
9 I'm just saying that the change is not two changes; it  
10 is one change.

11 Q Well, why don't we do this, every time you made  
12 a change, I want you to note it on here, and on  
13 redirect, if Ms. Perales wants to ask you why it's not  
14 really a change, I guess she can do that. But if you  
15 identify it as a change, I want you to mark it. And  
16 what you told me is that you changed your classification  
17 for that .5 to 5-foot interval, and then you changed  
18 your classification for the 5 to 10 interval. And so I  
19 want you to note each one of those.

20 A Okay. I guess I'll go with that.

21 Q Okay.

22 MS. PERALES: Your Honors, I'm going to  
23 object. I mean, I think that this witness has testified  
24 that he disagreed with Mr. Ryan's characterization and  
25 that he views this as one change. So if Mr. Ryan is

1 trying to get Mr. Rubinov to mark on this exhibit what  
2 Mr. Ryan considers a separate change, then that should  
3 be clear in the record.

4 JUDGE BELL: And I think it is. I mean,  
5 he has already explained that he considered it -- and I  
6 understood what he was saying and why he considers it to  
7 be just one change.

8 So for the record, you're going to be  
9 marking what Applicant's counsel considers to be a  
10 change --

11 MR. RYAN: I don't want you to do that,  
12 Mr. Rubinov.

13 JUDGE BELL: What she's saying makes  
14 sense, and I don't know what the objection is, but  
15 there's got to be a better way to do this.

16 JUDGE QUALTROUGH: Yeah, I think her  
17 objection is that what he's marking is Mr. Ryan's  
18 characterization and not the witness's testimony.

19 MR. RYAN: Okay.

20 JUDGE BELL: Right.

21 MR. RYAN: And I don't want you to do  
22 that. Did you mark that one yet?

23 THE WITNESS: I haven't.

24 MR. RYAN: Okay. I don't want you to do  
25 that.

1 Q (BY MR. RYAN) Let me ask you this. On your  
2 field log, how did you classify the material in interval  
3 from 5 feet to 10 feet?

4 A I classified it -- in the classification, it  
5 says CL/CH, silty clay.

6 Q And in your final log, how did you classify  
7 that interval?

8 A As a CH.

9 Q Do you consider that a change?

10 A I believe, according to your definition of  
11 change versus no change, that's a change.

12 Q Well, I don't want you to use my definition.  
13 Isn't it a change under any definition in the world?  
14 One of them says one thing and the other one says  
15 something else. Right?

16 A That's true.

17 Q Isn't that a change?

18 A It is -- it is a change. Although, I do have  
19 to say that I've got CH in there, so if I say CL/CH,  
20 that might mean that it's one or the other.

21 Q I understand that. But let me ask you this.  
22 If you hadn't changed your classification for 5-foot to  
23 10-foot interval, wouldn't it say CL/CH on the final  
24 log?

25 A Yes, that's true.

1 Q So you changed that?

2 A It's a change, yes.

3 Q Would you put a dot there to reflect that?

4 A I have.

5 Q Do you have two dots in that?

6 A No. I've got one dot.

7 Q Did you change your classification for 0.5 feet  
8 to 5 feet between your field log and the final log?

9 A I'm sorry. Repeat the question.

10 Q Did you change your classification for 0.5 feet  
11 to 5 feet between the field log and the final log?

12 A Yes.

13 Q Did you change your classification in the  
14 interval from 5 feet to 10 feet between your field log  
15 and the final log?

16 A My opinion is that that was one interval, and I  
17 wrote CL/CH in there twice.

18 Q And in the final log, does it say CL/CH  
19 anywhere in that interval?

20 A No.

21 Q But you had it in three different places on the  
22 field log?

23 A Right.

24 Q And how many places is it --

25 A Right now, I think we're talking about just the

1 .5 to 11 feet or at 10 feet. Right? Is that correct?

2 Q Well, are you going to claim the same thing for  
3 the next interval, that you didn't change it either?

4 A I haven't looked at that, but -- well, if you  
5 finish with this, I'll be able to look at the next one  
6 and decide.

7 Q Did you change the classifications for two  
8 intervals above 10 feet -- for three intervals above  
9 10 feet from your field log to your final log?

10 A I'd have to say that I defined interval  
11 differently from the field log and the final log.

12 Q Okay. So you changed your designation of the  
13 interval?

14 A No. Interval in the field log is -- it goes  
15 according to the physical change from one sample to the  
16 next. So there's -- the first sample is taken from zero  
17 to 5 feet and the first .5 feet were one interval, the  
18 second 5 feet were part of an interval that continued  
19 down from 5 to 10 feet. And that is what's in my final  
20 log.

21 Again, the field logs are there for me to  
22 initially describe the sediment, and the final  
23 lithologic logs reflect what I believe is the geology in  
24 terms of different strata layers.

25 Q Well, maybe we'll come back to this.



1                   Let's go down to 11 feet.

2           A     Okay.

3           Q     In your field log, how did you classify the  
4 interval from 11 feet to 15 feet?

5           A     It appears CL/CH.

6           Q     And how did you classify that interval in your  
7 final log?

8           A     As CH.

9           Q     Do you think that's a change?

10          A     Yes.

11          Q     Okay.  Would you put a mark there to indicate  
12 that?

13          A     (Complies.)

14          Q     Okay.  On your field log, how did you classify  
15 the interval from 15 feet to 20 feet?

16          A     As a CL.

17          Q     And on the final log, how did you classify that  
18 interval?

19          A     I grouped it as a silty fat clay, CH.

20          Q     So you changed it from a CL to a CH?  Or you  
21 don't think that's a change?

22          A     I'm just trying to wrap my head around how to  
23 explain this.

24          Q     All I'm asking you is if you changed it?  It  
25 used to be CL --

1           A       I feel maybe the dots need to go perhaps on the  
2 field log rather than on the final log.

3           Q       Well, let me ask you this.  If we did that, how  
4 many dots would you have put under the classification  
5 column on the field log by now?

6           A       Because the -- those refer to sample intervals,  
7 then I would put five dots, I think.

8           Q       So if you're marking the changes on the field  
9 log, there would five dots; but if you're marking them  
10 on the final log, there would be three?

11          A       Right.

12          Q       Do you understand how that seems ridiculous?

13                   MS. PERALES:  Objection.  It's just  
14 argumentative.

15                   JUDGE BELL:  Sustained.

16                   MS. PERALES:  I understand.  I think we  
17 could clear it up on redirect.

18                   JUDGE BELL:  Right.  Let's just keep  
19 moving.

20          Q       (BY MR. RYAN)  So Mr. Rubinov, did you change  
21 the classification for the interval between 15 and  
22 20 feet from what you put on your field log to what you  
23 put on your final log?

24          A       Yes.

25          Q       Would you put a dot there somewhere between 15

1 to 20 feet to indicate that change.

2 A (Complies.)

3 Q Did you do that?

4 A Yes.

5 Q Now, if we turn over to the next page in  
6 130EP-40, that's the continuation of the log -- of the  
7 field log for AR2. Right?

8 A Yes.

9 Q Did you make any change for the classification  
10 for the interval between 20 and 25 feet between your  
11 field log and your final log?

12 A No.

13 Q Did you make any change for your classification  
14 of the interval between 25 feet and 27 and a half feet  
15 between your field log and your final log?

16 A Yes.

17 Q Okay. Would you put a mark to indicate that  
18 change.

19 A (Complies.)

20 Q Did you make a change to the classification  
21 between 27 and a half feet and 30 feet?

22 A Yes.

23 Q Would you put a mark to indicate that change.

24 A (Complies.)

25 Q And did you make a change to your

1 classification for the interval between 30 feet and  
2 35 feet?

3 A Yes.

4 Q Would you put a mark to indicate that change.

5 A (Complies.)

6 Q Now if we go back to Page 660, looking at your  
7 descriptions here, zero to 5 feet, both of them say dark  
8 gray. Right?

9 A Right.

10 Q Do you have a reference on your field log to  
11 organic -- oh. Do you have a reference on your field  
12 log to organic?

13 A I have a reference to topsoil.

14 Q Okay. You call it moist, high plasticity.  
15 That didn't change. Right?

16 A Right.

17 Q Now, what about stiff? Is that a change?

18 A No. I -- that's -- that's off of the USCS  
19 guideline for -- it's a comparison of the pocket  
20 penetrometer reading, the density reading, and what they  
21 classify it as. So 1.75, I think, falls into the -- and  
22 it would be stiff. There's classifications depicted in  
23 USCS.

24 Q Okay. And it's your understanding that 1.75  
25 fits within the stiff range?

1 A Right.

2 Q Okay. Pretty sure about that?

3 A I'm fairly certain.

4 Q What's more dense than stiff?

5 A Very stiff.

6 Q Okay. And then we get into hard?

7 A Right.

8 Q Okay. Then down there in your next interval,  
9 you've got light greenish gray?

10 A Yeah, right.

11 Q You're going to have to help me out with what  
12 it says after that.

13 A To light brown/brown. And so I classified that  
14 as brown.

15 Q Okay. Silty fat clay. So that's a change.  
16 Right? Is that CH material?

17 A Right. That's a designation for CH.

18 Q Okay. But we already accounted for that over  
19 in your change to the USCS. Right?

20 A Right.

21 Q All right. Fine to medium gravel?

22 A Right.

23 Q That's in both. Right?

24 A Yes.

25 Q All right. Moist to dry?

1           A       So, because I classified .5 to 10 as one  
2 interval, you see that it says moist from .5 to 5, and  
3 then moist to dry from 5 to 10. The moist to dry  
4 encompasses that description.

5           Q       So with regard to the interval between 0.5 and  
6 5, you'd -- you had described that as moist on your  
7 field log, but now you have it as moist to dry, and  
8 you're saying that's somewhere in the same range?

9           A       Right.

10          Q       Okay. Now we get to very stiff. Is that based  
11 on the 3.0 reading?

12          A       Yeah. Yes.

13          Q       Okay.

14          A       I think so.

15          Q       Then you say laminated clay and silt.

16          A       Uh-huh.

17          Q       Well, here on the field log, it says laminated  
18 clay and iron seam/layers. Right?

19          A       Right.

20          Q       Is there a reference to laminated clay and silt  
21 on the field log for this interval?

22          A       The iron layers, that is typically the silt.  
23 If it's a hard iron oxide layer that's mineralized, I  
24 would classify that in the field as an iron oxide layer.  
25 Usually, the iron layers were the silty layers. And

1 this is from the way that I -- I write these on the log.

2 Q Okay. So in the field, you found something  
3 that you described as an iron -- as iron seams and  
4 layers. And then in the final log, you called that  
5 silt?

6 A Yes. Because when I say "laminated clay" --

7 Q Uh-huh.

8 A -- laminated means very fine interbedded layers  
9 of a material.

10 Q Uh-huh.

11 A And so the clay is different than the silt. So  
12 typically, the silts will be iron-bearing because they  
13 probably have some water percolating through there, and  
14 so you've got some iron oxidation going on there. And  
15 so when I say laminated silts into clay, that would  
16 refer to -- what I said here says to me that that's a  
17 silt layer. And that's according to my own definition  
18 of it as I'm writing the notes.

19 Q Okay. So you're saying that what you identify  
20 as iron seams and layers in the field is the same thing  
21 that you call silt --

22 A Right.

23 Q -- when you sit down and do the final log?

24 A Yes, typically.

25 Q Do you consider that a change?

1           A     I don't.

2           Q     Calling something iron seams and layers in one  
3 place and calling it silt in another place, that's not a  
4 change?

5           A     Well, I think the intention was the same.

6           Q     That wasn't my question.

7                     Is that a change in the description?

8           A     So the -- the field logs partially are not  
9 something that's to be used by others. It's something  
10 that I use to interpret the geology, and I may write  
11 something like that. And then when I transfer it to the  
12 final log, I make sure to make that something that  
13 everybody can understand, not just me. And so --

14          Q     So are you saying that when you're out in the  
15 field, what you meant to write down was silt?

16          A     Right. Iron bearing silt.

17          Q     As a note to yourself, instead of writing silt,  
18 you wrote iron seam/layers?

19          A     Right.

20          Q     That's some shorthand that you use?

21          A     Laminated clay and iron layers. Those  
22 typically are silt. And in retrospect, I probably  
23 should have put iron silt layers in there.

24          Q     So iron seams/layers --

25          A     Right.



1 Q -- is a shorthand version to you of the word  
2 "silt"?

3 A It's something that I can infer from what I  
4 wrote.

5 Q Did you put anything on the final log about  
6 iron seams and layers?

7 A I've got some, it looks like, cemented iron  
8 oxide layers from 10 to 11.

9 Q But that's not what this entry on the field log  
10 is talking about, is it?

11 A Right.

12 Q So do you have any place on your final log  
13 where you talk about the iron seams and layers that are  
14 noted here between .5 and 5 feet on the field log?

15 A I don't believe I specifically say iron "oxide  
16 bearing" silt. I just call it silt.

17 Q So that's a change.

18 A That -- I would suppose that's a change.

19 Q Okay. Would you put a mark somewhere in that  
20 rectangle to indicate that.

21 A (Complies.)

22 Q On the field log, you say "silt seams." And on  
23 the final log it says "laminated silt layers"?

24 A Right.

25 Q Why didn't you write silt seams on the final

1 log?

2 A The laminated, that is basically the definition  
3 for a seam. Seam is something very small. And so a  
4 laminated clay and silt layer would -- it will be  
5 defined as a seam. If I'm saying that correctly.

6 Q So in the field log, you wrote down "silt  
7 seams"?

8 A Right.

9 Q And in the final log, you wrote down "laminated  
10 silt layers." Right?

11 A I'm sorry. Hold on. Let's go back a little  
12 bit. I'm getting confused myself here.

13 Q After frequent gypsum nodules, then it says  
14 "and silt seams."

15 A Are you talking about the field logs?

16 Q Yes.

17 A Oh, okay. Right. Okay. And silt seams, yes.

18 Q The final log doesn't say anything about silt  
19 seams, does it?

20 A Yeah, it looks like I just wrote "laminated  
21 silt layers."

22 Q So that's a change?

23 A I suppose so.

24 Q Okay. Would you put a mark in there for that  
25 one.

1 A (Complies.)

2 Q Okay. And then on the field log, you talk  
3 about "iron nodules," and on the final log you say "iron  
4 oxide nodules"?

5 A Yes.

6 Q Same thing?

7 A Yes.

8 Q Okay. Then on the field log, between 5 and  
9 10 feet, you say "abundant/frequent calcareous nodules."  
10 Right?

11 A Yes.

12 Q Is that on the final log?

13 A You know, I think when I went back and I looked  
14 and I realized that those are probably gypsum nodules --

15 Q You changed it?

16 A -- rather than calcareous nodules --  
17 Yes.

18 Q Okay. So if that's a change, put a mark in  
19 there for that one.

20 A (Complies.)

21 Q Okay. And then in that same interval, on the  
22 field log -- you're going to have to help me with that,  
23 some kind of mottling throughout?

24 A Iron mottling throughout.

25 Q Iron mottling throughout.

1                   Is that on the final log?

2           A       It does not look like I recorded that.

3           Q       So that's a change you made?

4           A       Yes.

5           Q       Would you mark that.

6           A       (Complies.)

7           Q       And then that next one is a reference to the  
8 gravel?

9           A       Right.

10          Q       Okay. Which you do have referred to in the  
11 final log?

12          A       Yes.

13          Q       All right. So let's go down and start at  
14 11 feet. Under color, light greenish gray, that matches  
15 up. Right?

16          A       Yes.

17          Q       Silty fat clay, that's different, but that at  
18 least matches up with --

19          A       Right.

20          Q       -- what's in the USCS column?

21          A       Yes.

22          Q       Moist to dry, is that a change?

23          A       Where are we again? Sorry.

24          Q       From 11 to 15 feet on the field log. Does it  
25 say moist to dry anywhere in there? Or go all the way

1 down to 20 feet. Does it say moist to dry anywhere in  
2 there?

3 A It does not.

4 Q So that's a change?

5 A Yes.

6 Q Okay. Will you mark that one.

7 A (Complies.)

8 Q High plasticity is on the final log. And does  
9 it say high plasticity in the field log anywhere?

10 A No. But I believe that, from my  
11 classification, I can infer that I did not change -- it  
12 did not change from that interval to the interval above.  
13 However, that is -- I guess that would be an omission --

14 Q So it's a --

15 A -- strictly speaking.

16 Q So it's something that wasn't on the final log  
17 and it was on the final log, the reference to high  
18 plasticity?

19 A Yes, I suppose so, in that interval.

20 Q Okay. So that's a change that you made when  
21 you were preparing the final log; you added that?

22 A Again, I think that it may have been omitted on  
23 the field log. But it may be an inference from the  
24 layer above.

25 Q Okay. But you changed the description to add

1 that. Right?

2 A It's an omission that's been added. It's an  
3 addition, I suppose.

4 Q And isn't that a change?

5 A Yes, that's a change.

6 Q Will you put a mark to note that one.

7 A (Complies.)

8 Q Okay. And then on the final log, it talks  
9 about occasional laminated iron oxide layers.

10 A Right.

11 Q Is that on the field log? Is that the first  
12 entry below 10 feet, iron layers?

13 A No. That's --

14 Q That's different?

15 A That's actually for --

16 Q Oh, 10 to 11 feet?

17 A Right.

18 Q Is there anything about occasional laminated  
19 iron oxide layers on the field log between 11 and  
20 20 feet?

21 A Iron seams occasional.

22 Q Do you consider that to be the same thing as  
23 laminated iron oxide layers?

24 A No. Because that's -- but actually -- let me  
25 just think about this for one second, compare the two.

1 Yes, it is the same thing, essentially.

2 Q Okay. So a seam -- is it the same thing as a  
3 layer?

4 A Because they're laminated, it's a laminated  
5 layer, so it's a very small seam, essentially. A seam  
6 is a small layer.

7 Q Okay. So --

8 A And laminated means that it's -- it's layers  
9 that are on top of each other in very short increments,  
10 so it's thin layers, one on top of the other.

11 Q So a seam is a subset of the term "layer."  
12 Right? Is that what you're saying? Are they two  
13 terms --

14 A Yes, it's a subset. A layer could be -- a seam  
15 could be a -- a seam is a layer.

16 Q Okay. But not all layers are seams?

17 A Right.

18 Q Okay. Then the final log talks about "rare  
19 gypsum fissures."

20 A Right.

21 Q The field log says "gypsum veins rare." Right?

22 A I've got gypsum veins rare in the field log and  
23 frequent gypsum nodules.

24 Q Look just before that, in the final log, where  
25 it says "rare gypsum fissures from 11 to 15 feet."

1 Do you see that in the final log?

2 A Yes.

3 Q Is that the same thing as the gypsum veins

4 rare --

5 A Yes.

6 Q -- on the field log?

7 A Yes.

8 Q Okay. So a vein is the same thing as a

9 fissure?

10 A Right.

11 Q Okay. And what is that?

12 A It's a -- it's a crack that is filled with  
13 material, secondary material, like gypsum or an iron  
14 oxide.

15 Q Okay.

16 A If you can imagine some vein coming through  
17 originally deposited material, like a flat silt on top  
18 of a fat clay and then a vein of gypsum going -- cutting  
19 through those two. Like perhaps in this sample right  
20 here on the table.

21 Q So no difference between a vein and a fissure?

22 A Right. Yeah, I standardized vein to be fissure  
23 in my final logs.

24 Q Do you like that word more?

25 A Yeah. And it's referenced in ASTM 2488.



1 Q Okay. Then we got "frequent gypsum nodules."  
2 You got that down there, between 15 and 20. Right?

3 A Yes.

4 Q "Rare shale fragments." You got that in there?

5 A Right.

6 Q "Glaucenitic from 15 to 20 feet." You got that  
7 on the field log?

8 A Yes. "Possibly glaucenitic," down there at the  
9 bottom.

10 Q Okay. So it was possibly glaucenitic, and then  
11 you decided it was glaucenitic.

12 A Yes.

13 Q Is that a change?

14 A I don't think so.

15 Q At one point, you thought it was possible, and  
16 then you decided that it was actual, and that's not a  
17 change in the description?

18 A Well -- "possible" means, yes or no.

19 Q Right.

20 A And so this is yes --

21 Q Okay.

22 A -- which is encompassed in a yes or no.

23 Q So that wasn't a change?

24 A I don't believe it is.

25 Q Okay. Going from yes or no to yes, that's not

1 a change in your mind?

2 A Because the material was present, I had a  
3 reason for thinking it was possibly glauconitic. Going  
4 back and --

5 Q How did you decide to change it from a yes or  
6 no to a yes?

7 A I went back and I looked at the sample and  
8 reviewed what a glauconite was, and I decided that it  
9 was glauconitic. There is glauconitic sand or  
10 glauconite in both the Midway and the Wilcox, according  
11 to literature.

12 Q So you went from a maybe to a yes?

13 A Right.

14 Q Is that a change?

15 A I don't believe that it's a change --

16 Q Okay.

17 A -- because I observed it out in the field. And  
18 the maybe is what is this classified as or what is this,  
19 and then verifying that it's glauconitic, putting it in  
20 there. Again, this is kind of notes to myself. This is  
21 the final log.

22 Q I understand what it is. But -- and I'm not  
23 telling you there's anything wrong with making a change.  
24 I'm just asking you did you change something when you  
25 went from maybe to yes.

1 MS. PERALES: Objection. Asked and  
2 answered.

3 JUDGE BELL: I'm going to sustain that.  
4 Let's keep going.

5 Q (BY MR. RYAN) What's glauconite?

6 A Glauconite is a mineral of marine origin.  
7 Sometimes it's -- I think it's like marine poop. But  
8 it's a mineral.

9 Q And how do you identify it?

10 A It's small -- they're small, sort of  
11 dark-greenish -- or bluish-gray, bluish-green inclusions  
12 that -- not inclusions, but real small dots throughout  
13 there material.

14 Q Okay.

15 A And it's typical of the Midway and the Wilcox  
16 materials to have that stuff.

17 Q When you say "real small dots," you mean like  
18 pinhead size?

19 A Yes.

20 Q Okay.

21 A They're -- you can really see them in there.

22 Q Little, tiny dots scattered throughout the clay  
23 material?

24 A Scattered through the material -- throughout  
25 the material. It could be in sands as well.

1 Q But in this case, it was in clay?

2 A Yes.

3 Q Okay. All right. Let's turn the page to  
4 Rubinov 661. Between 20 and 25 feet on the field log,  
5 what's that say under "type"?

6 A Silty clay to --

7 Q Fat clay?

8 A Yes.

9 Q Okay.

10 A Thank you.

11 Q So that matches up. Right?

12 A Yes.

13 Q Okay.

14 A Yes, it does.

15 Q And then the color is light greenish gray to  
16 light brown?

17 A Right.

18 Q Okay. All right. And here, you're going all  
19 the way down to 27 and a half feet?

20 A Right.

21 Q Okay. So in the final log, it says  
22 "glaucanitic." Is that -- between 20 and 25, does that  
23 say "less glaucanitic"?

24 A It says glaucanitic at the top there, and then  
25 I made a note to myself that said it's less glaucanitic,

1 which means there's less glauconite in that material  
2 than there is in the material above.

3 Q Okay. And then by the time you got down --  
4 down there where it says, "no glauconite" --

5 A Right.

6 Q -- is that an arrow going down, showing that  
7 should be in the next interval?

8 A Yes, I believe that's true.

9 Q Okay. So on the final log, it then talks about  
10 frequent laminated iron oxide layers?

11 A Yes.

12 Q Is that on the field log?

13 A Iron partings, I kind of use it  
14 interchangeably.

15 Q So you use -- seams and --

16 A Partings.

17 Q -- partings and layers mean the same thing to  
18 you?

19 A Not layers, but seams and partings.

20 Q Are the same thing?

21 A Yes.

22 Q Okay. But here you change it from partings on  
23 the field log to layers on the final log. Right?

24 A Laminated layers. So laminated is also in the  
25 category of seams because laminated means seams, very

1 small layers on top of each other.

2 Q Well, but you had crossed out seams on the  
3 field log. Right?

4 A Yes.

5 Q And -- partings?

6 A Yes.

7 Q And you changed that to layers in the final  
8 log?

9 A Laminated layers.

10 Q Is a laminated layer the same thing as a  
11 parting?

12 A Yes, essentially it is.

13 Q Is there any difference?

14 A You know, you could be -- there could be a  
15 difference. It could be the iron partings are -- are  
16 not interbedded with other sieve material.

17 Q Okay. So on the final log, you say, "frequent  
18 laminated iron oxide layers, fissures." Does fissures  
19 have anything to do with the iron oxide?

20 A Yes. It's -- that means that it's frequent --  
21 I'm sorry. Could you point me back to  
22 where we are again? I'm getting lost here.

23 Q On the final log for boring AR-2, down at about  
24 23 feet, under "description," there's a sentence that  
25 starts "Glaucanitic --"

1           A       "Frequent laminated iron oxide layers,  
2 fissures." That means it's frequent laminated iron  
3 oxide layers, frequent fissures of iron oxide, frequent  
4 gypsum nodules, and frequent shale fragments.

5           Q       Okay. So the final log talks about iron oxide  
6 layers and fissures. Right?

7           A       Yes.

8           Q       And the field log talks about iron partings and  
9 veins?

10          A       Right. Abundant.

11          Q       Okay. Is there a difference in abundant and  
12 frequent?

13          A       No. I standardized abundant to be frequent.

14          Q       So that's a change you made?

15          A       Again, it's -- those two words, I use  
16 interchangeably.

17          Q       So you don't consider that a change?

18          A       No.

19          Q       Okay. Do you consider -- partings and veins on  
20 the field log and layers and fissures on the final log,  
21 is that one or more changes or no changes?

22          A       I'm sorry. Say that again.

23          Q       It says "partings and veins" on the field log,  
24 and it says "layers and fissures" on the final log. How  
25 many changes does that involve? Zero or --

1           A       I think that's zero changes.

2           Q       Partings and veins to layers and fissures is  
3 zero changes?

4           A       Yes.

5           Q       Okay. Then we've got, on the final log,  
6 frequent gypsum crystals from 25 to 26 feet. Is that on  
7 the field log?

8           A       When I say "highly mineralized" there, gypsum  
9 layers and crystals, that's again -- I would call that  
10 frequent.

11          Q       So that's no change?

12          A       That would not be a change.

13          Q       Okay. So you said "highly mineralized gypsum  
14 layers with crystals," and you changed that to "frequent  
15 gypsum crystals," and you don't -- you think that's zero  
16 changes?

17          A       I'm sorry. I suppose I don't have gypsum --  
18 the gypsum layers in my final log.

19          Q       Okay. So that's a change?

20          A       That would be a change.

21          Q       All right. Mark that one.

22          A       (Complies.)

23          Q       Okay. Then down -- starting at 27 and a  
24 half feet, dark-greenish gray to -- what does that say  
25 on the field log? To a brown color?



1           A     I think it's brown -- either to a brown color  
2 or above color.  Either way, it's --

3           Q     Okay.

4           A     I believe that's -- that's brown color.

5           Q     All right.  So then that's a change between the  
6 field log and the final log.  Right?

7           A     Well, no, because I've got stratified light and  
8 dark green, greenish gray layers with iron oxide  
9 mottling the from 27 to .30.  So I've got the color  
10 designation here saying dark green, and then it's got  
11 these inclusions.  And so the color I actually added  
12 inside of the verbiage, rather than at the front,  
13 because, I believe those were not the -- that was not  
14 the primary color; it was something that was just noted.

15          Q     Okay.  So no change in your color description  
16 between the field log and the final log?

17          A     Not for that, the color.

18          Q     Do you see over there, at about 28 feet on the  
19 right-hand side, does that say greenish gray to brown,  
20 greenish gray/brown?

21          A     Dark and light greenish gray to brown layers,  
22 interbedded.  Interbedded dark and light green,  
23 gray/brown layers of silty clay.

24          Q     Is there any reference in your final log to  
25 brown?

1 A No.

2 Q Is that a change?

3 A Yes, that would be a change.

4 Q Will you mark that one.

5 A (Complies.)

6 Q Okay. And then on the field log, do you see  
7 where it says "seams of gypsum"?

8 A Yes.

9 Q Is that on the final log?

10 A No, it does not appear to be.

11 Q Okay. Will you mark that change.

12 A (Complies.)

13 Q All right. How many changes did you make --  
14 how many changes did you note on Exhibit 130EP-44?  
15 Count them up.

16 A Twenty-two.

17 Q Okay. And did you generally follow the same  
18 process in going from your field logs to your final logs  
19 for each of the logs that's in Protestants Exhibit 6D?

20 A Yes.

21 Q Let's look at your prefiled testimony at  
22 Page 16.

23 A Where would I find that?

24 Q Oh, I'm sorry. Exhibit 6, at Tab 6 in that  
25 notebook there. Oh, sorry. You don't have it?

1           A       I'm not sure if I do.  What volume or notebook  
2 is that?

3           Q       We're looking for your prefiled testimony.  I  
4 think it ought to be that notebook you were just looking  
5 at, maybe.

6                   MS. PERALES:  It should say Volume 3 on  
7 the front, Volume 3 of 3.

8           A       This is Volume 3.

9           Q       (BY MR. RYAN)  Tab 6?

10          A       Exhibit 6?

11                   JUDGE BELL:  Yes.

12          Q       (BY MR. RYAN)  Well, yeah -- but it's -- oh,  
13 maybe yours says exhibit.  I just got a little tab.  
14 Okay.

15                   Did you find it?

16          A       No.

17          Q       It's past 5AG, if that helps you.  It's  
18 about -- well, I don't know where it is in that book.  
19 Can I come see if I can find it?

20          A       Yes.

21                   MR. RYAN:  Your Honor, may I approach?

22                   JUDGE BELL:  Yes.

23          A       I got confused.

24          Q       (BY MR. RYAN)  And if you'll look on Page 16.

25          A       Okay --

1 Q -- the sentence beginning at Line 5 -- well,  
2 let's start at Line 3. You say, "In the application,  
3 the Applicant failed to properly identify the geologic  
4 material in the subsurface. Specifically, Attachment E,  
5 Section 4.2 of the application, identifies the sediment  
6 underneath the site consisting solely of silty fat clay,  
7 CH, with Stratum I, also containing remnant gravel."

8 A Yes.

9 Q Isn't it true that if you look in the narrative  
10 descriptions of material, and certainly in the boring  
11 logs in the permit application, there are references to  
12 many materials other than silty fat clay?

13 A I'm not sure.

14 Q Okay. Have you ever looked at the --

15 A I have.

16 Q Okay. And you don't know if they refer to any  
17 material other than silty fat clay?

18 A I'm not sure what you're referring to. I'd  
19 have to look.

20 Q Do you know if the boring logs in the permit  
21 application refer to any material other than silty fat  
22 clay?

23 A From my recollection, the materials are  
24 classified as CH.

25 Q Okay. There are references in -- but do the

1 descriptions include materials other than silty fat  
2 clay?

3 A The descriptions do have, yes.

4 Q Okay.

5 A I believe that's true.

6 Q Okay. Isn't it also true that the boring logs  
7 in the application identify secondary features?

8 A Yeah. I believe that one slickenside is  
9 identified.

10 Q And you think that's the only secondary  
11 features that's identified in those logs? Is that the  
12 only one you remember?

13 A As far as fissures, yes.

14 Q Well, I'm talking now about any kind of  
15 secondary feature there is.

16 Is it your recollection that the only  
17 secondary feature identified in the boring logs in the  
18 application is one slickensides?

19 A I believe that's what's noted as -- in their  
20 report.

21 Q Okay.

22 A I do not seem to recall a gypsum inclusion in  
23 there -- in the boring logs.

24 Q Do you recall any other references to secondary  
25 features?

1           A       I can't recall exactly. I'd have to look at  
2 it.

3           Q       Okay. So the lost circulation that you  
4 testified about earlier, that was noted on the field log  
5 for that boring, wasn't it?

6           A       It was. I -- along with information in my  
7 field notes.

8           Q       Okay. But I want to make sure --

9           A       The loss of circulation? Is that what you  
10 mean?

11          Q       Yes.

12          A       I believe the loss of circulation was  
13 referenced in my notes.

14          Q       Okay. My question is, was the loss of  
15 circulation referenced on Mr. Stamoulis' field logs for  
16 that boring?

17          A       Although I don't recall specifically, but I'm  
18 pretty sure it was noted.

19          Q       Okay. Mr. Tucker asked you some questions  
20 about Mr. Stamoulis' practice of cutting the ends off of  
21 cores after they had been removed from the Shelby tubes.  
22 Do you recall that?

23          A       Yes.

24          Q       And I think you testified that typically what  
25 he would do would be to cut an inch or less off of each

1 end of the core?

2 A About an inch, from what I recall. I'd have to  
3 go back through my notes to really tell. But it's --  
4 essentially, that was the general practice from what I  
5 recall.

6 Q Okay. And you testified about Mr. Stamoulis  
7 not scraping the outer material off the cores. Right?

8 A Yes.

9 Q And instead of scraping the outer materials off  
10 the cores, would he bag those and label them and put  
11 them in a box?

12 A Yes.

13 Q And you are aware, are you not, that Mike  
14 Snyder and Gregg Adams scraped the cores when they  
15 prepare the boring logs?

16 A I am.

17 Q And they did that in a controlled environment  
18 in their office. Right?

19 A From their testimony, I believe that's what  
20 they said.

21 Q Okay. So do you think it's necessary to scrape  
22 the cores in the field to get the kind of information  
23 you talked about, or could that been done by Mr. Snyder  
24 and Mr. Adams at their office when they had all the  
25 cores?

1           A       That could have been done. My observation was  
2 that Mr. Stamoulis was creating geologic logs, but he  
3 was note scraping those samples. My opinion as to what  
4 happens after did not apply to that exactly. I was just  
5 observing what happened in the field.

6           Q       Okay. But if those samples had actually been  
7 scraped when Mr. Snyder and Mr. Adams observed the  
8 samples and prepared the logs, you don't have any reason  
9 to think that that wasn't an appropriate time to do  
10 that, do you?

11          A       I'm sorry. Could you rephrase that?

12          Q       Yeah.

13                    If the samples -- if the outer portion of  
14 the samples hadn't been scraped in the field, but  
15 instead Mr. Snyder and Mr. Adams did them in their  
16 office when they were preparing the logs, there's no  
17 reason that wouldn't be appropriate, is there?

18          A       Right. That would be appropriate to do.

19          Q       Okay. Let's take a quick look at your  
20 Exhibit F, Exhibit 6F, following your prefiled testimony  
21 in that same notebook there. And let's look at Page 4.

22          A       Okay.

23          Q       The outside of that sample hasn't been scraped,  
24 has it?

25          A       No, it has not.



1 Q And you never scraped the outside of that  
2 sample, did you?

3 A On that particular piece, no.

4 Q Okay. Turn back to your prefiled testimony  
5 Exhibit 6 at Page 9. Again, that sentence at Line 8  
6 that says, "Generally, I observed samples that included  
7 clays, silts, and interbedded gravels," isn't it true  
8 that all of those things were identified in the boring  
9 logs done by Mr. Snyder and Mr. Adams for the  
10 Applicant's 2016 borings?

11 A Yes.

12 Q And don't all of those things also appear on  
13 the boring logs they did for the Applicant's 2013  
14 borings?

15 A They didn't appear to be classified. There may  
16 be inclusions, but they were not classified with the  
17 CL --

18 Q Okay. But they do --

19 A -- or an ML.

20 Q -- they do identify clays?

21 A They do identify fat clays as CH.

22 Q And they identify silts in the boring logs?

23 A They identified those as inclusions or as small  
24 nodes rather than actual layers.

25 Q Well, don't they refer throughout those boring

1 logs to silty clays?

2 A They do.

3 Q Okay. And don't they also refer to interbedded  
4 gravels?

5 A They do refer to some interbedded gravels.

6 Q Turn over to Page 14, line -- starting at  
7 Line 10, in that sentence, you refer to the fact that  
8 your visual and tactile examination of the sediments in  
9 MP-1 and MP-1A suggest remnant gravels, lean clays, fat  
10 clays, silts, and sandstone are present within the  
11 subsurface. Do you see that?

12 A Yes.

13 Q In your opinion -- let me start that over.

14 Other than MP-1 and -- other than what you  
15 may have seen in MP-1 and MP-1A, are you aware of any  
16 other evidence of sandstone in the subsurface at the  
17 site?

18 A I know it's cemented siltstone, but cemented  
19 sandstone, I think I noted it in just MP-1.

20 Q So would the answer to my question be no?

21 A Yes, it would.

22 Q Okay. Would you describe the materials  
23 encountered during the borings at this site as  
24 consisting primarily of softer sediments?

25 A I'm not sure what you mean by "softer

1 sediments."

2 Q So you wouldn't have an opinion on that?

3 A It depends on the definition of "softer  
4 sediments," I would suppose.

5 Q Okay. But is that a description that you would  
6 use to describe the material out here or not?

7 A Aside from the gravels, which are not soft  
8 materials, and as compared to, let's say, igneous rock,  
9 these are softer sediments.

10 Q Softer than igneous rock?

11 A Right.

12 Q Okay. So you would consider them to be softer  
13 sediments? I mean, you think that would be a good  
14 general description for the material encountered out  
15 here?

16 A I believe the material, although it's dense,  
17 it's -- it's softer material, I think, at least by the  
18 definition that I can recall.

19 Q Okay. How many soil samples did you send to  
20 the lab to be tested from the borings that the  
21 Protestants did?

22 A I'd have to look at my exhibit.

23 Q Okay. Is that going to be in Exhibit 6C?

24 A Yes. Thirteen samples.

25 Q Thirteen. And of those 13, how many were from

1 trenches?

2 A Two.

3 Q Okay. And of the remaining 11, how many were  
4 from boring MP-1A or MP-1?

5 A Eight.

6 Q So -- and those two borings were essentially  
7 drilled right next to each other. Right?

8 A Yes.

9 Q Okay. So as far as your borings go, other than  
10 that location, you sent only three samples from borings  
11 to the lab to be tested. Is that right?

12 A Yes.

13 Q One from boring IV-2A?

14 A Right.

15 Q One from boring MP-2?

16 A Yes.

17 Q And one from boring MP-3?

18 A Right.

19 Q Do you think it's appropriate to show on boring  
20 logs material or features that you expect to find during  
21 a boring program but then don't actually observe?

22 A I'm sorry. Could you repeat the question?

23 Q Yeah. Do you think it would be appropriate to  
24 show on boring logs material or features that you expect  
25 to find during the boring program but then don't

1 actually observe?

2 A I would not include things that I didn't  
3 observe as my opinion is.

4 Q Okay. You don't think that would be  
5 appropriate to do that, do you?

6 A It's appropriate to make logs that are  
7 representative of the geology at the site.

8 Q Okay. And to not include on there something  
9 that you may have expected to find but didn't?

10 A In a definition, I think that's true. You  
11 record what you observe.

12 Q Okay. Thanks.

13 MR. RYAN: I'll pass the witness.

14 JUDGE BELL: All right. Thank you.

15 Redirect for Mr. Rubinov?

16 MS. PERALES: Yes, I have redirect. Can  
17 we take a short restroom break?

18 JUDGE BELL: Sure. How long do we need?  
19 Is 10 minutes enough?

20 MS. PERALES: That's plenty.

21 JUDGE BELL: Okay. Let's really try to do  
22 10 minutes. Thanks.

23 We're off the record.

24 (Recess: 4:02 p.m. to 4:13 p.m.)

25 JUDGE BELL: All right. We're back on the

1 record after a short break and ready for redirect of  
2 Mr. Rubinov.

3 REDIRECT EXAMINATION

4 BY MS. PERALES:

5 Q Good afternoon, Mr. Rubinov.

6 A Good afternoon.

7 Q I want to begin by asking you what is your  
8 understanding of the objective or the purpose of the  
9 drilling that was done by the Protestants in 2016?

10 A We were there to verify the information in the  
11 application, the original soil borings.

12 Q Okay. And so would you agree with me, then,  
13 that our purpose, or the Protestants' purpose, was not  
14 to characterize the subsurface?

15 A Yes. Our objective was to essentially check  
16 what was in the permit application, whether that was  
17 actually reflective of the materials on site. I think  
18 we didn't have any original field logs or soil samples  
19 from the original investigation, and so our goal was to  
20 verify what was beneath the site.

21 Q And in your opinion, did you collect enough  
22 data to accomplish that objective?

23 A I believe we found information that did  
24 contradict some of the things that were stated in the  
25 application.

1 Q Okay. And you were asked a question about  
2 whether you attempted to construct a cross section. Do  
3 you remember that?

4 A Yes.

5 Q Did you attempt to collect enough data from the  
6 Protestants' borings to actually construct a meaningful  
7 cross section?

8 A No. Again, the intent was to essentially check  
9 the Protestants' information. And so because that was  
10 the intent, we did not perform borings in locations and  
11 the amount of borings that would be required or that  
12 would be ideal to create a cross section of the geology  
13 beneath the site.

14 Q Okay. And in selecting the samples that were  
15 sent to the lab for analysis, what was the objective in  
16 making those selections?

17 A Again, the -- it was mostly to verify the  
18 materials on site. There were certain places, like at  
19 MP-1 that was drilled close to BME-32 or P-32, where we  
20 noted materials other than the materials that were  
21 stated in the original application. And so we sent some  
22 samples to the lab to verify what the sediment actually  
23 was.

24 Q Okay. So you were asked some questions related  
25 to the classifications and descriptions included in the

1 boring logs included in the application do you remember  
2 that?

3 A Yes.

4 Q So I want to direct your attention to the  
5 boring logs in the application, and that's going to be  
6 in Volume 4 of one of those white notebooks. It'll be  
7 Volume 4, Exhibit 4.

8 A I'd like to also note from what I said before,  
9 once we got out there, our intent was also to verify the  
10 information collected during the 2016 Applicant's  
11 borings.

12 Q Okay. Thank you for that clarification.

13 Related to that, at the time that the  
14 decision was made on how many borings to drill and where  
15 to drill the borings by the Protestant, did you know  
16 that the Applicant was going to be drilling more  
17 borings?

18 A I'm sorry. Could you repeat that?

19 Q Sure.

20 So my understanding of your last response  
21 was that another objective of the Protestants' boring  
22 program was to verify the borings that were drilled by  
23 the Applicant in 2016. Is that right?

24 A Yes.

25 Q Okay. So when the Protestants came up with



1 their boring plan and their boring program --

2 A Uh-huh.

3 Q -- did the Protestants -- or did you, in  
4 particular, even know that the Applicant would be  
5 drilling additional borings in 2016?

6 A I believe we did. Our borings were conducted  
7 after the borings of the Applicant.

8 Q Okay. When did you first find out about the  
9 Applicant -- their intention to drill borings in 2016?

10 A I was brought on to the project in, I think,  
11 January of 2016 --

12 Q Okay.

13 A -- and it was at that point -- and I don't  
14 recall exactly when. I know at some point I was called  
15 out to be an observer of the Applicant's borings, and if  
16 I recall correctly, that may have been really the first  
17 time that I was aware of that.

18 Q Okay. So do you recall how many days -- do you  
19 recall whether you were notified more than a week before  
20 you were asked to go out and start observing Applicant's  
21 borings?

22 A From what I remember, it was pretty short  
23 notice.

24 Q Could it have been maybe two days?

25 A It's possible.

1 Q Okay.

2 A I can't recall right now. But it's -- from  
3 what I can recall, it was fairly short notice.

4 Q Okay. So do you have Exhibit EP-4 there in  
5 front of you? It's a white binder. And it'll say  
6 Volume 4.

7 A I've got Volume 4 in front of me. And then  
8 we've got -- E-4?

9 Q So why don't you just turn to Page 51. And the  
10 page numbers are at the top right-hand corner.

11 A I see. It was under Tab E-2.

12 Q Okay. And so at Page 51 -- so Page 51, this is  
13 a final log for the Applicant's boring BME-1. Is that  
14 right?

15 A Yes, that's correct.

16 Q And in the middle, looking down the middle  
17 column, the widest column featured on the page, there  
18 are both descriptions and then there's a little  
19 parenthetical with the letters "CH." Do you see that?

20 A Yes, I do.

21 Q Okay. So can you tell us the difference  
22 between the descriptions and the parenthetical?

23 A The parenthetical is meant to classify the  
24 material, what it is at the site. The description may  
25 note some secondary features or minor inclusions that

1 the geologist may not think are of significance to  
2 classify the material.

3 Q Okay. So if I wanted to use a shorthand to  
4 refer to the difference between those two things that  
5 are noted on there, could I say that the descriptions  
6 such as clay, silty, dark brown, very stiff to hard,  
7 et cetera, those are observations and the parenthetical  
8 is the classification?

9 A I suppose the material descriptions are the --  
10 the descriptions. But the -- and the parenthetical is  
11 the classification of that material. Typically, the  
12 geologist will use all the data in the description to  
13 classify that material as whatever it is.

14 Q Okay. So earlier when you were asked -- let's  
15 see if I can find the page number real quickly. You  
16 were asked about your prefiled and specifically, you  
17 were asked about your criticism or your observation that  
18 the Applicant had classified the subsurface as "fat  
19 clay," were you referring to the classification in the  
20 parenthetical?

21 A Yes.

22 Q Okay. Now, you were also asked whether there  
23 were secondary features noted in these boring logs. Do  
24 you recall that?

25 A I do.

1 Q And you mentioned that you recalled reading  
2 that there was a slickenside. Is that right?

3 A Yes.

4 Q So if we were to stay on Page 51 and look down  
5 here in the bottom at about 35 feet or so --

6 A Uh-huh.

7 Q -- there's a description that says, "with  
8 ferrous stains and traces of gypsum." Do you see that?

9 A I do.

10 Q Okay. Would you consider that a secondary  
11 feature?

12 A You know, I would consider that a mineral  
13 inclusion.

14 Q Okay.

15 A As far as secondary features go, it's more a  
16 mineral content. And although minerals are secondary to  
17 the original materials, secondary features to me mean  
18 significant features that can transmit fluid.

19 Q Okay. So it sounds like this is perhaps  
20 indicative or may be something that you might see if  
21 there were a secondary feature, but it doesn't actually  
22 identify a secondary feature. Is that fair?

23 A Yes, that's fair.

24 Q So can you remind me what a secondary feature  
25 is?

1           A       It's a feature that's developed in the geology  
2 after the original lithology is deposited, after initial  
3 deposition.

4           Q       And as I recall, I think I heard either you or  
5 Dr. Ross testify that the significance of it is that it  
6 can be a preferential pathway for migration? Is that  
7 right?

8           A       Secondary features, yes, they can be pathways  
9 for migration.

10          Q       So if you have a description that says "ferrous  
11 stains," that does not indicate that that's a possible  
12 preferential pathway. Is that right?

13          A       A ferrous stain indicates weathering of the  
14 material, rather than a percolation of significant  
15 amount of water, something like you would see in a  
16 fissure where it's filled with gypsum.

17          Q       Okay.

18          A       So I guess a ferrous stain and traces of gypsum  
19 might be indicative of weathering.

20          Q       But it's not a fissure?

21          A       But it's not a fissure. It's not termed that  
22 here.

23          Q       So when -- let's see, the Applicant also  
24 recognized in their supplemental geology report, didn't  
25 they, that in 2013 they identified no fractures? Isn't

1 that correct?

2 A I believe that's true. In their report, they  
3 only noted a slickenside.

4 Q Okay. And so even the Applicant has not  
5 attempted to identify the ferrous stain as a fracture or  
6 a fissure. Right?

7 A They have not.

8 Q Okay. So on that same page, at about 30 feet,  
9 there's a phrase that says "with silt partings." Do you  
10 see that?

11 A I do.

12 Q Is -- a silt parting, is that a fracture or  
13 fissure?

14 A No, it's not.

15 Q Okay. And what's a silt parting?

16 A It's part of the original material. It might  
17 be a very small inclusion that's kind of a -- in a small  
18 layer, maybe like a lens that's in the material.

19 Q Okay. Well, let me ask you this. When you  
20 were observing -- when you were present during the  
21 Applicant's boring program and you were making  
22 observations, were you also taking field notes at that  
23 time?

24 A I was.

25 Q Okay. And those field notes would've been only

1 based on your visual observations. Is that right?

2 A Yes.

3 Q And had you had the opportunity, other than  
4 visual observations, what else would you have used in  
5 order to describe what you were observing in your field  
6 notes?

7 A I would've tactilely observed the sediment. I  
8 would have -- I would have taken parts of the core,  
9 analyzed it through using my hands. I would maybe take  
10 a microscope or a hand lens and look at the minerals or  
11 grain sizes. And then I would use my observations to  
12 note all the different -- well, I would note what I  
13 observed there.

14 Q Okay. I've heard other geologists say that  
15 they would take the sediment and rub it on their teeth  
16 or smell it. Is that something that some geologists do?

17 A You can do that. It's a way to try and  
18 pinpoint sand, grains of very fine sand in the material,  
19 because typically, silt is difficult to even feel,  
20 whereas those sand grains will kind of be gritty. And  
21 that's kind of a weird practice of a geologist.

22 Q Okay. So during the Protestants' borings, you  
23 did have the opportunity to tactilely observe the  
24 sediments as well as virtually observe. Correct?

25 A Yes, I did.

1 Q And your observations were recorded in the  
2 field logs. Is that right?

3 A They were.

4 Q So in your field notes, did you also -- and let  
5 me back up.

6 Are you taking both field notes and field  
7 logs, and is there a difference?

8 A Yes. During the boring program, I was  
9 taking -- I was creating field logs from the sediment,  
10 but I was also noting anything about the operation that  
11 seemed important to me. I would note who was on site.  
12 I would note drilling conditions. I would try and be as  
13 thorough as possible to describe the whole process.

14 Q So earlier when we were looking at the  
15 descriptions in your field logs, that's what you were  
16 talking about when you say you logged the sediment  
17 observations. Is that right?

18 A That would be my lithologic field log.

19 Q Okay. And then separately, you have notes that  
20 describe the -- all of the other details you just  
21 mentioned?

22 A Yes. I try to keep that as well.

23 Q And is it important, in your opinion, to have  
24 field notes that describe the drilling efforts, the  
25 conditions of the drilling program, and the sampling



1 efforts and so forth?

2 A Yes --

3 MR. RYAN: I don't think he was asked any  
4 questions about field notes on cross-examination.

5 MS. PERALES: He was asked extensive  
6 questions related to his field logs, and he was asked  
7 during the cross-examination by Caldwell County about  
8 the -- his recollection of the drilling efforts and the  
9 sampling efforts.

10 MR. RYAN: He wasn't asked about any field  
11 notes.

12 MS. PERALES: Field notes are tied to his  
13 recollection of the drilling and the sampling.

14 JUDGE BELL: I'll overrule the objection.  
15 But let's limit this to something brief.

16 MS. PERALES: Okay. Sure.

17 Q (BY MS. PERALES) So is it important to note  
18 the drilling efforts and the drilling conditions and so  
19 forth?

20 A It is. It can be another piece of evidence  
21 that allows the geologist to interpret what's going on  
22 in the subsurface, because not everything can be  
23 recorded in the -- within the core. For instance, if  
24 there's a hard silt layer that's encountered and a  
25 Shelby tube can't push through it, and the recovery of

1 the Shelby tube is therefore one and a half or 1.8 feet,  
2 and then the drilling rig goes through and drills  
3 through .2 feet of silty, cement silty material and then  
4 the Shelby tube is then inserted again into the softer  
5 material, without notes, it's impossible to know that  
6 that silty material was present, especially if there's  
7 no recovery log of the Shelby tube.

8 Q Okay. And I think earlier you also talked  
9 about -- well, you talked about the loss circulation in  
10 response to some questions. Right?

11 A Yes.

12 Q And so is that something that you would also  
13 note in your field notes?

14 A Yes. It's a similar thing. If the loss of  
15 circulation isn't noted in field notes and it's not  
16 noted in the log, then somebody going forward would not  
17 know if that feature was present --

18 Q Okay.

19 A -- or that feature would be missed or that  
20 information would not be recorded.

21 Q And that's not the type of thing that would be  
22 apparent by observing soil samples in the office. Isn't  
23 that right?

24 A Right. If one geologist is doing the coring  
25 and a different geologist is doing the lithologic

1 logging, and there's no communication, there's no notes  
2 from one to the other, then you wouldn't be able to tell  
3 that there was a loss of circulation and a possible  
4 porosity in the borehole.

5 Q So you talked a little bit about noting the  
6 recovery. Can you explain what you mean when you note  
7 the recovery and what significance it has to your  
8 descriptions?

9 A Sure. A recovery log is used to show how much  
10 of the sample was actually recovered. Part of that is  
11 to allow the reader to understand that there may be  
12 segments of the material that are -- that weren't  
13 present, that are sort of inferred or missing. And it  
14 could also mean recovery -- full recovery with a Shelby  
15 tube may mean silty material or sand where that sand  
16 material does not stay in the Shelby tube, it sloughs  
17 out. While that's not the main goal of a recovery log,  
18 that's a secondary inference for geology beneath the  
19 site.

20 Q So is that information that you, as a  
21 geologist, would integrate or use in determining -- or  
22 determining how to describe your materials?

23 A It could tell me some things about it.

24 Q Okay. When the Protestants conducted their  
25 boring, did the Protestants send any of the collected

1 samples directly to the lab from the field?

2 A No.

3 Q And if samples had been sent directly to the  
4 lab from the field, then those samples would no longer  
5 be available for observation. Isn't that right?

6 A That's true.

7 Q Because once they're sent to the lab, then you  
8 no longer have possession of them. Right?

9 A Right. That's correct.

10 Q So if the Applicant had sent any samples  
11 directly to the lab from the field, then they wouldn't  
12 have had the opportunity to scrape them in the office.  
13 Isn't that right?

14 A Essentially that would be true by definition or  
15 by mechanics of that interaction.

16 Q So we also went through a pretty comprehensive  
17 comparison of your field logs to your final logs. Do  
18 you recall that line of questioning?

19 A I'm pretty sure I do.

20 Q Let's go back over them, shall we. Turn to  
21 Page 18 of your final log, so that will be Protestants  
22 Exhibit 60.

23 A Okay.

24 Q And then take out Exhibit 130EP-40, which  
25 should be your field logs, and turn to Page 662 of that

1 document.

2 A Sure.

3 Q Actually, turn to Page 660. Are you there?

4 A Yes.

5 Q Okay. So really I just want to clear up the  
6 record here. You were asked some questions related to  
7 the -- I guess, the length of the interval under the  
8 column that's labeled USCS on Page 18 of 6D. Do you see  
9 that?

10 A Yes.

11 Q And then that was compared to the -- your field  
12 logs and the length of the sample that's shown as  
13 collected there. Do you recall that line of  
14 questioning?

15 A Yeah, I do.

16 Q So can you explain to us the difference here?  
17 So if we looked at Page 18 of Exhibit 60 and we focused  
18 on the column underneath the label "USCS," what is it  
19 that's being described there, and how is it divided up,  
20 more specifically?

21 A It's sort of an iterative process. I'll take  
22 my field logs. I may review them, seeing if I could see  
23 any patterns in terms of how it would classify or lump  
24 materials into discrete intervals. I would also  
25 incorporate -- once the lab results were returned, I

1 would incorporate lab results and verify what -- the  
2 material I observed and what the lab results are to  
3 determine the classification more clearly.

4 Q Okay.

5 A I may go back and look at samples in the  
6 storage unit to verify my initial observations.

7 Q So are you --

8 A I'm not sure if I answered your question.

9 Q I think you did. I just want to make sure I  
10 understand.

11 So when you have -- let's say you have the  
12 classification under USCS from, let's say one and a half  
13 down to 20 feet, do you see that under USCS?

14 A Yes. Half a foot to 20 feet?

15 Q Yeah. That's right. Half a foot to 20 feet.

16 So that's not intended to convey that  
17 that's one solid core. Is that right?

18 A Right.

19 Q My understanding is -- based on your testimony,  
20 is that this isn't intended to reflect that that's how  
21 you divided this -- I'll call it a stratum --

22 A Sure.

23 Q -- of dirt or rock or lithology or whatever --

24 A Sure.

25 Q Okay. -- as compared to your field logs,

1 where you're dividing it based on how you bagged the  
2 actual piece of dirt. Is that right?

3 A And you're talking about which columns again?

4 Q I'm talking about -- well, why don't you  
5 explain to me the difference here between SAMP recovery  
6 and then, you know, how you divided this up here.

7 A Are you talking about into intervals?

8 Q Uh-huh.

9 A I looked at the materials, the lab results, and  
10 then I would go back, maybe verify materials again,  
11 looking at my field logs and then I would grab materials  
12 that I thought were similar enough. And this is -- this  
13 is kind of a geologic interpretation as to what is  
14 grouped and what isn't.

15 And so I would group the materials based  
16 on a few different things. Like, you can see here in  
17 .5 to 11, I've got a silty fat clay with gravel. Even  
18 though it's a silty fat clay, I believe that the strata  
19 changes between 11 to 20. In 11 to 20, although it is a  
20 silty fat clay, it does not have gravel, so I split  
21 those up into two intervals.

22 Q And you're still talking about your final log.  
23 Right?

24 A Yes.

25 Q Okay. So -- and I'm trying to distinguish the

1 way you've divided the strata up in the final log versus  
2 the way you have divided up the intervals in your draft  
3 log.

4 A Oh, are you talking about the classification?

5 Q No. I'm talking about the way that the  
6 intervals are divided up.

7 A Right. The intervals are divided up either --  
8 if I think that there's a break, a difference in strata  
9 in the field, I'll note that. So that's typically  
10 obvious from color changes, especially in the field.  
11 But the classifications -- or the breaks are more the  
12 breaks of the sample intervals. So if we have a coring  
13 interval from zero to 5, and I don't have -- I don't  
14 think there's a color change or something else that may  
15 indicate to me that there is a change in lithology, I'll  
16 go through and I'll describe that entire core.

17 Q Okay. I want you to focus with me on Page 660  
18 of Exhibit EP-40. Are you there?

19 A Yes.

20 Q Okay. So here you're dividing up the  
21 intervals, not based on your lithologic description.  
22 Isn't that right? You're dividing them up based on the  
23 actual piece of dirt that you bagged. Isn't that right?

24 A Partially.

25 Q Okay.



1 A You can see the .5 is the topsoil, dark gray.

2 Q Right.

3 A And then below that is a silty clay, is what I  
4 originally called it. So although that was the same  
5 interval, sample interval, I divided that because I  
6 thought that there was a lithologic change. But the  
7 difference between the interval from .5 to 5 and 5 to  
8 10, that was -- that was just a break based on sampling.

9 So I had a core from zero to 5 and then  
10 one from 5 to 10. And they came in succession. I  
11 wasn't able to look at them at the same time. Because  
12 as I would describe one, I would then bag it, and then I  
13 would describe the next core that came up. It's part of  
14 the drilling process. You don't really have all the  
15 time in the world to look at the materials. You have to  
16 describe the material and then continue on.

17 Q Okay. And that's really what I was getting at,  
18 is that you weren't trying to group them based on their  
19 description out in the field, but instead you're noting  
20 where physically the samples were broken?

21 A Partially, yes.

22 Q Okay. Okay. So you were asked a number of  
23 questions related to the changes that were made between  
24 the field logs and the final logs, and I wonder if you  
25 could walk us through the process from the time you

1 drafted your field logs to the time that you ended up  
2 with the final log with your seal on it.

3 A Sure. I would start off with my -- I think I  
4 started describing this earlier, but I'll repeat.

5 I started off with the field log. That's  
6 the description that I got during the field  
7 investigation. I may look at it. We looked at it, and  
8 I think we -- looking at my descriptions and looking at  
9 some of the sediment, decided which samples to send to  
10 the lab. And this was, again, to verify rather than  
11 classify. The intent was to verify the materials as  
12 they appeared in the application.

13 But we did end up with some lab samples,  
14 which I could also use to create my final log. And so I  
15 would use that information to compare to my logs and see  
16 if -- how mine and the lab's may be different. And the  
17 lab will give you a better idea of what a specific  
18 classification is, like a CL versus a CH. It may be  
19 difficult to tell the difference in the field, but a lab  
20 should be able to tell you precisely, because there's  
21 certain methods in place for that.

22 After that, I may go back and look at some  
23 of the samples again to verify what I think is -- where,  
24 I think lithologic breaks are and also what I think the  
25 sample material -- or the material is. So I may go back

1 and do some more analysis and see if things change. And  
2 at that point, I've already got some draft logs, and I'm  
3 going through and adding information or making the logs  
4 based on those samples and my observations in the --  
5 essentially in the office.

6 Q Okay. And so even today, if you were asked a  
7 question that you wanted to verify, you have both your  
8 field logs, your field notes, and your actual samples to  
9 go back and compare to your final logs. Isn't that  
10 right?

11 A Right. Some samples have gone to the lab. But  
12 aside from those, we've got all of the samples, and I  
13 can use them to verify what I've got.

14 Q Okay. You talked about the classification and  
15 the lab analyses and how that impacts the  
16 classification. But I want to make sure that the record  
17 is clear between -- in the description between a  
18 classification versus a secondary feature. Now, is a  
19 secondary feature part of the classification?

20 A The secondary feature is independent of a  
21 classification.

22 Q So you wouldn't need a lab analysis to identify  
23 a secondary feature. Is that right?

24 A Secondary features are easier to identify  
25 through visual observation. Sometimes tactile

1 observation or looking under a hand lens at some  
2 minerals. But essentially, yes, a gypsum fissure does  
3 not need a lab result. Typically, it's readily  
4 apparent.

5 Q And when you're looking for -- let me back up.

6 So you were asked some questions about  
7 whether the core samples that are taken out of the  
8 ground, whether they should be scraped or cut in half  
9 lengthwise, when you are doing that, are you looking for  
10 secondary features?

11 A I am.

12 Q Okay. And can you -- among the samples that  
13 you have here today, can you -- do you have one that can  
14 show us a secondary feature that you would've observed  
15 after scraping or cutting?

16 A Sure. The sample I showed earlier.

17 Q Okay. Is that the only one, or do you have any  
18 others?

19 A There's also iron oxide-filled fissures in  
20 here.

21 Q Okay.

22 A Let me just get this out. For example, in this  
23 sample from IV-3, 24 to 25, you can see this sort of  
24 orange line right here, which is indicative of iron  
25 oxide material being deposited. And because there's

1 such a concentration, and it looks like there's almost a  
2 break in this material, you can see that it's probably a  
3 fissure filled with iron oxide.

4 Q Okay. Would it be appropriate to just pass it  
5 around so that everybody can kind of see what he's  
6 talking about, or we could do that or mob him to take a  
7 look? It just seems like it would be helpful to be able  
8 to see what he just described.

9 JUDGE BELL: I don't have a problem with  
10 that. If you want to hand it around, and whoever wants  
11 to look at it, can look at it, and whoever doesn't, can  
12 just pass it along.

13 What sample did you say that was from?  
14 What boring?

15 THE WITNESS: This is Bore Well IV-3, 24  
16 to 25 feet.

17 JUDGE QUALTROUGH: So that's the picture  
18 on Exhibit 6F, Page 1? Protestants Exhibit 6F?

19 THE WITNESS: Yes. And the second page as  
20 well.

21 Q (BY MS. PERALES) And the gypsum-filled fissure  
22 that you showed us earlier, can you pass that around  
23 too?

24 A Sure.

25 Q So you were -- maybe I should wait just a

1 second.

2 JUDGE QUALTROUGH: Well, I don't want to  
3 waste too much time.

4 MS. PERALES: True, okay. Let me just  
5 move on. You are right about that.

6 Q (BY MS. PERALES) So you were asked questions  
7 about whether there's a threshold amount of a particular  
8 material that's necessary to observe before it's noted  
9 in your log. I think those were questions asked by the  
10 Executive Director. Do you recall that?

11 A I do.

12 Q Let me start with the secondary features. Is  
13 there some sort of threshold size or threshold  
14 observation that you would make before you decide  
15 whether to record it?

16 A No. If I have observed it, then I will note  
17 it. So if I see a gypsum-filled fissure, if I see some  
18 gypsum, I'll note that.

19 Q And with the description of the soils, is there  
20 a threshold amount of say, you know, silt that you would  
21 look for before you noted that in your field logs?

22 A If I note -- again, if I note the silt in some  
23 kind of discrete form, like a laminated silt, where you  
24 have maybe something actually like this in MP-2,  
25 interval 16 to 17 feet --

1 Q Can you hold it up?

2 A Sure.

3 You can see this sort of light brownish,  
4 reddish material, and you've got some gray stuff in  
5 there. So, you know, that kind of flakes off. It's  
6 fairly silty. That's an obvious, you know, indication  
7 that that's silt. If it's silt that I may see in the  
8 clays, so if I rub my hands together and I look at under  
9 a microscope, or I can tell some indication that there's  
10 silt there, maybe the sample crumbles, I'll call it a  
11 silty clay. And if it's a -- let's just say it's a clay  
12 silt where I think it's predominantly silt with some  
13 clays in there, where the material doesn't readily  
14 crumble, but it does crumble fairly easily and it  
15 doesn't roll out in a plastic matter, then I would call  
16 that a clay silt.

17 Q Okay.

18 A And again, this is just kind of what -- as a  
19 geologist, what you kind of do in the field is you try  
20 to identify the materials based on these indications.

21 Q Okay. And when you're trying to identify the  
22 presence of silt as you've described, what are you doing  
23 tactilely? In other words, what I'm trying to determine  
24 is whether in that case it's important to scrape the  
25 core, cut it in half, or just roll it between your

1 fingers? What are you doing?

2 A All those are important to initially see what  
3 the material is. You scrape the core. I cut the core  
4 in half, at least to observe the materials inside. And  
5 then I'll do some tactile tests to see if it's a silt.  
6 Typically, if it's got very low dry strength, so if it  
7 crumbles easily, it's likely to be a silty material.  
8 And depending on how much it crumbles, gives you an  
9 indication. Also, you can roll the material up into a  
10 ball and then try to make a little -- like I was saying  
11 before, a little, I guess, shoestring out of it, kind  
12 of. And, you know, if it doesn't roll out more than a  
13 little bit before it crumbles into little, tiny pieces  
14 and it's not very plastic, it's likely a silt. Those  
15 are all indications.

16 Q Okay. So you were also asked some questions  
17 about Mr. Stamoulis -- and again, can you tell us who  
18 Mr. Stamoulis was and what his role was?

19 A I believe Mr. Stamoulis was the drilling  
20 supervisor, from what I understand from his deposition.  
21 I know that he's a registered geologist. I know that he  
22 was, I guess -- he was a -- he was in the -- at the site  
23 in the capacity of a drilling supervisor.

24 Q Okay. And he was not -- he was not on the  
25 drilling rig. Is that right?



1           A       Right.  He wasn't actually operating the rig  
2 himself.  There was somebody else operating it.

3           Q       And he made it pretty clear, didn't he, that he  
4 was also not out on the site as a professional  
5 geoscientist.  Isn't that right?

6           A       I believe that's what he stated in his  
7 deposition.

8           Q       So he was essentially overseeing the drilling  
9 of the borings by the Applicant?

10          A       From my understanding.

11          Q       And he's the person who was recording -- or  
12 preparing field logs, as far as you could tell?

13          A       Yes.

14          Q       So you described Mr. Stamoulis as having cut  
15 off the ends of the cores that were collected by the  
16 Applicant during their drilling in 2016.  Is that right?

17          A       Yes.

18          Q       Do you have any problem with that?

19          A       I guess it's -- to me, it was odd that  
20 Mr. Stamoulis was logging the samples and describing  
21 them if he wasn't there as a geologist.  Also, just  
22 generally, like I had mentioned earlier, without  
23 scraping the core, he wasn't really seeing the  
24 descriptions of the materials on the inside, so his logs  
25 really were just descriptions of material essentially

1 every 2 feet, rather than a description of the material  
2 within each 2-foot interval. Although, I suppose he may  
3 have noted some things on the outside that may have not  
4 been smeared or apparent without smearing.

5 Q Okay. So to be clear, it sounds to me, and  
6 correct me if I'm wrong, as though your critique isn't  
7 so much that he was cutting off the ends, but rather  
8 that he was logging the samples without looking at the  
9 material beneath the surface?

10 A Right.

11 Q And the ends of the samples, are those the  
12 areas that are pretty disturbed?

13 A They can be disturbed, yes. At the end of the  
14 sample, you typically -- I think that -- sheer the  
15 material off, so they could be disturbed. And also, if  
16 there's any material that has slipped in the hole,  
17 that'll be included in the bottom of the sample  
18 interval. So that may be -- that may not be the stuff  
19 that is actually being cored, but things from above.

20 Q Okay. We also heard in someone's question a  
21 reference to the cores that were being brought up as  
22 similar to a baseball bat. Do you recall that?

23 A Yes.

24 Q So would you describe the cores that were  
25 brought up by either -- let's start with the Applicant's

1 cores. Would you describe them as -- or even a majority  
2 of them as being similar to a baseball bat?

3 A I'm not sure that I would describe it as a  
4 baseball bat. It's just a cylindrical tube of material.

5 Q And were there several of those cylindrical  
6 tubes of material that were broken?

7 A I believe I noted that there was materials,  
8 yes, that were broken in the middle.

9 Q And some were broken by the Shelby tube. Isn't  
10 that right?

11 A Some were deformed by the Shelby tube. There  
12 are instances where the Shelby tube had bent in the  
13 subsurface. And so when those materials were extracted,  
14 they were extracted with -- sort of disturbed based on  
15 the shape of the tube, which was no longer round. I  
16 think there was also moments where gravel had been  
17 caught in the tube, and so when it was extracted, there  
18 was a streak in the samples from that gravel piece.

19 Q So you were also asked some questions about  
20 loggings from cuttings. Do you recall a question or two  
21 about that?

22 A I believe so.

23 Q Okay. That's what I wrote in my notes.

24 A Okay. I remember talking about cuttings.

25 Q So did you -- do you happen to know whether the

1 Applicant, their piezometer logs were -- well, let me  
2 back up.

3 Do you happen to know what drilling method  
4 was used to drill the piezometers by the Applicant?

5 A I believe it was -- although, I can't recall, I  
6 remember -- I think it was mud rotary.

7 Q And so mud rotary, would that have resulted in  
8 cuttings?

9 A Yes. So that would've resulted in cuttings  
10 coming up around the angles of the borehole.

11 Q Okay. Okay. I'm going to change topics just a  
12 little bit now.

13 So you were asked some questions about the  
14 depositional environment beneath the site, and I think  
15 you were asked that by Caldwell County. Do you recall  
16 that?

17 A Yes.

18 Q And I think you were asked about the Wilcox  
19 formation in particular. Do you recall that?

20 A Sure.

21 Q And you talked about marine origin -- this is  
22 what I have written down, "marine origin and deltaic  
23 deposits," and I'd like you to explain what those two  
24 different phrases mean.

25 A Sure. The marine deposits, that's the

1 depositional environment. That's marine. So you've got  
2 sort of clays. I guess, it's relatively shallow marine.  
3 You've got clays being deposited in the bottom of the  
4 sea floor, where deltaic deposits, especially in the  
5 case of the Wilcox formation in the area where there's a  
6 contact, those are deposits from deltas that began to  
7 propagate on shore and then washed materials off shore,  
8 silts and clays and some sands. And those materials are  
9 deposited on top of that marine material while you're  
10 still in the subsurface or on the ocean floor. And so  
11 you have a sort of dynamic environment of the deltas  
12 being deposited on top of the marine environment. This  
13 is -- and I'm talking about the transition zone here.

14           So, you know, probably over tens of  
15 thousands of years, the sedimentary environment, the  
16 depositional environment changes from a predominantly  
17 marine environment to a delta environment, and the delta  
18 environment has -- again, it's more dynamic. So if you  
19 can imagine streams coming down from mountains, carrying  
20 lots of material with them, and then as they outwash  
21 into the sea, all the material then goes into the ocean,  
22 and at some point it starts getting deposited on top of  
23 the material that's already there.

24           And then the environment changes as that  
25 delta is propagated, as more material is deposited on a

1 continental shelf sort of building up, creating a new  
2 depositional environment, and that can take time. Well,  
3 it does take time, geologically, so tens of thousands of  
4 years for it to go from one to the other.

5           And in a transitional environment where --  
6 in a transitional zone where we are, it may be difficult  
7 to tell between a Midway and a Wilcox material, because  
8 it's sort of transitioning from one to the other.

9           Q     Okay. And so did you -- in your investigation,  
10 did you encounter any evidence that supports this  
11 description of this transitional marine and deltaic  
12 environment?

13          A     We noted silts, silts interbedded with clays  
14 and also some sandstone, some siltstone, some clay  
15 stone, and those could be indicative of a deltaic  
16 deposit. And knowing where we are, I can infer that  
17 it's possible that this is partially at least a Wilcox  
18 sediment rather than a Midway sediment.

19          Q     Okay. How does -- the presence of water found  
20 at P-32 and MP-1, how does that factor into your  
21 description, if it does at all?

22          A     Well, I think that was -- that water was  
23 encompassed in what we noted as a sandstone and a  
24 relatively silty material. I think it was actually silt  
25 for part of the -- for part of that layer. And because

1 the water came in fairly quickly into the well, I'm  
2 assuming -- I have to assume that there's some hydraulic  
3 gradient that's causing the water to flow into this --  
4 into the swale, which means that that water is stored in  
5 some material that's transmitting it, likely the silt  
6 material.

7           So that may be indicative of a continuous  
8 silty material. With these deltas, delta materials, you  
9 may have interfingering. Especially with all the turbid  
10 environment and the silty material that we noted,  
11 especially in laminations, it could possibly be  
12 interfingered in the subsurface.

13       Q     So I heard you in your testimony refer to  
14 "ASTM" a couple of times, and I wonder if you could  
15 describe for us what you're referring to when you  
16 mention "ASTM."

17       A     Sure. There are standards that are developed.  
18 ASTM is a body that develops standards for different  
19 technical procedures.

20       Q     And specifically the ASTM standards that you  
21 referred to or that you, as a geologist, would've used  
22 in preparing your final logs, could you describe what  
23 those are?

24       A     Sure. I used that -- it's 2488. It outlines  
25 how to prepare a boring log.

1 Q And what does it does it generally say about  
2 how to prepare a boring log?

3 A It generally gives guidelines to standardize  
4 how the boring logs are presented, what kind of words to  
5 use, so frequent fissures, thing like that, that allow  
6 others to be able to understand what it is that's  
7 presented in the boring logs.

8 Q So are you using these standards as you are  
9 converting your field logs to final logs?

10 A I was using them to give a good standardization  
11 of the material or the descriptions.

12 Q So at least some of the changes that you were  
13 asked about between your field logs and your final logs,  
14 would those have been because you were relying on the  
15 ASTM standards?

16 A Yes, partially.

17 Q Okay. And when you're recording your  
18 observations out in the field, do you -- are you relying  
19 on the ASTM standards at that time?

20 A It's a lot more difficult to do that. I  
21 typically go with the geologic descriptions that I  
22 learned, and then I standardize them when making the  
23 final log. I'll do my best to do that.

24 Q Were you here during the testimony by  
25 Mr. Adams?



1           A       I believe I was.

2           Q       Do you recall whether he mentioned the ASTM  
3 standards in coming up with the classifications for his  
4 logs?

5                   MR. RYAN:  Objection.  He hasn't been  
6 asked about Mr. Adams' testimony.

7                   MS. PERALES:  I'm just trying to explore  
8 what went into the final logs by Mr. Rubinov and compare  
9 the language so that we can understand what the purpose  
10 of his changes were.

11                  MR. RYAN:  He hasn't been asked about  
12 that.

13                  JUDGE BELL:  Yeah, I think we've already  
14 done that, so I'll sustain that objection.  Let's move  
15 on.

16                  MS. PERALES:  Okay.

17           Q       (BY MS. PERALES)  I have just a couple of more  
18 questions, I think, here.  I'm going to go back to the  
19 loss circulation for the loss of fluid circulation that  
20 you observed.

21           A       Okay.

22           Q       So the loss circulation, again, that was during  
23 the Applicant's borings.  Is that right?

24           A       Yes.

25           Q       And were you physically present when that

1 occurred?

2 A I was.

3 Q Do you recall if Mr. Snyder was present?

4 A I recall he was not present.

5 Q Do you recall whether Mr. Adams was present?

6 A I recall Mr. Adams wasn't present.

7 Q Okay. So if Mr. Adams or Mr. Snyder wanted a  
8 description of what occurred, is that something that  
9 they would've had to rely on Mr. Stamoulis for?

10 A I imagine, yes, that's true.

11 Q And you talked about the water that was  
12 evacuated. Was all of the water -- or I'll call it  
13 "fluid." Was -- all of the fluid that had been  
14 circulated, was all of that lost?

15 A I believe -- I believe it was -- the hole was  
16 dry, if I recall correctly. Yes, the fluid was  
17 evacuated.

18 Q Okay. So if more fluid had been added, would  
19 it seem logical that that fluid would've been lost too?

20 A There's a couple of things that were done and  
21 could be done that would stymie that loss of fluid,  
22 number one, because it wasn't a clay material. Just the  
23 process of drilling through may smear and close up some  
24 of those pores.

25 Secondly, from what I remember, they used

1 a couple of bags of quick gel, which is a mud additive  
2 that thickens up the fluid, causing it -- decreasing the  
3 viscosity, essentially. That's typically done to  
4 disallow the fluid to freely flow into pores like that,  
5 and it's also -- typically, it's good for bringing up a  
6 heavier material, heavier cuttings.

7 Q Okay.

8 MS. PERALES: I think I'm just about done.  
9 I just need a second to review my notes.

10 JUDGE BELL: Okay.

11 MS. PERALES: Okay. I'll pass the  
12 witness.

13 JUDGE BELL: All right. Any recross from  
14 Plum Creek?

15 MR. WILSON: No, sir.

16 JUDGE BELL: Very good. How about  
17 Caldwell County?

18 MR. MAGEE: No, Your Honor.

19 JUDGE BELL: OPIC?

20 MR. TUCKER: No questions, Your Honor.

21 JUDGE BELL: Executive Director?

22 MR. VARGAS: No questions, Your Honor.

23 JUDGE BELL: Thank you. And the  
24 Applicant?

25 MR. RYAN: Just a couple of things. First

1 off, a couple of housekeeping matters.

2 I'd like to offer Exhibits 130EP-40 and  
3 130EP-44.

4 JUDGE BELL: Any objections to 130EP-40?

5 MS. PERALES: I have no objections to  
6 EP40.

7 JUDGE BELL: All right. EP-40 is  
8 admitted.

9 (Exhibit Applicant No. EP-40 admitted)

10 JUDGE QUALTROUGH: We kind of need to see  
11 44 before we admit it. Right?

12 MR. RYAN: Well, he's got it.

13 JUDGE QUALTROUGH: Nobody else has a copy  
14 of it.

15 MR. RYAN: I can make copies of it and  
16 bring them in the morning.

17 JUDGE BELL: That's what I was going to  
18 suggest.

19 MR. RYAN: Yeah, let's do that.

20 JUDGE BELL: Okay. All right.  
21 40 is admitted.

22 MR. RYAN: And then the other thing that I  
23 want to ask, since those samples have been used by the  
24 witness, I'd like to make sure that they're here for us  
25 to refer to during rebuttal.

1 JUDGE QUALTROUGH: For the record, I broke  
2 a little piece off.

3 MS. PERALES: Oh, wait. Are we talking  
4 about rebuttal, or are we talking about his recross?

5 MR. RYAN: Rebuttal.

6 MS. PERALES: So there is a chain of  
7 custody that goes with these. If Mr. Rubinov isn't  
8 here, I don't think that we can just have the samples  
9 here.

10 MR. RYAN: Well, then I'll move to  
11 subpoena them to be here during our rebuttal case if  
12 they won't agree to make sure they're here.

13 JUDGE BELL: Are you going to require a  
14 subpoena for these things?

15 JUDGE QUALTROUGH: When is your rebuttal?  
16 Do you think we'll do that Friday?

17 MR. RYAN: I hope we're doing it before  
18 then.

19 JUDGE BELL: Me too.

20 MS. PERALES: If you can give us a heads  
21 up, we can do our best to make those arrangements.

22 MR. RYAN: Heads up. I want them here  
23 when I do my rebuttal.

24 MS. PERALES: Tomorrow or Thursday? I  
25 mean --

1 MR. RYAN: Maybe tomorrow or Thursday or  
2 maybe Friday. At some point between now and the end of  
3 the hearing, I need those samples here.

4 JUDGE BELL: Let's go off the record.

5 (Brief discussion off the record)

6 JUDGE BELL: All right. We are back on  
7 the record. And we had a brief discussion off the  
8 record about having the actual soil samples that have  
9 been referred to in Mr. Rubinov's redirect available for  
10 the Applicant's rebuttal case, and it's our  
11 understanding that that will happen.

12 Is that correct, Ms. Perales?

13 MS. PERALES: We'll try to make that  
14 happen either with Mr. Rubinov's presence; or if it's  
15 not with Mr. Rubinov's presence, then without a subpoena  
16 and a chain of custody form.

17 JUDGE BELL: All right. Very good. So  
18 we're back to recross by the Applicant.

19 MR. RYAN: Thank you, Your Honor.

20 RE-CROSS-EXAMINATION

21 BY MR. RYAN:

22 Q Would you look at Exhibit 6B, which is the map  
23 that shows boring and trench locations?

24 A Yes.

25 Q So boring AR-2, you testified earlier that that

1 was an aquifer reconnaissance boring?

2 A That's what it was called.

3 Q And you didn't find an aquifer at that  
4 location, did you?

5 A We found clays and no evidence of silts or  
6 groundwater.

7 Q You didn't find an aquifer at that location,  
8 did you?

9 MS. PERALES: Your Honors, the scope of my  
10 questioning did not include questions about finding an  
11 aquifer at AR-2.

12 MR. RYAN: Well, she was asking why did  
13 they drill their various borings, and this is -- my  
14 point is that they drilled this one for some other  
15 purpose.

16 MS. PERALES: I believe my question was  
17 what was the objective of the boring program.

18 JUDGE BELL: And that's pretty broad.  
19 I'll overrule the objection.

20 MS. PERALES: Okay.

21 Q (BY MR. RYAN) Did you find an aquifer at the  
22 location of AR-2?

23 A We didn't find materials that were indicative  
24 of an aquifer there.

25 Q Did you find an aquifer at AR-2?

1           A       We didn't find materials that were indicative  
2 of an aquifer. And I don't think that there's an  
3 aquifer present in that boring.

4           Q       Okay. But you did find the same dark gray clay  
5 that's been found throughout the rest of the site?

6           A       We did. The unweathered clay.

7           Q       Okay.

8                   MR. RYAN: I'll pass the witness.

9                   JUDGE BELL: All right. Thank you,  
10 Mr. Rubinov. Appreciate your time. You may step down.

11                   All right. We will adjourn for the day  
12 and be back at 9:00 o'clock tomorrow morning for your  
13 last witness, Mr. Courtney. Correct?

14                   MS. PERALES: Correct.

15                   JUDGE BELL: All right. Very good. We  
16 are adjourned.

17                   (Proceedings recessed at 5:21 p.m.)

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C E R T I F I C A T E

STATE OF TEXAS )  
COUNTY OF TRAVIS )

We, Jodi Cardenas and Dalia F. Inman,  
Certified Shorthand Reporters in and for the State of  
Texas, do hereby certify that the above-mentioned matter  
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WE FURTHER CERTIFY THAT the proceedings of  
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and correct transcription of the original notes.

IN WITNESS WHEREOF, we have hereunto set our  
hand and seal this 6th day of September 2016.

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