

Restoration Advisory Board Meeting

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April 21, 2021

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**PHIPPS REPORTING**

*Raising the Bar!*

April 21, 2021

AIR FORCE INSTALLATION & MISSION SUPPORT CENTER

WURTSMITH RESTORATION ADVISORY BOARD MEETING

PAGES 1 - 111

Wednesday, April 21, 2021

5:01 p.m. - 8:00 p.m.

Stenographically Reported Via Web Conference by:  
LILLIAN RIVERA, STENOGRAPHER

Job Number: 185582

1 APPEARANCES: (All appearing via web conference:)

2

Tim Sueltenfuss, Meeting Facilitator

3 Catharine Varley, Air Force representative

Puneet Vich, Michigan Dept. of Health and Human

4 Resources

Beth Place, Michigan Dept. of Environment, Great Lakes

5 and Energy

Chloe Ruddy, National Wildlife Federation

6 Paula Bond, Aerostar Representative

Kevin Nicholas, Bay West Representative

7 Colin Plank, Air Force Representative, Sequence

Stratigraphy Specialist

8

9 RAB Members:

10 Bill Gaines

David Winn

11 Mark Henry

Arnold Leriche

12 Dan Stock

Ryan Mertz

13 Cathy Wusterbarth

Denise Bryan

14 Tim Cummings

Rex Vaughn

15 Mike Munson

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1 Thereupon,

2 The following proceedings began at 5:01 p.m.:

3 MR. SUELTFUSS: We do ask that you hold  
4 questions until the end of the presentation.

5 RAB members, please let us know if you  
6 have any questions by raising your hand  
7 electronically, using that button there. I will  
8 call on you. And we do also ask that you mute  
9 your microphones, just to make sure we don't  
10 hear background noise.

11 Members of the public can share comments  
12 towards the end of the meeting. And as a  
13 reminder, our court reporter will capture your  
14 comments word for word.

15 I'll now review the ground rules for  
16 tonight's meeting. After I read those, I am  
17 going to ask all RAB numbers to indicate their  
18 agreement with these ground rules by raising  
19 their hand electronically. Let me just read  
20 these off, and then we will go from there.

21 Number 1: Respect one another and  
22 maintain an atmosphere of open dialogue and  
23 exchange of ideas.

24 Number 2: Use our time together  
25 efficiently, wisely and respectfully.

1           Number 3: Speak clearly and succinctly,  
2 one person at a time. Avoid interrupting other.  
3 It's especially important when we're trying to  
4 capture a verbatim transcript.

5           Number 4: Listen and remain open to  
6 different points of view.

7           Number 5: Maintain a propensity for  
8 progress. Prepare, discuss, document and move  
9 forward.

10           Number 6: Share information early, openly  
11 and honestly.

12           Number 7: Accurately and objectively  
13 relay to the others discussions that occur at  
14 these Restoration Advisory Board meetings.

15           So, RAB members, do you agree to abide by  
16 those rules? Just raise your hand  
17 electronically if you do.

18           Great. Thank you very much.

19           So one of my jobs is to keep our focus on  
20 these ground rules and to really help ensure a  
21 positive, productive and respectful meeting. So  
22 I appreciate your assistance in that.

23           I want to now confirm that our RAB members  
24 are present and make sure that we have a quorum.

25           So I am going to be calling off the RAB

1 members' names one by one. If you could please  
2 take them off mute, and I can say hello to these  
3 folks, and I will just document your presence  
4 here. Also, it will confirm that we have that  
5 quorum, per our operating procedures.

6 Do we have Mr. Bill Gaines with us?

7 MR. GAINES: I have to un-mute.

8 MR. SUELTFUSS: Thank you, Bill.

9 Do we have Mark Henry with us -- still  
10 with us?

11 MR. HENRY: I am here.

12 MR. SUELTFUSS: Thanks, Mark.

13 How about Mr. Arny Leriche?

14 MR. LERICHE: I am here.

15 MR. SUELTFUSS: Thank you, Arny. I  
16 appreciate that.

17 Do we have Mr. Maxwell with us?

18 MR. HENRY: Bill is not going to be  
19 attending tonight.

20 MR. SUELTFUSS: Okay. Great. Thanks  
21 very much, Mark.

22 Do we have Rex Vaughn with us?

23 I believe I saw Rex's name on the list.

24 MR. VAUGHN: Yes, I am here, present.

25 MR. SUELTFUSS: Thank you very much,

1 Rex. So it sounds like you will be operating on  
2 behalf of Mr. Maxwell as his alternate.

3 Does that work for you?

4 MR. VAUGHN: Yes, that would be fine.

5 MR. SUELTFUSS: Do we have Ryan Mertz?

6 I don't see Ryan Mertz on the list. He  
7 may join later.

8 Do we have Jerry Schmit?

9 Also, not on the list, but can be joined  
10 later.

11 I saw Daniel Stock. I believe I saw  
12 Daniel with us.

13 MR. STOCK: Present. It takes a while to  
14 get un-muted, but I am here. Thanks.

15 MR. SUELTFUSS: Thanks for your  
16 patience. I appreciate that.

17 Do we have David Winn?

18 MR. WINN: Yes, David is here.

19 MR. SUELTFUSS: Thank you, David.

20 Do we have Cathy Wusterbarth?

21 Cathy, are you with us?

22 Cathy, it's showing that you are  
23 self-muted. So if you could check on that.

24 We have more than 51 percent of the  
25 community RAB members.

1           Let me go down the list for our government  
2 RAB members.

3           Dr. Catharine Varley, the Air Force  
4 representative is present, with us.

5           Do we have Lisa Sutton with Au Sable  
6 Township?

7           Okay. If anybody else is representing Au  
8 Sable Township, please just raise your hand  
9 electronically.

10          Okay. Others may join after a bit.

11          Do we have Denise Bryan with District  
12 Health Department?

13          MS. BRYAN: Good evening. I am present.

14          MR. SUELTFUSS: Thank you, Denise. I  
15 appreciate that.

16          Do we have Puneet Vich with Michigan  
17 Department of Health and Human Services?

18          MR. VICH: Yes, I am here.

19          MR. SUELTFUSS: Great. Thank you. I  
20 appreciate your presence.

21          Do we have Beth Place with Michigan  
22 Department of Environment, Great Lakes, and  
23 Energy.

24          MS. PLACE: Yeah, Beth Place is here.  
25 Thank you.



1 MR. SUELTFUSS: Thanks, Beth.

2 Do we have Tim Cummings?

3 Okay. I see you raised your hand  
4 electronically there, Tim.

5 MR. CUMMINGS: Yes, I am here. I am here.

6 MR. SUELTFUSS: Thank you. I appreciate  
7 that.

8 Do we have Mike Munson with us with the  
9 Airport Authority?

10 MR. MUNSON: Yes. This is Mike Munson  
11 here.

12 MR. SUELTFUSS: Thank you, Mike.

13 Do we have Jessie Stinbeck with USDAA  
14 Corp. Service?

15 If anyone else is representing the Corp.  
16 Service, then go ahead and raise your hand.

17 Okay. Well, likewise, we have more than  
18 51 percent of the government RAB members. We  
19 have both co-chairs as well. So we do have a  
20 quorum tonight per operating procedure Section  
21 3.10. So thank you for your patience with that  
22 and with this technology as well.

23 Final comment before we begin. Dr. Varley  
24 submitted the final minutes of the January 2021  
25 RAB meeting, the e-mail on 30th March.

1           So let's go ahead and move to slide six,  
2           if we could. We are entering the Stakeholder  
3           RAB member update portion of the agenda.

4           The topic is for RAB members to provide  
5           brief updates. Not full presentations, detailed  
6           presentations, but just quick updates that you  
7           might want to share.

8           And if you have anything extended, then,  
9           of course, in the public comment period, that  
10          information can be shared as well.

11          Let's start with Dr. Varley's Air Force  
12          updates. Over to you, Dr. Varley.

13          MS. VARLEY: All right. So we have got  
14          some really neat field work going on right now.

15          At the beginning of April, our RI  
16          contractor went ahead and did a base-wide water  
17          level survey to support the RI Conceptual Site  
18          Model, which we'll be hearing more about this  
19          afternoon.

20          Additionally, SS57 on site 7, please, if  
21          you go one further -- SS57, we did our sampling  
22          for BOCs out there. And we did sampling last  
23          week at FT02 to create our baseline for efforts  
24          out there.

25          Right now, as we speak, FT02, the

1 underground storage tank and the pad are being  
2 demolished, so that we can actually put the 2017  
3 remedy in place.

4 And then we continue operation to  
5 maintenance efforts at all of our pump and treat  
6 systems. So all of that work is ongoing and  
7 sampling is being done.

8 That's all I've got, Tim. On to the next.

9 MR. SUELTFUSS: Sorry. I was on mute.

10 Let's continue down the list of the  
11 stakeholder updates. We will go next to junior  
12 RAB members. We will start with Mark Henry.

13 Mark Henry, any updates that you'd like to  
14 share?

15 MR. HENRY: Sure. We have done a few  
16 things since the last RAB meeting. We reviewed  
17 and discussed with the Air Force the list of  
18 action items that has been accumulating over the  
19 years, and agreed that certain ones should be  
20 closed out, and we refined some other ones.

21 The community RAB has been working towards  
22 revamping the operating procedures a little bit.  
23 And we have been very slowly providing language  
24 to a draft document that I'll be sharing with  
25 the Air Force. So that perhaps if they agree,

1 we can vote on this during the next RAB meeting.

2 Of course, we reviewed the Clark's Marsh  
3 interim remedial actions and commented; provided  
4 those by e-mail to Dr. Varley. And we also  
5 received from the NOW Group, the Need Our Water  
6 Group, a general comment letter that expressed  
7 their disappointment that the Clark's Marsh IRA  
8 does not go far enough for protecting the marsh  
9 from the ongoing works with the perfluoro  
10 chemical threats or the marsh's perfluoro  
11 chemical discharge to the Au Sable.

12 They recommended additional interim  
13 remedial actions as soon as possible, and  
14 recommended community input and transparency on  
15 the front end of the process.

16 They brought this to the community RAB for  
17 our consideration and if we wanted to be a  
18 signatory to that letter. So we took a vote  
19 within our membership, and there was a majority.  
20 So the community RAB sent an e-mail to the NOW  
21 Group expressing our concurrence with their  
22 letter.

23 We have about 12 other pages of  
24 supporters. So that's my update.

25 MR. SUELTFUSS: Thank you very much,

1 Mark. I appreciate that.

2 Let's turn now to Dan Stock.

3 Any updates you have, Dan?

4 (No verbal response given.)

5 MR. SUELTFUSS: All right. Well, thank  
6 you very much. I appreciate your time, Dan.

7 We don't have Jill Maxwell with us. Let's  
8 turn to Rex Vaughn.

9 Rex, any update from your standpoint?

10 MR. VAUGHN: I have no additional comments  
11 other than what Mark has already presented.

12 Thank you.

13 MR. SUELTFUSS: Thank you.

14 How about to Bill Gaines?

15 MR. GAINES: Mark spoke for what I needed  
16 to present. Thank you.

17 MR. SUELTFUSS: Sounds good. Thank you  
18 very much.

19 How about over to Cathy Wusterbarth?

20 Cathy, I see you are here. I see that you  
21 are self-muted. I have sent you an audio to see  
22 if you can connect via phone.

23 We'll come back and capture any updates  
24 that you have as well, Cathy.

25 In the meantime, let's move on.

1 Ryan Marks and Jerry Schmidt are not with  
2 us tonight. So we will go to Arny Leriche.

3 MR. LERICHE: Yes. I've been working on  
4 the environmental sequencing way of doing  
5 things. And I have made a comment just today,  
6 actually, on the action item, and going to be  
7 very interested in the CSM tonight and the use  
8 of the sequencing methodology that the RAB will  
9 be reviewing after tonight's session. Thank  
10 you.

11 MR. SUELTFUSS: Thank you, Arny. I  
12 appreciate that. We definitely do have a lot on  
13 the agenda tonight. Let's turn last among our  
14 community RAB member, to David Winn.

15 David, did you have any comments to share?

16 Okay. Well, let's continue on, then, to  
17 our government RAB members, and see if there are  
18 any brief stakeholder updates they would like to  
19 share. First, to Beth Place with Michigan EGLE.

20 MS. PLACE: Hi. This is Beth Place with  
21 EGLE, and I do have a few updates.

22 EGLE completed review -- since our last  
23 draft, EGLE completed review of the draft of  
24 Clark's Marsh's interim proposed plan and  
25 submitted our comments to Air Force prior to

1 that being released for public comment.

2 Currently EGLE is reviewing the Van Etten  
3 Lake draft, proposed plan for that interim  
4 remedial action. And we are in our resolution  
5 phase with Air Force right now.

6 We also reviewed some of the work that Dr.  
7 Varley mentioned previously. Some of that work  
8 was reviewed a while back. And it's an ongoing  
9 process, such as SS57. But we did review the  
10 removal of the vault at FT02, as well as the  
11 addendum to the work plan to remove the  
12 concrete, the concrete pad of FT02. So I'm glad  
13 that field work is ongoing.

14 On March 23rd of 2021, EGLE also asked for  
15 an additional interim remedial action between  
16 the FT02 treatment system and the Mission Street  
17 treatment system to evaluate an additional  
18 interim remedial action at that location. Thank  
19 you.

20 MR. SUELTFUSS: Thank you, Beth.

21 Now to Mike Munson with the Port  
22 Authority.

23 MR. MUNSON: Here we go. I gave a brief  
24 business summary last month. At this particular  
25 time, there are no updates to bring forward to

1 the team.

2 MR. SUELTFUSS: Thank you, Mike. I  
3 appreciate that.

4 I think Lisa Sutton has not been able to  
5 join us from Au Sable.

6 And let's turn to Puneet Vich with the  
7 Michigan Department of Health and Human Services  
8 for a stakeholder update you might have for us.

9 MR. VICH: Can you hear me?

10 MR. SUELTFUSS: I can, yes. Go ahead.

11 MR. VICH: So I have a couple of updates.  
12 I'll start with the resampling update.

13 So we are planning another round of  
14 resampling next month. So we will be reaching  
15 out to the residents.

16 Regarding fish updates, we recently  
17 received mercury and PFAS results back for the  
18 yellow perch collected from Van Etten Lake in  
19 2018 and 2019. Currently, yellow perch found in  
20 Van Etten Lake are covered under the statewide  
21 advisory of four servings per month due to  
22 mercury. But the new data suggests that that  
23 advisory be changed to two servings per month of  
24 the yellow perch due to PFAS and mercury.

25 Regarding the yearly report updates, based



1 on the data and the relationship between  
2 detections of PFAS and liver samples at the  
3 collection location centers from Clark's Marsh,  
4 and we have suggested and recommend that the "Do  
5 Not Eat" advisory be changed from within five  
6 miles of Clark's Marsh to within three miles of  
7 Clark's Marsh.

8 And, finally, regarding the exposure  
9 assessment, we have our next meeting planned for  
10 May 4th. And we are in the process of forming a  
11 community advisory team at this point.

12 Thank you. I appreciate that.

13 MR. SUELTFUSS: We'll turn next to Tim  
14 Cummings.

15 MR. CUMMINGS: This is Tim Cummings.

16 I just wanted to echo the earlier  
17 statement that Mark Henry had presented. And  
18 that is, we would like to see the Air Force  
19 pursue a more thorough and comprehensive  
20 solution of remediation at this time.

21 And in the sense of time here, I want to  
22 keep it as a simple statement. I know there's a  
23 number of people involved that have already  
24 spoken on that topic. For the time being, that  
25 is essentially what I think the township and a

1 number of organizations' representatives are  
2 looking for. Thank you.

3 MR. SUELTFUSS: Thank you, Mr. Cummings.

4 I see that Cathy has gotten back in now.  
5 So, Cathy, we'll come to you in just a moment.

6 But let me first go to Denise Bryan with  
7 Department of Health District 2.

8 MS. BRYAN: Good evening. My updates are  
9 that I am here to listen to the dialogue and the  
10 planning. I would like to applaud the NOW  
11 community members who work diligently every day  
12 to seek social justice for people affected by  
13 the contamination; and also, recognizing the  
14 need for environmental justice in the Great  
15 Lakes state of Michigan here, around the Former  
16 Wurtsmith Air Force base.

17 I am appreciative of listening to the Air  
18 Force's plan, and I hope they're ready to act  
19 with some urgency. It was 2013 when I issued  
20 the first health advisory, and we are here still  
21 waiting for comprehensive remediation.

22 And I would like to make it clear, that 26  
23 years of public health, I feel this is a public  
24 health threat and a crisis that is global. My  
25 focus and energy will be in the jurisdiction I

1 am responsible for.

2 I appreciate all of my state partners and  
3 liaisons who are involved in many different  
4 levels. And I hope to continue to work in a  
5 transparent manner with our residents.

6 And if there is any legislators on  
7 tonight, I appreciate your advocacy. And I hope  
8 that we can continue to have national policy.

9 I would like to say that I have been  
10 called to work with NOW on Michigan legislation  
11 to create the seven standards in Michigan.  
12 Those are minimum regulations that I hope the  
13 Air Force will recognize as well.

14 Thank you for the opportunity to speak to  
15 all of you in the community.

16 MR. SUELTFUSS: Thank you very much,  
17 Denise. I appreciate that.

18 Cathy has been patient. So we will turn  
19 back to Cathy Wusterbarth for any updates she  
20 may have.

21 MS. WUSTERBARTH: Hi, Tim, and, everybody.  
22 I am sorry. I was having some, I guess, audio  
23 difficulties there. But I had heard the entire  
24 portion of the meeting.

25 My comments are really -- I just want to

1 address the transparency concerns that continue  
2 to occur.

3 First of all, just to explain to the  
4 public the practice of being informed about the  
5 Clark's Marsh plan, on March 16th, the media  
6 received a press release, apparently. And the  
7 community members were contacted for comments.  
8 Unfortunately, we were unable to give comments  
9 because we were unaware that there was a plan  
10 that had been submitted.

11 But we were informed on March 17th that a  
12 press release was given to us. Again, the plan  
13 was not attached. So we did have to go to that  
14 administrative record to go look for that plan.

15 So in the future, we are hoping that we  
16 can get those plans and be informed of any  
17 plans, like the Van Etten plan that will be  
18 happening, in advance.

19 The Air Force did post a webinar on March  
20 24th to educate the public about the process of  
21 the comments and the plan itself. We do want to  
22 note that we were kept in the dark during the  
23 entire process of preparing the draft plan. And  
24 we were only given the opportunity to comment  
25 after the plan was drafted.

1           The NOW Group did hold a webinar on March  
2   31st to further educate the public on the  
3   details of the plan and how they could use --  
4   how they could contribute to it. And we  
5   proceeded to have dozens of meetings to develop  
6   intelligent, well thought-out comments on the  
7   plan. And this took hundreds of hours of work  
8   for community members and partners.

9           The RAB met and voted to support the  
10   public comments, along with more than 200 other  
11   business organizations and individuals.

12           Due to the extent of coordinating public  
13   engagement and support, we were unable to make  
14   the US Air Force impose a deadline of an April  
15   14 RAB meeting submission, despite the comment  
16   period ending on April 17th.

17           The community RAB members agreed the  
18   comments from the public would be summarized and  
19   read during the RAB member briefings.

20           Subsequently, we requested the US Air Force  
21   allow the inclusion of the slides that were  
22   developed by the community and a read of the  
23   letter in the meeting to ensure that all parties  
24   were aware of the community input for the plan.

25           I was informed that the slides would not

1 be allowed for inclusion in the meeting.  
2 Therefore, I am requesting anyone wanting those  
3 slides for this discussion tonight, find them on  
4 the NOW Facebook page or e-mail us at  
5 nowactiongroup@gmail.com, and we will send them  
6 to you immediately.

7 Unfortunately, I was told that I may  
8 suffer repercussions if I attempt to read the  
9 community public comments during the meeting.  
10 Therefore, I request the public do so during  
11 public comments.

12 MS. VARLEY: This is Catharine.

13 Can you please add this at the end during  
14 the public comment period? That's what we  
15 asked, not that you do it during your updates.  
16 These are supposed to be the updates, what  
17 you're doing based on your RAB position.

18 MS. WUSTERBARTH: I have been doing it as  
19 a RAB member. So if they have a question,  
20 forward it to the address given during the  
21 meeting --

22 MR. SUELTFUSS: Let me jump in, if I  
23 could. Thank you.

24 As a reminder, and as you have suggested  
25 Cathy, there is an opportunity at the end of the

1 meeting for the public comments.

2 So as you were suggesting, for folks to  
3 make whatever comments they'd like to provide,  
4 to read off whatever statement they'd like  
5 provide. And, of course, the RAB members can do  
6 that as well.

7 Let me move this forward, unless there are  
8 other updates that you'd like to share, Cathy.

9 Anything else that you'd like to share  
10 before we move on to the RAB business portion of  
11 the agenda?

12 MS. WUSTERBARTH: I did have questions for  
13 Dr. Varley.

14 Just explain what your plans are for  
15 future engagement for the Van Etten Lake plume,  
16 so there aren't these transparency issues.

17 And then, also, explain again to the  
18 public -- there were some RAB conversations  
19 about, I guess, the limitations of what you  
20 thought the NOW or the community submissions for  
21 the slides, the drawbacks and limitations of  
22 those; if you could address those tonight.

23 MS. VARLEY: So I have to put all slides  
24 through Air Force coordination to get approval.  
25 I asked for all slides, all input to be provided

1 by the 14th. I have the e-mails. If you'd like  
2 me to send those out to everyone, I can. I can  
3 re-send them.

4 I also add -- to every e-mail, I add on to  
5 the chain. So it continues to build. So you  
6 can go back to the e-mails I sent today or  
7 yesterday and find that one from the 9th of  
8 April asking for all submittals by the 14th.

9 And I apologize for being new. I added a  
10 lot of technical detail. So that technical  
11 detail takes a lot longer to clear.

12 We are also providing a lot of the CSM  
13 tonight. You can ask your questions and have  
14 them answered, with all available data.

15 We are giving you a chance to ask -- it's  
16 being recorded. The tools that we use and how  
17 we make our informed decisions are all being  
18 shared. I am trying to be transparent. I am  
19 doing my best.

20 MR. SUELTFUSS: Thank you, both.

21 What I wanted to do is move us on forward.  
22 We do have a packed agenda here.

23 The next item on our agenda is RAB  
24 business. That's slide 10 there, as indicated.

25 You can move to the next slide as well.



1           So we're now in that RAB business portion.  
2           And just a brief note, as to -- Dr. Varley and  
3           Mark Henry, the two co-chairs, have discussed  
4           the action items as a standard practice for each  
5           RAB meeting. They get together and review the  
6           action items. Mark referred to that process as  
7           well.

8           Also, Dr. Varley has issued a number of  
9           e-mails with updates to specific action items.  
10          So there will be a followup discussion among the  
11          co-chairs who will talk in detail of each of  
12          these.

13          I wanted to see with the co-chairs if  
14          there is anything you'd like to add.

15          Catharine, is anything you'd like to share  
16          on the action item?

17          MS. VARLEY: I am slowly making my list  
18          through the action items. And, hopefully, I'm  
19          addressing everybody's -- so if I missed the  
20          ball on something, please let me know. I think  
21          Arny is already pointing out ones that I've  
22          missed. So we'll get there.

23          MR. SUELTFUSS: Thank you, Dr. Varley.

24          Mark, anything you'd like to share about  
25          the action item review process or other RAB

1 business?

2 MR. HENRY: I am looking forward to going  
3 over the new action items that were added to the  
4 action item tracker as a result of the last RAB  
5 meeting. We didn't have an opportunity to go  
6 through those when we went through things  
7 before. So after this meeting, I look forward  
8 to it. We'll set a date and get it done.

9 MR. SUELTFUSS: Always a good approach.  
10 Let's move into our next topic, if we  
11 could. It's the Military Munitions Response  
12 Program Ordinance Training. And Kevin Nicholas  
13 with Bay West will be presenting.

14 We have ten minutes for this update. So  
15 I'll turn it over to Kevin Nicholas.

16 MR. NICHOLAS: Thank you very much. This  
17 is Kevin Nicholas. And today we will do the  
18 Munitions Response Program.

19 We'd like to touch base on the three Rs of  
20 explosive safety. Next slide, please.

21 What are munitions? Munitions include  
22 artillery, mortar shells, rounds, bombs, small  
23 arms ammunition, grenades. As you see, they  
24 come in many shapes and sizes. And you can find  
25 them in any form or fashion, rusted, new, used.

1 So keep that in mind. Next slide.

2 What are UXO? UXO is unexploded ordnance:  
3 Munitions, ammo that have failed to function  
4 properly. It can be of any type. It may just  
5 be a component of munitions: Fuze, exposed,  
6 explosive fill. As you can see, you have a bomb  
7 there on the bottom there. And it's rusted,  
8 kind of mangled, hard to tell what it was. Next  
9 slide.

10 Some munitions are hard to identify.  
11 Explosives can be encountered anywhere on an  
12 installation from previous military training.  
13 As you can see, it's hard to tell. They look  
14 like an old car part. So rule of thumb is if  
15 you didn't drop it, don't pick it up. Next  
16 slide.

17 Munitions vary in appearance. Munitions  
18 are dangerous regardless of appearance.  
19 Munitions type, shape, size, age or condition  
20 does not matter. Flares, simulators and  
21 blasting caps are all dangerous. War souvenirs  
22 can be dangerous also. Next slide.

23 We have a picture of artillery  
24 projectiles. You have 105 in new condition,  
25 unfired; and 105 that's been fired and in used

1 condition.

2 As you can see, it's definitely different.  
3 You have some rusted. It's hard to tell that  
4 it's actually military munition. And we have a  
5 pen there for reference in size. Next slide.

6 Now we have a new, unfired rocket and a  
7 used, fired rocket. And, once again, you can  
8 tell it's rusted. Its color coating is gone.  
9 It's hard to tell that it's actually military  
10 munition. Next slide.

11 Recent munition accidents. A lot of  
12 people like to go out and find munitions, scrap  
13 it. And this is a very bad idea. You have  
14 potential explosive hazards that are within the  
15 scrap. And you can die, get hurt, mangled, hurt  
16 your family. You definitely don't want to go  
17 out in a range and find souvenirs. Next slide.

18 Example of warning signs. Trespassing on  
19 areas with warning signs or gates: May result  
20 in injury or death; is hazardous and prohibited  
21 by law; may result in substantial fines.

22 As you can see, there are examples of  
23 signs, stop signs, you know, danger, military  
24 fire range, unexploded ordnance. If you see  
25 these, do not enter. Next slide.

1           What do you do if you encounter munitions?

2           You have the three Rs. The first one is:

3           Recognize that munitions are dangerous.

4           Munitions may not look like a bomb or bullet.

5           They may look harmless, but they are dangerous.

6           They can be shiny or rusty. They may be clean

7           or dirty. Regardless of whether a munition has

8           been moved, it may still explode. In fact, most

9           munitions can be more dangerous once they have

10          been fired. Next slide.

11          The second step is retreat. Do not

12          approach, touch, move or disturb. Carefully

13          leave the area the same way you entered.

14          In remote surroundings, mark the general

15          area where you encountered munitions so local

16          authorities can locate. Do not go closer to the

17          munitions when marking.

18          Last step is report. Report what you saw

19          and where you saw it. You want to call 911.

20          The authorities will clear an area and contact

21          Explosives Ordnance Disposal, EOD, personnel to

22          dispose of it. Next slide.

23          We have resources, DENIX.com. The DoD,

24          Environment, Safety and Occupational Health

25          Network and Information Exchange, is a

1 collaborative cloud platform used to share and  
2 report DoD-specific environment, safety and  
3 occupational health information with the public  
4 and DoD communities. They have the three Rs,  
5 Explosives Safety Education Program on there.  
6 They have many resources that are good. I  
7 recommend checking it out. You can find  
8 presentations, videos, photos, handouts and  
9 numerous other resources.

10 Next slide.

11 And thank you.

12 MR. SUELTFUSS: Great. Well, Kevin, as  
13 a former marine artillery officer, that reminds  
14 me of a different life I used to have. Thank  
15 you for that update.

16 Can you tell us a little bit about just  
17 the purpose behind the training and why it's  
18 important to provide that training regularly?

19 MR. NICHOLAS: Yes, definitely.

20 The purpose is just -- so if you're out  
21 there and you're conducting your business and  
22 you find something, you know how to proceed.  
23 You definitely don't want to pick it up.

24 It's good just as a refresher. Anybody  
25 that's going to be out on the site, that you

1 give this refresher course to them, and so  
2 they're aware and they know how to respond.

3 The biggest one is do not pick anything  
4 up. If you didn't drop it, don't pick it up.

5 MR. SUELTFUSS: Thank you. I appreciate  
6 that.

7 We have a couple of minutes for any  
8 questions about this munitions topic. If you do  
9 have questions about the munitions topic, go  
10 ahead and raise your hand.

11 I see Mark Henry's hand up.

12 Go ahead, Mark.

13 MR. HENRY: I was just going to bring this  
14 home a little bit. There have been some  
15 munitions found at Wurtsmith historically. In  
16 fact, one of the retaining banks at Ratliff Park  
17 along Van Etten Lake is built underneath the  
18 soil of old practice bombs.

19 So practice bombs are around the Wurtsmith  
20 area. And if you go up, around the Seven Mile  
21 Hill, that was used as a practice bombing and  
22 striking area during World War II. And you can  
23 probably run into live munitions up there.

24 So just be aware they're around.

25 MR. SUELTFUSS: Thank you, Mark. I

1 appreciate that.

2 Kevin, anything else you have for us?

3 MR. NICHOLAS: No. That's all. Thank  
4 you.

5 MR. SUELTFUSS: I apologize. I see Arny  
6 had a question. A hand up or a question, Arny?

7 MR. LERICHE: Just to add to Mark.

8 Actually, that bombing range is  
9 identified, a lot of it, by the US Forest  
10 Service who operates the Pine River and  
11 Kirtland's Warbler area. So the signs are up  
12 there not to go off the road.

13 So it is a serious problem, as your  
14 speakers have talked about. That's great that  
15 you're giving this training.

16 MR. SUELTFUSS: Thank you, Arny. Thank  
17 you, Kevin. I appreciate that.

18 Let's go ahead and move on to the remedial  
19 investigation and interim remedial action  
20 update. We're a bit off schedule, so we will do  
21 this one before we take a break.

22 Slide 26, I believe. And we will turn to  
23 Paula Bond with Aerostar for this update.

24 Paula?

25 MS. BOND: Good evening, everybody.



1 I am just going to give a quick update on  
2 the schedule for the remedial investigation and  
3 interim remedial actions. Next slide, please.

4 So the first slide we have up here is just  
5 a diagram of the RI process, the CERCLA process,  
6 and then the IRA CERCLA process.

7 We showed these in the last round. I  
8 think it's important to remind everybody in what  
9 phase that the CERCLA process that we currently  
10 are, with both the RI and the IRA.

11 So under the RI, we are currently in the  
12 UFP-QAPP documentation process; and under the  
13 IRA CERCLA process for the Clark's Marsh and Van  
14 Etten.

15 As you guys mentioned earlier, we have  
16 just finished the Clark's Marsh proposed plan  
17 comment period, and we are working on moving  
18 forward to the record of decision for that.

19 And then we are in the process of working  
20 on the Van Etten Lake proposed plan. I think  
21 Beth with EGLE mentioned earlier that they have  
22 reviewed that document and are currently in the  
23 comment resolution phase.

24 So, again, that just kind of shows you  
25 where we are in the overall process for the RI

1 and IRAs. Next slide, please.

2 So the RI Work Plan, UFP-QAPP, that was  
3 submitted to EGLE for review on April 6th. So  
4 we are waiting for those comments to come back.  
5 And then we'll move into the comment resolution  
6 phase.

7 While we're doing that, we are beginning  
8 our preparation for field activities, looking at  
9 potential sampling locations, and vetting things  
10 like that in the field, getting our procurement  
11 ready, ordering our supplies and material.

12 Next slide, please.

13 On the IRA, like I just mentioned, the  
14 proposed plans and records of decision, the Van  
15 Etten Lake proposed plan will be coming very  
16 soon. And the public comment period is yet to  
17 be determined. That will be based on comment  
18 resolution and coordinating with EGLE on that.

19 And there will be a virtual public meeting  
20 for the Van Etten Lake proposed plan, similar to  
21 what we did for Clark's Marsh. The date on that  
22 is also to be determined, pending that document  
23 being issued.

24 And then we will move forward with the  
25 record decision for Clark's Marsh after

1 reviewing all of the public comments and  
2 considering all the information that has been  
3 provided during the public comment period that  
4 closed on Saturday.

5 Next slide, please.

6 So this is a graph that just kind of gives  
7 everybody an idea of the field schedule for both  
8 the RI and the IRA. As you can see, in the  
9 left, we're still in the documentation phase for  
10 both of those activities; finishing up the  
11 UFP-QAPP, and then the documentation, the  
12 proposed plans for the IRA before we get to the  
13 field.

14 So right now, we are looking at beginning  
15 the RI field work in July. And we're looking at  
16 beginning the IRAs for Clark's Marsh in early  
17 August; and Van Etten Lake, later in August, if  
18 everything stays on schedule with the  
19 documentation and the review cycles with EGLE  
20 public comment, periods and information  
21 provided.

22 This is just our outlook at the schedule  
23 currently. We do plan to have the RI field work  
24 completed in late December of this year. And  
25 then we also plan to have both IRAs up and

1 running in February of 2022.

2 So that's just a brief look at where we  
3 are with the schedule right now. Next slide,  
4 please.

5 So with that, I'd be happy to take any  
6 questions anyone has on the schedule. I know  
7 everyone is itching to get to the Conceptual  
8 Site Model discussion.

9 MR. SUELTFUSS: Thank you, Paula.

10 Any questions, please go ahead and raise  
11 your hand electronically, and we'll deal with it  
12 one by one.

13 Any questions to Paula on this update?

14 MR. GAINES: Yes, I had my hand raised. I  
15 would like to get some idea of the --

16 STENOGRAPHER: I'm sorry. Who is the  
17 speaker?

18 MR. SUELTFUSS: Go ahead and say your  
19 name again for the court reporter, please.

20 MR. GAINES: Bill Gaines.

21 MR. SUELTFUSS: Bill, if you don't mind,  
22 go ahead and repeat your question, if you would.

23 MR. GAINES: I wonder if you would have  
24 some kind of comment on the scope of the field  
25 work that's going to be done between now and

1 December.

2 It seems that there is a lot of work to be  
3 done in comparison to what we did in the ESI and  
4 a shorter period of time to complete that work.

5 MS. BOND: Right. Sure. We do have a lot  
6 of field work scheduled. We will be sampling  
7 soil. We will be sampling ground, surface  
8 water, sediment. We're going to be installing  
9 monitoring wells out there in multiple  
10 locations.

11 So we do have a lot of field work  
12 scheduled for this summer and fall. There will  
13 be a lot of activity out there; so a lot going  
14 on. That's just for the RI.

15 Of course, once the IRAs get started,  
16 there will be construction work going on in a  
17 couple of different places for those IRAs,  
18 installing the extraction wells, as well as  
19 expanding the existing buildings with the fire  
20 training area and the central treatment system.  
21 So there will be a lot of activity out there  
22 this summer and fall.

23 MR. SUELTFUSS: Thank you, Paula. Thank  
24 you, Bill. I am seeing two other questions, one  
25 for Army Leriche, another one Rex Vaughn. So,

1 again, asking RAB members for questions.

2 Army, go ahead.

3 MR. LERICHE: Paula, this is Arny Leriche.  
4 I appreciate the process that the Air Force and  
5 EGLE have in negotiations and review of comments  
6 and everything and fully support that that  
7 cannot be made totally public.

8 However, some of these highly technical  
9 things -- topics that are brought up by either  
10 EGLE or the Air Force or other agencies, it's  
11 difficult for the public and the RAB to know --  
12 anticipate the significant issues that are being  
13 discussed by those agencies.

14 We don't have to have the details. But as  
15 we prepare and try to train ourselves on how to  
16 review the CERCLA process in this particular  
17 site, it would be helpful if you could just let  
18 us know the topics that are being discussed  
19 based on the comments. At least, we would know  
20 how to prepare; so that when you do give us the  
21 documents as a public review, we will be able to  
22 start with a little bit more capability.

23 One perfect example is the State's request  
24 for the -- IRD's request for that additional  
25 interim remedial action. I did not know about

1 that for a couple of weeks, almost to the end of  
2 the public comment period when it showed up on  
3 their website.

4 So if we had known within a few days or a  
5 week after they submitted that to you, just as a  
6 topic, we could have been looking at that area.  
7 That would have been helpful.

8 MR. SUELTFUSS: Let me jump in and see  
9 if Paula or others have a response. Also, just  
10 to note, we are getting a lot of background  
11 noise.

12 Paula, did you have any initial responses  
13 to the point Arny brings up?

14 MS. BOND: Yeah. I think I heard most of  
15 your comment. Arny, I'm sorry, there was a  
16 little bit of breaking up there.

17 But I think it was related to technical  
18 information that we are discussing with EGLE in  
19 our scoping meetings and preparing our  
20 documents. Is that right?

21 MR. LERICHE: That is correct.

22 MS. BOND: So I know that the meeting  
23 minutes from our scoping meetings, EGLE posts to  
24 the Impart website. So that is one place where  
25 I think you can get some more technical

1 information for what the team is working on.

2 MR. LERICHE: But also, the followup  
3 questions on particular topics that EGLE may  
4 send to the Air Force.

5 MS. BOND: Oh, well, now you're referring  
6 to the letter that EGLE sent -- and I'll let Dr.  
7 Varley respond to that, on the correspondence  
8 between EGLE and the Air Force.

9 MS. VARLEY: Arny, this is Catharine  
10 Varley. All of that is still in Air Force  
11 review. So I am new to the project. I am  
12 looking at the data, and I am depending on the  
13 environmental director as well to help me out  
14 with those reviews, as well as our support  
15 contractors.

16 So until we actually have a path forward,  
17 it's hard to share. Because we don't -- we're  
18 pulling data and we're looking at it. Right?  
19 So once we have a path forward, then it becomes  
20 available to share.

21 But EGLE and Air Force discussions are  
22 part of the -- they're a process of working  
23 through to get to the next stage, right, so that  
24 we can share what we're doing.

25 MR. SUELTFUSS: Okay. Well, Arny, thank



1 you for your question. I appreciate that.

2 I see we have one other RAB member who had  
3 a question. Rex Vaughn. Go ahead, Rex.

4 MR. VAUGHN: This is a question for Paula.  
5 This is Rex Vaughn.

6 Paula, based upon the size, volume,  
7 quantity, and technical detail that you  
8 undoubtedly will see from the public comments on  
9 Clark's Marsh, do you anticipate that this  
10 information and the communication from the  
11 public will impact your project schedule?

12 What I am looking for is if you need to  
13 make some changes, have you built that into your  
14 timelines and all of your project scheduling  
15 documents, versus just going ahead on what you  
16 already had?

17 So I'm looking for your opinion on whether  
18 or not you are going to be faced with some  
19 redesign issues. Thank you.

20 MS. BOND: So the simple answer is yes.  
21 And we have considered that in our schedule.  
22 And we are looking at all of the comments that  
23 were received from the public. We are looking  
24 at them to determine if there are things that we  
25 can do, if they're applicable to make changes.

1 So we are looking at that, yes. And we have  
2 included that in our project schedule.

3 As we move through this process -- I think  
4 I say this every time, because it's true every  
5 time. Every document we submit or every step  
6 that we take, there are always things that may  
7 slow us down or speed us up, in some cases. So  
8 we update the schedule monthly based on things  
9 that have happened during that month.

10 So we stay on top of that, and that's kind  
11 of the schedule that I presented today. It's  
12 where we are based on what we know right now.  
13 But we do incorporate time in the schedule for  
14 public comments for changes that we need to  
15 make.

16 MR. VAUGHN: Okay. I have a followup  
17 question, if you would, please.

18 If the public comments result in a change  
19 in the scope of work, is that subject to  
20 re-review through the public comment process?

21 MS. BOND: It is not. Oh, sorry. Go  
22 ahead, Dr. Varley.

23 MS. VARLEY: Not necessarily, but it could  
24 result in a contract mod, which would cause more  
25 delays. Right.

1           MR. VAUGHN: Public comment is not  
2 included for a redesign based on public comment;  
3 is that correct?

4           MS. VARLEY: The public comment will be  
5 addressed in the ROD. EGLE will be reviewing  
6 the ROD and making sure that everything is  
7 appropriately addressed.

8           MR. VAUGHN: Let me try to clarify my  
9 question. What I am asking is: If you have to  
10 make a change based on public comment, does the  
11 process require you to go back to another public  
12 review and comment period?

13          MS. VARLEY: No.

14          MR. VAUGHN: Thank you. That's all I need  
15 to know.

16          MR. SUELTFUSS: On our agenda, we have a  
17 ten-minute break. So let me suggest that we go  
18 ahead and take that break now.

19           It's 5:58 now. We'll come back at 6:08.  
20 And we will continue with the Conceptual Site  
21 Model. So we're on break for ten minutes.

22           (A brief recess was taken from 5:58 p.m.  
23 until 6:10 p.m.)

24          MR. SUELTFUSS: Just as a reminder, it  
25 be can difficult to pose questions during the

1 middle of on-line presentations. So please hold  
2 those until Colin asks for questions, and then  
3 just raise your hand electronically. And I will  
4 go down the list, and all the RAB members can at  
5 least get their questions answered.

6 This is the portion of the agenda focused  
7 on the RAB members themselves. Other attendees  
8 will have an opportunity to provide further  
9 comments after.

10 So Colin Plank will be providing us this  
11 update. Over to you, Colin.

12 MR. PLANK: Thank you for the  
13 presentation. I will be sharing my screen.  
14 Does everybody see the presentation line?

15 Thanks for the attention. I'm glad  
16 there's a lot of interest in the Conceptual Site  
17 Model. It's something we have been working very  
18 hard on as part of the RI process in preparation  
19 of the UFP-QAPP.

20 There's the requirements for a Conceptual  
21 Site Model. There are preliminary Conceptual  
22 Site Models. And that formed the nucleus of  
23 what I am going to show you today.

24 And we have since been expanding on that  
25 as the project needs have evolved, and as we

1 have been able to add to sort of that initial  
2 surge in CSM production associated with the  
3 initial work plan.

4 That's a key point, is that a Conceptual  
5 Site Model is a dynamic, sort of living thing.  
6 And it's not a numerical model. It's just some  
7 basic background here.

8 Conceptual Site Models mean different  
9 things to different people. This is not an  
10 ecological and human health risk assessment type  
11 Conceptual Site Model. Those typically look  
12 like flow charts showing completed pathways.

13 This is a geologic and hydrogeologic  
14 Conceptual Site Model that helps understand or  
15 communicate what we know about contaminant  
16 transport and the bigger sort of groundwater  
17 picture.

18 So these types of Conceptual Site Models,  
19 while they're dynamic, are often communicated to  
20 groups or included in reports as sort of static  
21 elements, you know, consisting of maps,  
22 stratigraphic summaries, or hydrostratigraphic  
23 columns showing the major water moving zones,  
24 and then cross sections.

25 That is the bulk of what we're going to

1 show today. But one of the things we are doing  
2 negotiated with complex sites like Wurtsmith is  
3 we are moving towards sharing these and making  
4 these materials more dynamic by incorporating  
5 them into web applications that allow for easier  
6 sharing between team members.

7 So I am going to be presenting some of the  
8 material today via this thing we're calling the  
9 digital site management tool line. I am going  
10 to share that with you a second. So when this  
11 pops up later, you'll know where this is coming  
12 from.

13 And then also, this will give me a chance  
14 to sort of give an overview of some of the CSM  
15 contents.

16 So we have in here a live map. We can  
17 zoom in to areas of interest later on when we're  
18 discussing this. We can measure off areas and  
19 annotate the map to capture ideas.

20 And we can display on here a range of data  
21 sets. What I am showing right now is the  
22 current point data set that consists of -- it  
23 has to refresh. This is the point data set of  
24 subsurface data locations, both groundwater and  
25 surface water samples.

1           This is the current status of the data  
2           that's been made available to us from EGLE. So  
3           this is the data set we're working with.

4           So we can share that and make it clear,  
5           you know, where we do and don't have data.

6           You have probably seen, members of the  
7           public and other RAB, you guys have probably  
8           seen some potentiometric maps in some form or  
9           another. You're pretty familiar with them.

10          We can bring up in here different  
11          generations of potentiometric maps. We have  
12          queued up two for this meeting. This is the  
13          potentiometric surface, or the groundwater  
14          elevation map from the UFP-QAPP CSM, the  
15          preliminary CSM.

16          This was created using November 2019 data,  
17          and then EGLE October 2018 data for off-base  
18          locations. This is kind of a bit of a  
19          combination of data sets.

20          This gave us an initial sort of  
21          understanding of some of the commonly observed  
22          groundwater sort of system trends here at  
23          Wurtsmith. And that's this groundwater mound.  
24          So there is flow-off to the northeast towards  
25          Van Etten, flow-off to the south/southeast

1 towards Au Sable.

2 We are familiar with the gaining nature of  
3 Van Etten Creek and the Au Sable.

4 And because this is a mish-mash, what we  
5 prefer is a synoptic groundwater snapshot. So  
6 this is the newest groundwater elevation survey  
7 that we have comprised from the 2020 November  
8 synoptic ground. So this is really more of a  
9 one-snapshot-in-time holistic view. So we'll  
10 bring this map up as well. And this is showing  
11 some of those same features.

12 We can also bring in here, and we'll use  
13 to drive the discussion -- so this kind of  
14 illustrates our current understanding of source  
15 areas and plume trajectory relative to the  
16 potentiometric surface.

17 So when you're looking at potentiometric  
18 surface, now you want to be thinking about  
19 groundwater moving at right angles to those  
20 lines flowing straight downhill. And, in  
21 general, plume trajectories should mimic that.  
22 And in sandier, coarser-grained material, these  
23 plumes start to form some sort of longer, linear  
24 shapes.

25 This is where the traditional network of



1 cross sections come in. And we will be able to  
2 share these with you via this tool by pulling  
3 them up on the fly.

4 I have a lot of these queued up so we  
5 don't have pauses. But we can pull these up,  
6 look at where these are oriented relative to the  
7 potentiometric map.

8 So this is kind of an overview of the  
9 contents of the CSM. The point of this effort  
10 upfront isn't a research program for sake of a  
11 research program. This is to compile a large  
12 legacy data set, put new data into the context  
13 of that new legacy data set, and really make  
14 better, informed decisions with respect to  
15 investigation and remediation strategies, which  
16 ultimately should improve efficiency.

17 With that, I am going to put this back  
18 over here. We'll come back to that. I am going  
19 to talk more of the traditional slides here for  
20 a minute more.

21 And I'll pause for questions at certain  
22 points. But there is a lot of material to get  
23 through. And my plan is to go over the contents  
24 of the CSM, get through the major components of  
25 the story, and then open it up to questions and

1 revisit those areas with other data and looking  
2 at the digital site management tool.

3 But if you guys start getting impatient  
4 and you just got to have a question answered,  
5 then I will leave that up to the moderator to be  
6 the judge.

7 Again, overview of the CSM elements and  
8 presentation. We're going to talk a lot about  
9 the geology early on because this is the  
10 plumbing that controls groundwater flow paths.

11 You've seen some discussion of the geology  
12 before. Just to reiterate the importance of it,  
13 is that it is the plumbing of the house. The  
14 hydrogeology of this site, we'll address, again,  
15 using things like the potentiometric maps. But  
16 then, also, on our cross sections, we're showing  
17 lines of exponential, which will stretch your  
18 ability to think three-dimensionally a little  
19 bit. But they show the component of flow within  
20 the plane of the cross section and help  
21 facilitate discussion of transport.

22 In each of these throughout the discussion  
23 of the CSM, I think you will see our current  
24 emphasis on the eastern and southern boundaries  
25 of the former Wurtsmith Airforce Base, the

1 relationships of groundwater and stratigraphy  
2 contaminant to Van Etten Lake Creek and Clark's  
3 Marsh.

4 I don't remember who it was at the start  
5 of the call, but they had an interest in  
6 sequence stratigraphy. And just by way of  
7 familiarizing some of you, that this is an EPA  
8 paper that you can look up or I can provide the  
9 link to this EPA groundwater issue paper that  
10 summarizes this approach.

11 This outlines this methodology. I'll go  
12 over some of that. But if you want to read up  
13 more on that, that is available for free.

14 The big message, though, is that while  
15 sequence stratigraphy -- classic sequence  
16 stratigraphy has sort of its grounding in green  
17 systems and an approach to oil exploration and  
18 finding reservoir rock.

19 The concept that we promote is that the  
20 stratigraphy that sets up the aquifers and  
21 aquitards of a site are analogous to the target  
22 reservoir, per say, in oil industry. So this  
23 approach is equally applicable to environmental  
24 sites.

25 The key element is that your site

1 stratigraphy, the way you correlate your cross  
2 sections, the lithologies present at your site  
3 should be the product of a coherent series of  
4 geologic events. Otherwise, with that context  
5 missing, you're prone to just connecting sands  
6 to sands because they seem to be at the same  
7 elevation; clays to clays because, well, they're  
8 clays. And so you end up with these crazy  
9 shapes and things like that.

10 The point is to do some background  
11 research, establish a series of geologic events  
12 that are known that generated the site  
13 stratigraphy, and then make sure that your  
14 sections work together coherently, in a  
15 geologically, plausible and defensible sort of  
16 realm. So that's a little bit of what this  
17 slide is about. Again, I am going to back up  
18 one.

19 Looking at Wurtsmith, I always start  
20 looking at sites with topography. You can see  
21 right off the bat, this is from a figure that's  
22 been passed around a few times. You can see  
23 these bodies. These are relict, high-stand  
24 deltas left over from paleo levels of Lake Huron  
25 and in the stages immediately following

1     glaciation. We'll talk about that here a little  
2     bit more.

3             These are large, deltaic bodies. So if  
4     you're ever riding your bike on this area and  
5     you're noticing a steep hill, and then flat, and  
6     steep hill, and then flat, it's because these  
7     legs were progressively dipping down lower in  
8     this delta produced by the paleo Au Sable.

9             These deltas are adjacent to thinly -- or  
10    thinly-veiled or exposed at the surface tills.  
11    So this speaks to the base aquitard in the area.  
12    These deltas built out onto newly-exposed basal  
13    tills. So they're not far from the surface in  
14    some areas.

15            And then the beach ridges and shoreline  
16    deposits associated with the dynamics of Lake  
17    Huron through time helped build up a portion of  
18    this site stratigraphy as well. So we're going  
19    to talk more about this. This is sort of that  
20    overview.

21            So Larson 1987, among others, put together  
22    a chronology of lake stages for Huron associated  
23    with the deglaciation of the landscape.

24            There is also a Ph.D. by Winnie Burgess  
25    from the University of Michigan that really

1 nailed this early on in the '70s.

2           Again, the Jack Pines delta and the Seven  
3 Mile Hill delta, these are the product of a  
4 glacial lake. This is a stage high-stand of  
5 paleo Lake Huron that was present when the ice  
6 was still very much within the base.

7           The subsequent withdrawal of ice to about  
8 around 11,000 to 10,000 years ago resulted in  
9 Lake Algonquin, and that's shown in this map  
10 here. Wurtsmith is shown as a star at these  
11 shoreline locations here.

12           This progression of lower lake levels and  
13 the dynamics of that is really driven in part by  
14 not only just the position of the ice, but the  
15 position of these outlets. As outlets were  
16 exposed through withdrawal of the ice, the lake  
17 would begin to drain through a new, preferred  
18 outlet. So it might start lowering as ice  
19 static rebound. Lifted up an outlet, the lake  
20 might start rising until a new outlet was  
21 discovered. So these lake levels are going up  
22 and down.

23           But the important part of the story is  
24 that the Algonquin delta that Wurtsmith is  
25 situated on here, on the north end, is this

1 broad, arcuate shape here. And it's the last of  
2 these arcuate, deltaic forms that are preserved.  
3 So it sits atop the tills that are present, just  
4 west of the site that are present under all of  
5 these deltas.

6 So Lake Algonquin, the shoreline of Lake  
7 Algonquin is probably somewhere back in here.  
8 But during that time, the paleo Au Sable is  
9 depositing sediment in a fan delta-type form  
10 here on the shoreline. And that really results  
11 in the bulk of the permeable aquifer under  
12 Wurtsmith Airforce Base.

13 The other key event is catastrophic  
14 drainage of that lake. And that, we'll see,  
15 relates very much to Au Sable's -- the Au Sable  
16 River's position. And this resulted during this  
17 low-stand, which is a drop in lake level;  
18 multiple basins forming. The shoreline is now  
19 200 feet lower than it was during the Algonquin  
20 high-stand.

21 So the key point here is that the Au Sable  
22 River incises down through the delta, into the  
23 tills, and finds its outlet further out in these  
24 basins.

25 Subsequent rise of lake levels, then,

1 resulted in Lake Nipissing and Lake Algoma lake  
2 levels, which you can see in the modern  
3 topography very clearly, had a series of  
4 elevated beach ridges. And also, a sort of  
5 backfilling of that incised valley. As the  
6 river responded to the rising base level,  
7 sedimentation would increase in the river  
8 valley.

9 I am not going to dwell too much more on  
10 it here, but an important element of  
11 understanding stratigraphy is to have a  
12 depositional analog or some sense spatially of  
13 how grain size changes might work. So we look  
14 to depositional models from analogous systems.

15 In South America where there are  
16 glacially-fed systems in filling lakes, there  
17 are modern analogs being looked at as we speak.  
18 And this is a block diagram model from a  
19 glacially-fed river system in filling a lake.  
20 So this is very much what I pictured the  
21 Algonquin delta to have looked like after  
22 incision of the Seven Mile Hill delta.

23 So you have a large, archean body of sand  
24 and gravel. This is primarily the aquifer. You  
25 have these slopes preserved. You have down to



1 the lake basin bedding preserved. And then, you  
2 know, it is very coarse, but you have potential  
3 for silty channel fills and preferential  
4 pathways where gravels have concentrated within  
5 these channels.

6 So it's not just a pile of sand at  
7 Wurtsmith. It's very permeable. And that  
8 groundwater mound speaks to large, saturated  
9 flow off this mound of sediment.

10 The backfilling and the beach ridge  
11 formation is more analogous to a modern  
12 wave-dominated delta. And this is a model  
13 that's been presented in some other  
14 presentations.

15 Equivalent with that also would be sort of  
16 the increasing maturation of the landscape and  
17 the increasing amounts of organic matter and  
18 debris and soil formation and so on; so a change  
19 in general content of the valley fill. And  
20 then, also, a more pronounced offshore silt and  
21 clay volume.

22 This is a look at the hydrostratigraphic  
23 column that I was kind of showing in that  
24 previous slide. I just want to take a minute to  
25 talk about this.

1           These colors will be present on all of the  
2 cross sections and in the cross section key.  
3 And this really outlines for you sort of the  
4 major water moving bodies on the site and the  
5 major aquitards.

6           So just working up from the bottom, you  
7 have the Marshall Sandstone, and you have the  
8 sandstone aquifer here, not really an issue for  
9 us. Here, due to a large, fairly thick, 60 to  
10 100-foot thick till, which is topped by thin,  
11 pro-delta and lake bottom clays, so you have got  
12 a pretty regionally robust aquitard that the  
13 aquifer system sits upon.

14           Then you've got your Algonquin fan delta,  
15 which is the major water mover, and then the  
16 incision, and backfilling of that incision with  
17 floodplain deposits of the Au Sable River. So  
18 this is important because it functions as a bit  
19 of a hydraulic boundary on the southern portion  
20 of the site.

21           One more little bit about this. Here is a  
22 look at the topography of the site. I am just  
23 sort of starting to zoom in now from that larger  
24 map.

25           So these are one-foot contours. And you

1 can see the flat zone, of course, where the Air  
2 Force likes to put their runways. They always  
3 prefer that. Right?

4 So here's your portion of the delta.  
5 Here's the incision of the Au Sable. These are  
6 the beach ridges I'm talking about, where you  
7 can see that -- and if you were to continue  
8 further north, it would be here as well.

9 So if we step through then the evolution  
10 of the site, here's the Algonquin delta. It's  
11 your major aquifer. Then there was the event of  
12 the incision into the Algonquin delta, which  
13 would subsequently be backfilled as lake levels  
14 rose and Nipissing beach ridges were deposited.

15 A little bit uncertain about relict  
16 drainage that possibly could have formed off the  
17 front of the high -- you know, preserved  
18 Algonquin delta. And then holocene floodplain  
19 deposits, this is kind of like the system as it  
20 exists today made up of these components.

21 What we're going to talk about now is how  
22 this geologic evolution of this site will impact  
23 potential for offsite migration and groundwater  
24 flow.

25 I am just going to keep going ahead,

1 unless anyone thinks they want to stop for  
2 questions on that material.

3 MR. SUELTFUSS: I'm sorry. Colin, I did  
4 see that we do have a couple of hands raised.  
5 So let me just suggest we go ahead and press on.

6 David Winn, I will start off with you when  
7 we do get to questions and then move on to  
8 others.

9 But, Colin, back to you.

10 MR. PLANK: Again, back to that initial  
11 map that I showed you in the DSMT. Just, again,  
12 to reiterate, we're interpreting flows towards  
13 Van Etten Lake, flow offsite towards the Au  
14 Sable River from both sides, the groundwater  
15 divide that -- this stretching to the south, and  
16 gaining groundwater in both Van Etten Creek and  
17 the Au Sable River.

18 This is, again, a little closer look at  
19 that synoptic from last year and the data set  
20 that was used to create it; its strong  
21 convergence of groundwater flow at Clark's  
22 Marsh, gaining conditions at the Au Sable River.

23 Again, we have kind of shown you that  
24 cross section of network. We are going to start  
25 talking about those now.

1           We have a network of nine cross sections  
2 prepared and the ability to generate more on the  
3 fly and some software.

4           These cross sections are hand-drawn; so  
5 are our potentiometric maps. We're big  
6 advocates of not automating that process, in  
7 that you're working with your -- again, you  
8 would be working with your knowledge of  
9 depositional systems. You're working with your  
10 knowledge of typical groundwater dynamics.

11           So let's get into the cross sections now  
12 and show you how we're using them to -- and form  
13 the approach to investigation and remedies.

14           So when I start looking at the PDFs of the  
15 cross sections, we'll be able to come back to  
16 this key. But, again, all of those elements in  
17 the hydrostratigraphic column that I showed are  
18 color coded to that hydrostratigraphic column.

19           Just note that in each of these pairings,  
20 the darker of the colors is supposed to indicate  
21 the lower permeability component. The lighter  
22 of the two colors is supposed to indicate the  
23 more permeable bases component.

24           A little harder when you get down into  
25 here, and we're talking about the Au Sable,

1 incised valley fill. The pale green is  
2 permeable. The not-as-pale, the deeper green is  
3 the impermeable.

4 We use some locations, some gamma log  
5 information, which is a geophysical tool, legacy  
6 data collected by DEQ and Air Force over time.  
7 This is natural gamma log emissions. There is  
8 no radioactive source to put down the well. But  
9 because clay minerals emit radiation naturally,  
10 you can use a gamma log as a proxy for grain  
11 size. So it gives you kind of a continuous  
12 record.

13 When we're implementing the sequence  
14 stratigraphic approach, you will see sort of a  
15 different depiction of borings instead of just a  
16 strip log or a stick that shows the location of  
17 the lithology data. We try to depict the  
18 general characteristic of the lithology using  
19 these color boxes.

20 The bigger the box, the bigger the grain  
21 size. If there is an orange, a red component to  
22 the box, there is some component -- or color to  
23 the box, there is some component of gravel.

24 Very few, just pure gravels. But if you  
25 see a big -- you know, a big red or a big orange

1 box, that indicates higher permeability gravels.  
2 That doesn't indicate a contaminant or something  
3 like that that we're trying to flag. Those  
4 colors all correspond to lithology.

5 Where the colors are plain yellow, that  
6 means a well-sorted, clean sand. Box gets  
7 bigger from fine, to medium, to coarse.

8 Where there is green, it means there is a  
9 silty component. Where there is blue, it means  
10 there is a clay component.

11 When dealing with tills or with gravels,  
12 with clay with some gravel component, we  
13 sometimes try to flag that with a ground color,  
14 so that we can maybe differentiate between all  
15 the clay and the till.

16 And in some cases, you'll see some fine  
17 lines on these cross sections. These are  
18 deferred bedding orientations, things that are  
19 important for the correlation of the sediments.  
20 These are to kind of inform the geologist as he  
21 or she is interpreting the sections.

22 Then, also, lastly, we'll have the  
23 groundwater elevations in PFAS and PFOA; data  
24 available for posting on those sections. And we  
25 depict flow within the section. Sort of

1 analogous to a potentiometric surface, but now  
2 shown within the plain at the cross section.

3 And I am going to go into the cross  
4 sections themselves. And I am just going to  
5 cover the basics in kind of an overview of  
6 several sections.

7 So here is cross section A, which runs  
8 from west to east across the base; and then  
9 over, cross Van Etten. This is the Algonquin  
10 delta, main body here shown in the tan.

11 Here is the basal aquitard, consisting of  
12 tills and pro delta and lacustrine clays related  
13 to either the Seven Mile Hill, an older delta  
14 system, or the Algonquin delta. These are the  
15 clays associated with onlap of the Nipissing and  
16 Algoma shorelines. So it's a key feature here  
17 that the Algonquin delta sort of pinches out  
18 laterally into these clays. And we'll talk more  
19 about that later.

20 But this is significant for the discussion  
21 of the plumbing underneath and away from the  
22 base. So we're going to focus in on this area a  
23 little later.

24 And just a word about Clark's Marsh. We  
25 just nipped the side of Clark's Marsh here.



1 We'll focus in on this again later as well.

2 But this is the nature of this  
3 stratigraphy underneath Clark's Marsh.  
4 Basically, this is fairly low permeability  
5 material, very organic-rich underlying Clark's  
6 Marsh, and it's juxtaposed directly against the  
7 permeable Algonquin delta.

8 Again, note the oranges, some siltier  
9 zones. These are not high proportions of silt,  
10 but there is 10 percent silt in some areas.  
11 These are 10 percent gravels. These aren't  
12 smoking hot, but there is a gravel component to  
13 these.

14 The potentiometric surface shows generally  
15 flow towards Van Etten Creek and -- Van Etten  
16 Lake, pardon me, and a flow towards Clark's  
17 Marsh.

18 I always have to remind myself as well,  
19 keep your 3-D thinking hat on when looking at  
20 this. Remember, the groundwater mound kind of  
21 comes like so. So there is a heavy component of  
22 flow shown on this cross section that is out of  
23 the plain towards the viewer.

24 So while we're showing convergence on the  
25 marsh from left to right and from right to left

1 here, there is also an element of this flow  
2 coming out towards you. And, similarly, with  
3 the kind of main body of the delta here, a lot  
4 of that flow is coming out of the plain, kind of  
5 at you.

6 This is cross section B. Again, here's a  
7 scan of a gamma ray log from the Air Force.  
8 Again, there is a really stout basal aquitard.  
9 This is Marshall Sandstone at depth. But you've  
10 got 60 to 80 feet of clay overlying that. This  
11 is a robust basal clay.

12 This depression in the clay I don't think  
13 is a sign of any kind of incision or  
14 channelization that runs out of the plain here.

15 Some of that irregularity is also probably  
16 related to the surface left by the abandoned --  
17 the ice, right, glacial sequences. And glacial  
18 topography can be very, very complex and  
19 somewhat unpredictable in its elevations.

20 This is the major incision of this Stanley  
21 low. I should note the scale here on these.  
22 This is 100 feet. The vertical exaggeration is  
23 quite high in this figure. This is not a narrow  
24 figure. This is the modern Au Sable and the Au  
25 Sable valley per scale. So this is not a minor

1 feature.

2 In looking at the logs, you can see --  
3 finding upward sequences preserved within this  
4 incision. And the characteristic of the  
5 sediment is very black and laminated as you move  
6 up in this section.

7 So this really suggests incision, paleo Au  
8 Sable here, channel deposits, and this incisive  
9 lag evolving to a bay lagoonal system as this  
10 fills with onlap and rise of lake level; and  
11 then the inheritance of that valley or the  
12 continued evolution of that valley by the modern  
13 Au Sable.

14 So this is more fine-grain dominant,  
15 right. This is this feature we're talking about  
16 laterally. And that's located about here, and  
17 we progress up the valley. This is a  
18 significant geologic feature that provides some  
19 impedance to flow across to the modern Au Sable.

20 Again, with respect to groundwater flow, a  
21 lot of the flow shown in this cross section is  
22 into the plain, particularly on the northern  
23 side or the left side of this diagram. So while  
24 these show some left and right in here -- keep  
25 in mind that that is just the partial flow in

1 line with this cross section. The main flow is  
2 out of the -- or into the page, on the north  
3 side of this cross section.

4 As this bends around, you start to pick up  
5 more of the groundwater mound. So you would  
6 actually have a little bit more of a  
7 left-to-right and/or out of the page flow.

8 So I'll do my best to continue to remind  
9 you of the three-dimensionality of the flow.  
10 But that is the mind bending element of some of  
11 these cross section exercises.

12 So now, last section for the overview.  
13 This is back over here by Clark's Marsh, just to  
14 the east of it. Again, we're showing -- this is  
15 a little different scale here. These are  
16 20-foot intervals. So this is a much smaller  
17 section shown. We're not showing 100 feet here.  
18 We're showing 20, 40, 60, 80 -- we are not  
19 showing hundreds of feet. So this is 100 feet  
20 total.

21 So from left to right, again, we're coming  
22 off of the Algonquin delta. And you see a  
23 higher component of gravel in some of this  
24 portion of the delta.

25 And the key thing to note here is what

1 happens when you get into -- there is a sharp  
2 topographic dip there. That's that scarp at the  
3 edge of the incision. Key thing here is look at  
4 how the character of the stratigraphy changes  
5 when you go from the Algonquin to the modern Au  
6 Sable and incised valley. It's fairly massive,  
7 coarse sands, to these discrete, upward  
8 pathogen associated with fluvial deposition.  
9 So that's significant, and we'll discuss that  
10 more.

11 Again, the gamma ray does a good job here  
12 of showing that log. There is lithologic  
13 variability to the coarse grain sizes. The  
14 coarse can be fine, to coarse sand. It's not  
15 until you get to that basal clay about 50 feet  
16 down that you have a very prominent aquitard.

17 So we're showing flow converging to the  
18 modern Au Sable. We'll talk more about this in  
19 a little bit. But convergence of flow towards  
20 the Au Sable River, a little bit of -- sort of  
21 capture of shallow flow via surface water, and  
22 then a deeper groundwater path recharging the  
23 modern Au Sable.

24 All right. So I'm going to have to speed  
25 this up. Groundwater on the eastern boundary of

1 the base now is what I'd like to talk about.  
2 And we are going to hit these points again, sort  
3 of a geologic plumbing groundwater flow. And  
4 we'll look at some of the analytical data that  
5 supports some of our interpretations. Again, we  
6 can come back to this.

7 But the point we're trying to illustrate  
8 here is that when interpreting the hydrogeology  
9 of groundwater surface water systems, there is  
10 some end members that are sort of known end  
11 members in the hydrogeologic world. You think  
12 of lakes as discharge of groundwater or lakes  
13 that are recharged by the groundwater.

14 And these are characterized by  
15 equipotentials that come down towards the lake,  
16 and then curb upwards, curbing upwards toward  
17 the lake, showing that the lake is the location  
18 where the groundwater is ultimately heading. So  
19 that results in these upward gradients.

20 And this, we think, is similar to Van  
21 Etten Lake. In contraction to that, there are  
22 discharge lakes; so lakes that are actually  
23 feeding groundwater. And these are  
24 characterized by potentiometric surfaces that  
25 come straight down, steep gradient, dipping

1     beneath the lake.   So no upward gradients  
2     observed at the margin of the lake.

3             Now we're going to focus in on the  
4     components of the stratigraphy of Section A and  
5     C and talk a bit about what's going on here.

6             So to reintroduce this, here we are.  
7     We're going to focus on this area now.   I am  
8     going to move on to a zoomed-in portion of it on  
9     cross section C.

10            In this previous section, you note that  
11     we're talking about the onlap of the clay and  
12     the pinch-out of the Algonquin delta creating  
13     some complexity or some barriers to flow at  
14     depth.   But you still have the Nipissing beach  
15     ridges, and then this lake bottom sediment that  
16     is a potential -- sort of one might think as a  
17     potential pathway through.

18            So I want to take a minute to look at that  
19     in a little greater detail.   And this is based  
20     on some of the information from some EGLE sub  
21     bottom surveys of Van Etten Lake.   And if you  
22     take the elevation of the clays from that study  
23     being between 552 and 548 within the sub bottom,  
24     that's about this elevation on this cross  
25     section.   And that matches really nicely with

1 the observed clay elevation.

2 So this, I think, is consistent with this  
3 idea of onlap over the incised Algonquin delta.  
4 So I think there is pretty solid standing for  
5 this clay coming up, right up against the delta  
6 here.

7 They also noted in that work a sand  
8 reflector at about 561 -- I'm getting some  
9 background noise here.

10 So I think that's potentially the  
11 reworking of Nipissing beach ridges by the  
12 relict, you know, Pine River system.

13 So what would this stratigraphy look like?  
14 We don't have borings, right, within the lake.  
15 We have an inference here. But that inference  
16 is based on some pretty sound geology.

17 If you look up gradient -- if you look to  
18 the north end of Van Etten Lake for the analogue  
19 of what would have produced -- what would have  
20 been present prior to the impoundment, you see  
21 this small scale, you know, fluvial system with  
22 a floodplain and preserved point bars.

23 So we know preserved point bars to be  
24 laterally heterogenous. So I am depicting this  
25 here -- this would be not a superhighway of



1 flow. This would be a lower permeability,  
2 heterogenous zone that would create only the  
3 most torturous paths laterally across the lake.

4 So the geologic plumbing here is pretty  
5 minimal across the lake.

6 Again, with these cross sections, we want  
7 to hit the geology, right, the plumbing, and  
8 then we want to look at the hydrogeology.

9 So these are the heads from 2018, these  
10 nested EGGLE wells. So the lake level at this  
11 time was about 589. And I am going to zoom in  
12 to the PDF here.

13 You can see here that if the lake level is  
14 about 589, the head observed -- this is hard to  
15 read. It says 589.66. The head observed at  
16 MW-07 is just slightly higher than that. The  
17 heads observed at depth throughout this nested  
18 well are all 589 or higher. So this is  
19 supporting the concept of an upward gradient to  
20 a lake level that is five-hundredths of a foot  
21 lower.

22 So this doesn't show outflow of the lake.  
23 The lake doesn't have a higher head than these  
24 values. It shows an upward gradient.

25 If you go eastward, these gradients

1 remain -- or these heads remain higher, both  
2 with respect to the lake and the adjacent nested  
3 pair, and they remain so throughout the water  
4 column. So, if anything, there is a slight  
5 downward gradient suggested by the nested pair  
6 at MW-08.

7 So this supports the idea of flow as shown  
8 from right to left or towards the lake, the  
9 eastern side.

10 And then there is a weakly portrayed  
11 divide here, partly of the orientation of the  
12 cross section. But then we get over to MW-09.  
13 And its elevations are even higher, 591 with  
14 maybe a slightly downward gradient and  
15 equipotentials showing flow towards Huron.

16 And equipotentials and heads on this side  
17 are from November of 2019. And the lake level  
18 was not 589 at that time when these were  
19 collected. The lake level was 585, I believe.

20 So this is why we are going back in our  
21 normal process and producing these synoptic well  
22 data sets. And we just completed our first full  
23 synoptic this April. So we'll be able to post  
24 that on here. But with the knowledge the  
25 labeling level was about 585, and these heads at

1 587, again, it supports discharge to the lake  
2 from Algonquin delta. So that is a look at the  
3 hydraulics.

4 The other kind of third line of evidence  
5 that we like to post think about is the  
6 analytical. And this is PFOA and PFOS. PFOA is  
7 shown in purple. PFOS is shown in green. And  
8 we can see that the concentrations on the  
9 Wurtsmith side of the lake are on the order  
10 of -- in the hundreds and thousands; so  
11 elevated, except with the exception of the  
12 depth. These are non-detect.

13 And the concentrations on the east side  
14 are largely non-detect in this 2018 data set; a  
15 non-detect at depth of 1.43, at depth MW-07; and  
16 then the same observation here at MW-08,  
17 non-detects; and MW-09.

18 So good evidence. You know, the  
19 contaminant works as a tracer to some degree.  
20 It agrees with the hydraulics. So I feel like  
21 we have a pretty solid understanding of the  
22 elements at work with respect to large-scale  
23 underflow of the lake.

24 So a word about the dynamics of the  
25 shoreline. This is a more complex issue, I

1 think, on the eastern margin of Van Etten. And,  
2 again, this kind of speaks to this idea of we  
3 view Van Etten as a discharge lake, but with  
4 some dynamics, artificial dynamics created by a  
5 seasonally-controlled outlet.

6 We think there is  
7 a couple-of-hundred-foot-wide dynamic zone of  
8 interchange seasonally at the lake's eastern or  
9 southeastern margin.

10 And a lot of that is based on -- so that's  
11 a very limited area along the eastern margin. A  
12 lot of that is based on this transducer study  
13 completed by EGLE in 2020.

14 This is important work. When we're  
15 looking at the cross sections, we're looking at  
16 snapshots in time of hydraulic conditions  
17 relative to the plumbing, relative to the  
18 analytical data. The nice thing about the  
19 transducer data is that it gives you a  
20 continuous time series; so you can start to  
21 understand by looking at these more about the  
22 daily, weekly, monthly dynamics of groundwater  
23 flow.

24 If you haven't seen this one before, I'll  
25 just take a minute to walk through it. But the

1 red is the Van Etten Lake level from a  
2 transducer, which is an instrument that is  
3 sensitive to pressure. And when calibrated to  
4 the barometer, it gives you an elevation of  
5 water level.

6 This is Van Etten's transducer data from  
7 the well area down here at the outlet. So this  
8 is the lake level. So what you can see is that  
9 the lake level is maintained at a higher lake  
10 level through the spring and summer months,  
11 roughly, April to March -- March, April to  
12 October time frame.

13 And just stepping down through these, the  
14 instrumented well set up by EGGLE, RI MW-05 is  
15 not shown on this map, but it's north of here  
16 along the shoreline.

17 The important thing to note is that the  
18 majority of the wells shown here are all  
19 recording water levels that are higher than the  
20 Van Etten Lake level.

21 RI MW-05, at 20 and 60 feet, always higher  
22 than a foot -- you know, feet elevation scale  
23 here. They're riding around 594 or 593  
24 throughout the year.

25 MW-07, which is located here, is notably

1 closer in elevation to Van Etten Lake. It is  
2 reliably higher as well throughout the year,  
3 both summer and fall.

4 And RI-08, which is further away, so you  
5 would expect it to be in less -- you know, even  
6 higher than MW-07. It fits that bill and rides  
7 higher than Van Etten Lake.

8 The only one on this data set shown here  
9 that is routinely lower than the lake -- during  
10 the lake level high of the summer months is  
11 MW-03.

12 So this speaks to a portion of the  
13 shoreline at which throughout the summer months,  
14 lake level -- or lake water is likely  
15 discharging to the shallow aquifer here. And so  
16 that's a significant finding from this study.

17 But that is indicative of behavior very  
18 close to the lake margin. We can discuss that  
19 further.

20 This also supports kind of that concept of  
21 this being -- this next slide supports this  
22 concept of it being a limited margin.

23 If we look further at some of these  
24 levels, again, the Van Etten Lake level curve  
25 from the transducer data and another set of --

1 unfortunately, the transducer studies don't  
2 overlap. But if we look at a similar time  
3 frame, April to July of '18 compared to April to  
4 July of 2019, and then consider this  
5 single-point measurement that exists, we have  
6 some information to go on.

7       You can take this kind of average and  
8 speculate as to what the lake level, normal  
9 behavior would be during the high season by  
10 looking that up, just graphically, by looking at  
11 an average across here.

12       So what we see is that MW-32 in the summer  
13 months appears to be higher than Van Etten, and  
14 is, therefore, discharging to the lake. But  
15 there is some potential -- during the  
16 transitional months for some potential  
17 interchange there.

18       So I think that's indicative of this  
19 dynamic zone along the shoreline. But it's not  
20 indicative of -- it's not a symptom of large  
21 underflow of the groundwater, past the  
22 groundwater divide. I think this is something  
23 that is limited to just the very nearest and  
24 shallow borings.

25       And so MW-33 sort of speaks to that. 32

1 is within a few hundred feet, a couple of  
2 hundred feet of the lake. 33 is over 1,000 feet  
3 away. And 33's transducer shows reliably higher  
4 groundwater elevations.

5 Just to summarize, based on the cross  
6 sections and the plumbing and that valuable  
7 transducer work, we don't see large evidence per  
8 significant underflow or continuous underflow,  
9 underflow of the lake to Lake Huron. We do see  
10 evidence of dynamic exchange within a very  
11 narrow area of the shoreline.

12 So now, we'll take just a minute and move  
13 a little further south as we kind of go around  
14 the bend here and look at cross section E and  
15 Van Etten Creek, and kind of what we know about  
16 the stratigraphy and groundwater flow at Van  
17 Etten Creek.

18 And, again, some of these rules of thumb,  
19 some of these general hydrogeologic figures,  
20 where you have a break in slope, such as you  
21 would at the margin of the Algonquin delta, it's  
22 not uncommon to get some discharge of  
23 groundwater at that inflexion point, some  
24 seepage into wetlands and/or smaller creeks,  
25 creeks of any sort.



1           So this is probably analogous to what's  
2   happening at the west side of Van Etten Creek,  
3   the north end of Clark's Marsh, along the  
4   margins of the Au Sable Valley. Again, we'll  
5   hit this again later, but this concept of  
6   gaining streams.

7           So this is cross section E; very sandy.  
8   You're up on the elevated Algonquin delta, some  
9   concentrations of gravels. It gets a little  
10  siltier towards the eastern margin here.

11          Because you're rounding the bend here, the  
12  stratigraphy at this end of the cross section,  
13  it's really viewed as pretty analogous to what  
14  we were talking about on section C.

15          So you're coming off of the delta margin.  
16  You're encountering probably some preserved  
17  Nipissing. These may be indicative of some sort  
18  of beach shore, kind of para-sequence set. This  
19  is where you can find medium sands with silts.  
20  So that was kind of interesting.

21          And then the Van Etten Creek valley, we  
22  don't have borings throughout here. The public  
23  water records, you know, driller's logs are  
24  inference from the nature of small scale,  
25  eluvial valley. We point to this being more

1 heterogenous than the surrounding beach ridge  
2 and deltaic deposits.

3         So the plumbing of the geology here shows  
4 a little wider conduit for a permeable zone  
5 through this area. But if we, again, look at  
6 the groundwater elevations and the analytical  
7 data, we think it speaks to discharge to Van  
8 Etten Creek, which has an elevation of 583  
9 upwards and a very typical sort of hydrogeologic  
10 scenario. And the analytical data show impacts  
11 on one side of the delta and not in the beach  
12 ridge deposits on the other side.

13         I'll just take a minute. Again, here is  
14 the historic water levels from 2019. You have  
15 got elevations of 589, 588 and 587. These are  
16 all higher than Van Etten Creek's 583 elevation.  
17 So this speaks to a gradient that would feed and  
18 discharge to that lower level.

19         The nested wells and the EGLE wells show  
20 very little gradient at depth. But there is a  
21 six-hundredths of a foot upward gradient between  
22 these two. So there is not a downward gradient  
23 by any means observed here indicating underflow.  
24 In fact, these are all higher than the Van Etten  
25 elevation of 583 as well. So that implies

1 discharge.

2           If you bring up the analytical data and we  
3 zoom in, we're seeing impacts on the order of --  
4 you know, for PFOS and PFOA of 4 to 6, 40 to 23,  
5 17 to 15. This is the 2018 data; so impacts,  
6 but not screaming hot impacts, but impacts,  
7 nonetheless, within the Algonquin delta. And  
8 then on the other side of this, we're seeing  
9 non-detects of 1.72.

10           So the analytical data, again, as a  
11 tracer, it's sort of speaking towards  
12 predominant characteristic, you know, being just  
13 what you would expect from a geologic and a  
14 hydrogeologic perspective of discharge to that  
15 creek.

16           Okay. So now on to the southern margin of  
17 the base, and we will hit Clark's Marsh. I am  
18 going to address a concern about potential  
19 underflow of the Au Sable River, and discharge  
20 to the surface water. I think we've beaten this  
21 dog to death, but we think these are gaining  
22 streams.

23           Here's a look at a close-up of the  
24 potentiometric surface, at the southern margin  
25 of the Air Force base. Again, we're showing

1 convergence of flow onto the -- into the Au  
2 Sable River, and these contours across  
3 indicating gaining conditions.

4 Really steep contours of the margin of  
5 Clark's Marsh, indicating discharge to the  
6 marsh, and then continued groundwater flow away  
7 from the marsh.

8 Now we'll pull up cross section A again,  
9 and we're going to move to the PDF to zoom in on  
10 this area of Clark's Marsh. This is, again, the  
11 stratigraphy.

12 These GSLs of the grain size log show fine  
13 grain material dominating this core at the  
14 margin of Clark's Marsh; the organic, silty,  
15 clay-ey under this 20 feet of sediment  
16 underneath the marsh, grading into silts, fine  
17 sands and silts at depth, and probable channel  
18 deposits, and then a more pronounced clay.

19 So if you brought this holocene fill down  
20 further, interpretively, and just said this was  
21 a little nick of the incised Stanley low, that  
22 might be reasonable as well. But the important  
23 point is that this is a fine-grained zone  
24 juxtaposed next to the coarser, grainy Algonquin  
25 delta.

1           Again, part of this flow here, these  
2           potentiometric lines and this gaggle of large  
3           streams here is a current remediation system at  
4           work.

5           So that's indicating it's pulling  
6           groundwater to those streams doing its job  
7           locally there. But there is still flow  
8           discharging to Clark's Marsh on both sides.

9           And now we can zoom in on this, on the  
10          PDF, and we can talk a little bit more about  
11          that.

12          MR. SUELTFENFUSS: This is Tim. I wanted  
13          to acknowledge I did have a list of RAB members  
14          with questions I will turn to.

15          I will go to David Winn first, and then to  
16          Beth Place, and Arny Leriche, and then Mark  
17          Henry once we get to the point when you're ready  
18          for questions.

19          MR. PLANK: And that is coming shortly.

20          MR. SUELTFENFUSS: I saw your hands up.

21          MR. PLANK: This is the danger of inviting  
22          Colin Plank.

23          The analytical data adjacent to the marsh,  
24          looking at this from the 2018, again, we have  
25          PFOS and PFOA impacts observed high in this

1 vertical sample; 7.8 in the PFOA and PFOS; and  
2 then non-detects at depth; and a similar pattern  
3 on the other side, although, we don't get so  
4 deep. We have a non-detect in PFOS; and then  
5 270 in PFOA at depth; a 200 in PFOA at depth.

6 So we're showing detections of PFOA and  
7 PFOS likely discharging to the marsh in the  
8 upper 40 feet there.

9 We aren't showing significant downward  
10 gradient into the incision of the Stanley low  
11 here. Indeed, the stratigraphy would impede  
12 that. So I think this is still an effective  
13 aquitard at the base here.

14 And, again, the discharge to Clark's Marsh  
15 is supported by the heads; the higher  
16 elevations, 609, 613, 600, than the elevation of  
17 the water in the marsh itself. So it's likely  
18 that this serves as a discharge point based on  
19 these relationships adjacent to it.

20 Okay. Again, we're just revisiting this  
21 section in a little more detail, section D to D,  
22 which we hit on at the start. And I am just  
23 going to move right over to the PDF.

24 The plumbing, the geologic plumbing as we  
25 talked about, very sandy with some gravels,

1 maybe some of the more pronounced gravel;  
2 setting up a flow to the south. We're showing  
3 pretty strong horizontal flow.

4 And then the geology transitions to this,  
5 what is really characteristic of smaller scale  
6 fluvial systems. And then you have these coarse  
7 channel lags, forming upward into clay.

8 So we portrayed a flow as it enters this  
9 incised valley, which has these other little,  
10 smaller channels within it, where it's showing  
11 the potentiometric lines functioning a little  
12 bit there as that flow gets impeded.

13 This is a large inference. This is not  
14 meant to indicate that this is all just one  
15 giant clay plug. We don't have the  
16 characterization within this area. And some of  
17 the RI borings are set up to gather some of that  
18 data.

19 But this boring here, MW-13, is, like I  
20 said, likely very characteristic of the fill of  
21 this incised valley and modern Au Sable system.  
22 The depth of this is based on that cross section  
23 A, the observation of this incision directly  
24 adjacent to -- not directly adjacent to MW-13,  
25 but in the nearby vicinity. This goes down to a

1 540-foot elevation.

2 And so we're inferring this incision --  
3 because I think that is associated with the  
4 Stanley low, that this incision would go down to  
5 at least 540 in the center of the valley.

6 So what that means is that there is  
7 heterogenous point bar and floodplain deposits  
8 throughout here, interrupting this very  
9 permeable Algonquin delta.

10 And, again, we interpret the  
11 potentiometric flow as groundwater discharging  
12 to the Au Sable River. The heads would promote  
13 flow to the river's elevation of about 592, I  
14 believe it was.

15 And as you enter -- partially because of  
16 those dynamics of being at the margin of a  
17 slope, but then partially just because of some  
18 of the changes in permeability, we also kind of  
19 envision a divide of flow here.

20 So this would mean groundwater flow into  
21 the incised valley fill, discharging to the  
22 modern Au Sable, groundwater flow into the  
23 modern floodplain deposits discharging to  
24 tributary streams; but not translating all the  
25 way across the underflow -- you know, not



1 underflowing all the way across the Au Sable  
2 River.

3           So if I zoom in now on these heads, you  
4 can see what we're talking about. You've got  
5 very little gradient, if at all, between these  
6 screens, indicating pretty strong horizontal  
7 flow.

8           These would discharge to -- the lower  
9 heads to the south, show a little bit of a  
10 downward gradient within the nested well pairs.  
11 That's consistent with this idea of channelized  
12 flow at depth. So you get a little bit of a  
13 downward gradient here.

14           Because these things change from a  
15 horizontal flow to downward, we're depicting  
16 sort of a divergence, zone of divergence there.

17           On the other side we have gradients that  
18 are pretty similar to what we saw on the  
19 northern side, and that there is not a large  
20 downward vertical gradient shown within this  
21 nested well pair we're looking at.

22           It looks like we don't have the nested  
23 well information for MW-15 here. What we're  
24 looking at is horizontal flow, an elevation  
25 that's higher than the elevation of the modern

1 Au Sable. It's about 592 -- or 582. And it's  
2 discharging to that.

3 No plumbing for the underflow and  
4 gradients that don't necessarily support that;  
5 and then the analytical data, again, and that  
6 third line of evidence.

7 On this side of the river valley, PFOA and  
8 PFOS are posted. We have non-detects  
9 throughout.

10 Whereas, if you look at the detections on  
11 this side of the river, we have some fairly high  
12 elevation -- or high concentrations in the  
13 shallowest well: 425, 294. And lower  
14 concentrations, but impacts, nonetheless.

15 And then lastly, we won't spend too much  
16 time on it, those are the concepts. But that  
17 diversion and that kind of complexity, I think,  
18 is portrayed here in some of these surface water  
19 samples. These are some of these locations that  
20 were studied in the past for groundwater seeps.

21 I think it's reasonable to -- even though  
22 the thermal imaging shows seeps along just these  
23 areas, I think it's reasonable to say there is  
24 discharge to the margin, possible, all along the  
25 northern boundary of the Au Sable, just as there

1 would be to the south.

2 So if you look at the analytical data, we  
3 are seeing some of our higher concentrations  
4 within the surface waters, some more variable  
5 concentrations within the seeps. Again, a  
6 higher concentration where there is a little  
7 tributary coming across here.

8 The higher concentrations are being  
9 transmitted via the surface water runoff. But  
10 there are pore water samples along the margin  
11 there that have some elevated concentrations.  
12 So there is some of that recharge. From which  
13 depth that comes -- you know, this is a pore  
14 water sample taken in the first few feet of the  
15 river channel. These observations are  
16 consistent with the flow we just outlined on  
17 section D.

18 Okay. So I will take questions now. I'm  
19 glad you all hung in there. So we have outlined  
20 what we know about the geology, the plumbing.  
21 We have tried to support inferences based on the  
22 hydrogeology and the heads, used the analytical  
23 data as a tracer. We can pull up more  
24 analytical data.

25 And the current synthesis is groundwater

1 discharge to surface water bodies on the  
2 immediate eastern and southern margins is  
3 likely, but that groundwater underflow off base  
4 is not currently indicated by data.

5 MR. SUELTFUSS: Well, Colin, thank you.  
6 I appreciate that.

7 Do you mind just introducing us to you,  
8 who you work for and what your background is?

9 MR. PLANK: Sure. So my name is Colin  
10 Plank, and I am a senior geologist with Burns &  
11 McDonnell. And we're working with -- teaming  
12 with Aerostar and the Air Force to support on  
13 the CSM.

14 I am a Michigan native. I am actually  
15 talking to you from Lowell. I did my  
16 undergraduate in geology at Grand Valley State.  
17 And then I got my master's at University of  
18 South Carolina, doing sequence stratigraphic  
19 work for Chris Kendall there.

20 I worked for another eight years -- well,  
21 seven years for NOAA, the National Oceanic and  
22 Atmospheric Administration, doing oil spill  
23 response and geomorphic mapping coastlines with  
24 a geomorphologist named Miles Hayes, who is a  
25 real character.

1           And then I went back to school at  
2           University of Minnesota. I worked with a  
3           sequence stratigrapher there named Chris Paola,  
4           and then Bryan Schuman looking at the  
5           stratigraphy of lakes and their relationship to  
6           climate change.

7           So then after working on that, I came back  
8           to the environmental consulting world. And I've  
9           been doing that for the last -- I guess the last  
10          12, 13 years. So combined, 20-plus years of  
11          academic and consulting experience.

12          MR. SUELTFUSS: We're good. Thank you,  
13          Colin. I appreciate that.

14          This is the portion of the agenda where we  
15          are asking RAB members for their questions.

16          And David Winn, you've been very patient.  
17          You've had your hand up for a while. So we'll  
18          start with you first, David Winn, and then we'll  
19          go to Beth Place.

20          MR. WINN: My question is, I have noticed  
21          through the presentation that most of the data  
22          that you have been talking about as far as the  
23          monitoring wells was based on data from 2018.

24          But as I understand, there has been data  
25          available from 2012 to 2019 that would include

1 it.

2 Can you explain to me why you used data  
3 from 2018 and didn't take an average overall, or  
4 at least review some of the other data?

5 MR. PLANK: Yeah. So we have access to  
6 the other data in the digital site management  
7 tool here. So we can bring that up.

8 And we do include that in our analysis.

9 It's a manual process to post that data on  
10 those cross sections. And we like to pair it  
11 with groundwater data that it's in close  
12 temporal sort of time frame with. So we're  
13 trying to create these snapshots.

14 But if I can pull up the DSMT for you  
15 here, we can look at time series of PFOS and  
16 PFOA, and we're very mindful of that.

17 MR. WINN: But you used the 2018 data as  
18 your model. Am I correct in saying that?

19 MR. PLANK: We use that as a snapshot that  
20 showed what we think our representative  
21 conditions are, and we haven't seen in the newer  
22 data any significant diversions from that.

23 So we will be updating for the RI, CSM,  
24 the sections with the newest PFOS data. And  
25 this DSMT is meant to keep that data in front of

1 the -- in front of the team, you know, while  
2 we're in that process. I am having a little  
3 trouble pulling it up here.

4 If we wanted to go through -- we can  
5 select individual wells and pull up time series  
6 of the data.

7 That is exactly what you're saying, that  
8 you can't just base your interpretation on one  
9 generation of data. You're exactly right, and  
10 that is why we're using this tool.

11 MR. SUELTFUSS: Great. Well, thank you,  
12 Colin. Thank you for the question, David.

13 Let me go to Beth Place.

14 Beth?

15 MS. PLACE: Beth Place. Colin, thank you  
16 for your informative presentation. We  
17 appreciate it.

18 I just wanted the RAB members and the  
19 folks on this call to understand that EGLE is  
20 still in the process of reviewing the work plan  
21 for the RI. So we do have scoping sessions with  
22 the Air Force. I see that we discussed some of  
23 these areas that were presented tonight, and  
24 some of our changes were incorporated.

25 But we're still in the process of

1 reviewing the work plan. So all of our comments  
2 may not be captured tonight, but they will be in  
3 our comments to the Air Force.

4 I don't want to take too much time here,  
5 but some of our high-level comments, I guess,  
6 would be that if you're looking at this figure  
7 column, a good place to look at would be near  
8 Van Etten Lake, but with the groundwater levels  
9 on it.

10 If you could, zoom on it a bit more.

11 So one of our comments here is near that  
12 southeastern corner of Van Etten Lake, as you're  
13 moving down, as you're showing the groundwater  
14 divide there -- yes, and even further south.  
15 Once you get into that southern area, EGLE would  
16 just ask that if contamination that extended out  
17 that far, that we would want to verify with  
18 additional data on that groundwater boundary  
19 down there.

20 As you get south, away from Van Etten  
21 Lake, there seems to be a few points that kind  
22 of correspond to that groundwater boundary.

23 And then, since we're still in this area,  
24 moving from the base eastward in this area and  
25 going across Van Etten Creek, I know there has



1     been some speculation that Van Etten Creek is  
2     the hydraulic boundary.

3             EGLE would just ask if contamination  
4     extends to Van Etten Creek, then we would want  
5     additional data prior to concluding that that is  
6     a hydraulic boundary.

7             And just one or two more, and then I'll  
8     leave it open to the public.

9             As far as EGLE's transducer study, I know  
10    you mentioned -- I believe it was MW-07. This  
11    was around your slide 55 or 56. So I don't know  
12    if that's easy to go back.

13            MR. PLANK: Yes, I can. It's slide 56.  
14            You want the transducer data itself?

15            MS. PLACE: Yeah, this will work.

16            On this one, I think you had mentioned --  
17    it might even be the one before. I wrote my  
18    notes based on that, our team notes here.

19            So MW-07, it appears -- I know you had  
20    mentioned, I thought in your slide show, that it  
21    doesn't really influence -- I think it's the  
22    next one. But it doesn't really show hydraulic  
23    influence from the changing lake level.

24            But if you go to that hydrograph -- I'm  
25    sorry. There is some peaks in there that seems

1 to kind of follow the lake levels for the data  
2 that we have, the raising and the lowering of  
3 the lake.

4 And MW-07 is about 350 feet east of the  
5 Van Etten Lake shoreline. So we just wanted to  
6 mention there is homes in between -- there is  
7 Van Etten Lake, and then homes, and then MW-07.

8 So if you're seeing that little bit of  
9 influence there at MW-07, I guess it raises some  
10 questions of what's going on between MW-07 to  
11 the west.

12 MR. PLANK: Yeah. So to that point, the  
13 important thing to remember is that if the lake  
14 level is -- if the water level in the well is  
15 even marginally higher than the lake level, that  
16 discharge relationship is maintained, they can  
17 track one another. But it's only really where  
18 they crisscross that illustrates a significant  
19 moment of interchange.

20 And then I think also there is the dynamic  
21 zone, a couple-of-hundred-foot-zone is likely  
22 present along the margin of the lake.

23 So it really becomes a matter of  
24 understanding the well screen position relative  
25 to that area. And then the local stratigraphy

1 and how that would influence, you know, our  
2 estimation of the -- our estimation of the  
3 horizontal velocity groundwater is based on a  
4 medium sand.

5 So if you have a coarser sand, it could go  
6 a little further. If you have a finer sand, it  
7 wouldn't go quite so far.

8 Our maximum estimated, if we made it a  
9 coarse sand and gave a very long time frame,  
10 could be up to 500 feet. But we think it's  
11 reasonable, based on the lithologies present,  
12 it's probably around 200 feet or so.

13 MS. PLACE: And just because of that lack  
14 of data on that near-shore area, we just -- you  
15 know, during the RI scoping, and you guys won't  
16 be surprised to see it in our RI comments, we'd  
17 ask that Air Force evaluate that surface water  
18 interaction with those east side residential  
19 lows along the shore there; so on the east side  
20 of Van Etten Lake.

21 MR. SUELTFUSS: Well, thank you, Beth.

22 But I wanted to jump in. We have about  
23 seven minutes left or so for RAB member  
24 questions. So if you don't mind, I'll move on  
25 to our next RAB member with a question.

1 Mr. Arny Leriche. Go ahead, Arny.

2 MR. LERICHE: Thank you very much to  
3 Colin. It's very interesting.

4 I'd like to step up the level of detail  
5 and go a little bit higher.

6 Number one, in 2019, I asked Dr. Gillespie  
7 at that RAB meeting if there was any possibility  
8 of that portion in the southeast of the dam, up  
9 to north, to the well 7 that Beth was just  
10 talking about, is there any possibility that,  
11 historically or ancestral, cut through Lake  
12 Huron?

13 And he said -- it was right at the end of  
14 his briefing, and he couldn't see the screen or  
15 the slides. But he said, yeah, we don't know.

16 That was in 2019.

17 Tonight, you mentioned two things. On  
18 slide 36, 24 minutes into your talk, you said,  
19 there is a potential -- there's ancestral or  
20 pinch-outs or cuts through the historical Lake  
21 Huron ridges, which are predominantly to the  
22 east of the lake -- or the main current ridge.  
23 So there is a potential there.

24 Then you also on slide -- when you got to  
25 slide 45, at about 26 minutes, you said you were

1 unsure about ancestral Pine River cut through  
2 the ridges.

3 And I would add to that -- I think we're  
4 all unsure if the Pine River at some point in  
5 the last 10,000, 12,000 years ever cut deep  
6 enough to get into the dark green area that  
7 you're showing right now. Correct me when I am  
8 wrong. I believe the dark green soil is a silty  
9 till --

10 MR. PLANK: It's lagoonal deposits into  
11 the -- backfilling into the valley that was  
12 created by the incision of the ancestral Au  
13 Sable --

14 MR. LERICHE: But it's still impermeable?

15 MR. PLANK: It's impermeable with isolated  
16 zones of -- it's not impermeable. It's low  
17 permeable with isolated zones of channelized --  
18 or jelly bean-like point bar deposits. That  
19 would be little zones of high permeability.

20 MR. SUELTFUSS: Arny, if I could jump  
21 in. I want to recognize that we just have a few  
22 minutes left.

23 Arny, is there a specific question that  
24 you'd like Colin to address in the time that he  
25 has?

1           MR. PLANK: I can show you this extra  
2 section here, Arny, that I think really speaks  
3 to what you're talking about. That's exactly  
4 why I made it.

5           This section here, H to H prime, runs  
6 right along here. And with the data that we've  
7 got -- with the data that we've got, we can show  
8 that there is not evidence for a significant  
9 channel running through there.

10           This section here, H to H prime, runs  
11 right where you're talking about. So this is  
12 the north side. This is the south side. The  
13 clay, the till is pretty flat. There is a  
14 little bit of interbedded silts and clays, which  
15 I think this is a lateral faces change from like  
16 really well-developed beach ridges, to beach and  
17 shore phase, to coastal wetland. Kind of like  
18 you have those modern -- this actually has  
19 organic debris and modeling within it and some  
20 shells.

21           I think that's a shallow coastal wetland  
22 and not -- if there was a significant incision  
23 of the Pine River, I'd expect there to be a  
24 gravel lag of some sort in between here and some  
25 sense of a channel margin.

1           So this section, if I can just -- that  
2           section I just showed you runs right across  
3           north/south across there. So if that incision  
4           came through, we'd expect to see it in that  
5           cross section.

6           MR. LERICHE: Can I just add, because we  
7           have to go?

8           I think the main point is, I think the  
9           burden of proof is on the Air Force to say -- to  
10          prove after 1970, was there ever a chance that  
11          the conditions of water, groundwater and the  
12          plumes moving from west to east ever got to the  
13          east side of the lake and contaminated soil at  
14          depths below the depth of Van Etten Lake, so  
15          around 30 feet ground level, 25 feet.

16          And, therefore, that's possibly where the  
17          contamination, which was caused -- which is now  
18          being sampled at 100 parts per trillion of  
19          hexanesulfonate, one of the times that EGLE did  
20          sampling and Bob Delaney found in 2017, another  
21          place where there was a significant amount, the  
22          30 to 50 parts per trillion of PFOA and PFOS.

23          I'll just end with that; if it's possible.

24          Then we want the Air Force to sample more,  
25          like Beth asked, and prove that it can be

1 cleaned up if it needs to be. Thank you.

2 MR. SUELTFUSS: Army, thank you for your  
3 question, your comment there.

4 We have time for one more RAB member  
5 question.

6 So over to Mark Henry.

7 Go ahead, Mark.

8 MR. HENRY: Okay. I actually have a few  
9 questions. I wish we could have the time to get  
10 to those. But let me throw out the one that  
11 I've had the longest. And it kind of follows  
12 through with what Army was saying.

13 I believe and several other people believe  
14 that there used to be a connection, a direct  
15 connection between Van Etten Lake and Lake  
16 Huron. And I was wondering, Colin, if you could  
17 please put up the cross section I-I prime, which  
18 is about where that cut-through would go.

19 MR. PLANK: So this is the stratigraphy at  
20 that location. So this is MW-32. Here's  
21 probably Algoma beach ridge, down to the modern.

22 So I think MW-32 has a little different  
23 look about it because it probably does pick up  
24 some channel-like features on the margin of, you  
25 know, where the creek was maybe interfacing with



1 the beach ridges.

2 But I don't think this interbedded  
3 material at depth -- this is the stuff that has  
4 some organics and modeling in it. I don't think  
5 this indicates a significant through-flowing  
6 channel. But it is interbedded, and it does  
7 pinch out laterally. But there is not a strong  
8 downward gradient to like a permeable lag in  
9 here.

10 And the interbedded nature of it and then  
11 the high organic content makes me think more of  
12 like coastal wetland than a prominent channel.

13 When I first saw these lags here, this  
14 little gravel thing here and this little gravel  
15 guy here, and then the flat nature of the clay  
16 across there, it gave me pause to think about  
17 it.

18 But that would mean that we're capturing  
19 something in cross section, like so, which would  
20 be running in 90 degrees to what we would expect  
21 the through-flowing channel to -- you know, if  
22 there was a Pine Creek channel that was passing  
23 through here, I wouldn't expect to catch a  
24 channel profile, you know, a cross section on  
25 this plain. I'd expect this to be running down

1 that, or just taking a little chunk. And I'd  
2 expect there to be something more pronounced  
3 here.

4 With the data in hand, I investigated  
5 that. I thought that was -- but I think  
6 probably if there is a preserved channel course,  
7 it runs along the margin of the relict delta,  
8 and would mimic, you know -- because the same  
9 forces that are at play now, with long-shore  
10 transport pushing the system south, those forces  
11 would have been present all throughout the  
12 evolution of the --

13 MR. HENRY: Well, yes and no. I am not  
14 sure if you are aware, but Lake Huron has been  
15 at historic high levels since they have been  
16 keeping records on Lake Huron.

17 And during the transducer study and  
18 currently, levels are probably about 10 feet in  
19 Lake Huron higher than they were in the '70s,  
20 and the '60s and the '80s, when a lot of these  
21 releases went on.

22 So you have a potential ten-foot higher  
23 gradient that existed between Van Etten Creek  
24 and Lake Huron a decade ago than is current now.  
25 All the transducer studies and everything else

1 was measuring water levels when the lake was at  
2 a historic high.

3 MR. SUELTFUSS: Mark, I appreciate it.  
4 I know there is a lot of material that we've  
5 gone through. I do want to try to hit one last  
6 really important element of our meeting before  
7 we wrap up.

8 I just want to note also that this is  
9 being recorded. I know this was a lot of  
10 information-intensive material to go through.  
11 So you will have the opportunity -- you can view  
12 this same meeting again to listen a little bit  
13 more intently even.

14 But I do want to move us to the public  
15 comment portion of our meeting agenda. It's a  
16 really important element. It's referred to in  
17 the Restoration Advisory Board rule and in our  
18 operating procedures.

19 And both of those documents, which guide  
20 our RAB and guide our operations, emphasize the  
21 importance of having public comment. And it  
22 also indicates that all of our discussions  
23 should pertain to the environmental restoration  
24 of the former Wurtsmith Air Force base.

25 Let me turn for a three-minute comment to

1 one person who had submitted an e-mail to me  
2 just now, to Chloe Ruddy. We will go ahead and  
3 un-mute Chloe, if we could.

4 And then, Chloe, you have three minutes to  
5 make a comment.

6 MS. RUDDY: This is Chloe Ruddy. I am  
7 with the National Wildlife Federation, Great  
8 Lakes Regional Center.

9 We just wanted to register a couple of  
10 comments. First, we fully expect the Air Force  
11 should use Michigan standards for each remedial  
12 action from here on out, including interim and  
13 remedial actions rather than wait until the end  
14 of the remedial investigation feasibility study  
15 phase of the cleanup process.

16 We don't see any legitimate justification  
17 for delaying in applying the state standards,  
18 and it makes far more sense to use state  
19 standards now from an economic perspective, as  
20 well as to adequately protect public health and  
21 the environment.

22 Second, we just want to encourage the Air  
23 Force to submit more robust proposed plans that  
24 include all the information that is needed for  
25 the public to understand and offer meaningful

1 comments on these plans.

2 So, for example, in the Clark's Marsh IRA  
3 proposed plans, the Air Force did not provide  
4 information regarding how it would monitor  
5 treatment effectiveness for any of the proposed  
6 alternatives or information about how it chose  
7 the proposed locations of its new retraction  
8 wells.

9 So we think that the report provide such  
10 information, and it should solicit and welcome  
11 feedback on plans that go beyond the type of  
12 treatment and technology that will be  
13 implemented.

14 And, lastly, we fully expect that the Air  
15 Force should act as quickly as possible to take  
16 further protective actions along the Clark's  
17 Marsh and future Air Force beach IRAs to capture  
18 and treat contamination that is traveling off  
19 base from the numerous contaminants. Thank you.

20 MS. VARLEY: Chloe, we hear you, and we  
21 are doing our evaluation. We are doing the best  
22 we can looking at all the data available. And  
23 we are moving forward with the RI, which will  
24 provide the data that we need.

25 We still have to complete our remedial

1 design. We still need -- the proposed plan is  
2 what we propose. It is not finalized.

3 We will be going to through each and every  
4 comment that is submitted from the proposed  
5 plan, public comment period.

6 Considering those, with all the data that  
7 we have available using Colin's tool, using all  
8 the resources that we have at our ability, and  
9 then we will be coming up with the path forward.

10 Now, there were a lot of comments. So  
11 it's going to take us some time, but we will get  
12 there. Thank you, ma'am.

13 MR. SUELTFUSS: All right. Well, thank  
14 you very much.

15 This has been a chock-full agenda. We're  
16 already at the end time that we had said. So I  
17 just want to turn to our co-chairs for any  
18 closing thoughts they might have.

19 Dr. Varley, did you have any other closing  
20 comments there?

21 MS. VARLEY: Yeah. I'd like to thank  
22 everybody for your time and attendance to this.

23 Looking back through all of Beth's e-mails  
24 and action items, it seemed to be predominant  
25 more data was needed. So, hopefully, all the

1 requesters got what they needed out of this.  
2 And if this is something you want, keep talking  
3 to Mark and me, and we will see what we can do.

4 Mark?

5 MR. SUELTFUSS: Mark, can you hear me?

6 Mark, are you able to hear us?

7 MR. HENRY: Yes, I have you now.

8 I'd like to thank everybody for joining in  
9 the discussions today. I urge everybody on the  
10 call when the next IRA plan comes through for  
11 along Ratliff Beach at 41, that everybody in  
12 attendance here and everybody who is interested,  
13 please provide comments to that plan.

14 MS. VARLEY: Thank you, all.

15 MR. SUELTFUSS: All right. Well, thank  
16 you all very much.

17 We are adjourned for the evening. Have a  
18 great night. Thank you.

19 (The meeting was concluded at 8:00 p.m.)

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I, LILLIAN RIVERA, State of Florida at Large, certify that I was authorized to and did stenographically report the foregoing proceedings and that the transcript is a true and complete record of my stenographic notes.

Dated this 12th of May, 2021.



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LILLIAN RIVERA, STENOGRAPHER  
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