Restoration Advisory Board Meeting

April 21, 2021

PHIPPS REPORTING

Raising the Bar!

AIR FORCE INSTALLATION & MISSION SUPPORT CENTER

WURTSMITH RESTORATION ADVISORY BOARD MEETING

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Wednesday, April 21, 2021

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

Stenographically Reported Via Web Conference by:
LILLIAN RIVERA, STENOGRAPHER

Job Number: 185582

APPEARANCES: (All appearing via web conference:)

Tim Sueltenfuss, Meeting Facilitator
Catharine Varley, Air Force representative
Puneet Vich, Michigan Dept. of Health and Human Resources
Beth Place, Michigan Dept. of Environment, Great Lakes and Energy
Chloe Ruddy, National Wildlife Federation
Paula Bond, Aerostar Representative
Kevin Nicholas, Bay West Representative
Colin Plank, Air Force Representative, Sequence Stratigraphy Specialist

RAB Members:

Bill Gaines
David Winn
Mark Henry
Arnold Leriche
Dan Stock
Ryan Mertz
Cathy Wusterbarth
Denise Bryan
Tim Cummings
Rex Vaughn
Mike Munson

Thereupon,
The following proceedings began at 5:01 p.m.:

MR. SUELTENFUSS: We do ask that you hold questions until the end of the presentation.

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

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

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

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

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

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

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

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

Number 6: Share information early, openly and honestly.

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

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

Great. Thank you very much.

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

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

So I am going to be calling off the RAB

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

Do we have Mr. Bill Gaines with us?

MR. GAINES: I have to un-mute.

MR. SUELTENFUSS: Thank you, Bill.

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

MR. HENRY: I am here.

MR. SUELTENFUSS: Thanks, Mark.

How about Mr. Arny Leriche?

MR. LERICHE: I am here.

MR. SUELTENFUSS: Thank you, Arny. I appreciate that.

Do we have Mr. Maxwell with us?

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

MR. SUELTENFUSS: Okay. Great. Thanks very much, Mark.

Do we have Rex Vaughn with us?

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

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

MR. SUELTENFUSS: Thank you very much,

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

Does that work for you?

MR. VAUGHN: Yes, that would be fine.

MR. SUELTENFUSS: Do we have Ryan Mertz?

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

Do we have Jerry Schmit?

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

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

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

MR. SUELTENFUSS: Thanks for your patience. I appreciate that.

Do we have David Winn?

MR. WINN: Yes, David is here.

MR. SUELTENFUSS: Thank you, David.

Do we have Cathy Wusterbarth?

Cathy, are you with us?

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

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

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

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

Do we have Lisa Sutton with Au Sable Township?

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

Okay. Others may join after a bit.

Do we have Denise Bryan with District Health Department?

MS. BRYAN: Good evening. I am present.

MR. SUELTENFUSS: Thank you, Denise. I appreciate that.

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

MR. VICH: Yes, I am here.

MR. SUELTENFUSS: Great. Thank you. I appreciate your presence.

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

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

MR. SUELTENFUSS: Thanks, Beth.

Do we have Tim Cummings?

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

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

MR. SUELTENFUSS: Thank you. I appreciate that.

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

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

MR. SUELTENFUSS: Thank you, Mike.

Do we have Jessie Stinbeck with USDAA Corp. Service?

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

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

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

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

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

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

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

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

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

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

Right now, as we speak, FT02, the

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

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

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

MR. SUELTENFUSS: Sorry. I was on mute.

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

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

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

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

we can vote on this during the next RAB meeting.

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

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

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

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

MR. SUELTENFUSS: Thank you very much,

Mark. I appreciate that.

Let's turn now to Dan Stock.

Any updates you have, Dan?

(No verbal response given.)

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

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

Rex, any update from your standpoint?

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

MR. SUELTENFUSS: Thank you.

How about to Bill Gaines?

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

MR. SUELTENFUSS: Sounds good. Thank you very much.

How about over to Cathy Wusterbarth?

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

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

In the meantime, let's move on.

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

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

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

David, did you have any comments to share?

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

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

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

that being released for public comment.

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

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

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

MR. SUELTENFUSS: Thank you, Beth.

Now to Mike Munson with the Port Authority.

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

the team.

MR. SUELTENFUSS: Thank you, Mike. I appreciate that.

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

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

MR. VICH: Can you hear me?

MR. SUELTENFUSS: I can, yes. Go ahead.

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

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

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

Regarding the yearly report updates, based

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

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

Thank you. I appreciate that.

MR. SUELTENFUSS: We'll turn next to Tim Cummings.

MR. CUMMINGS: This is Tim Cummings.

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

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

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

MR. SUELTENFUSS: Thank you, Mr. Cummings.

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

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

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

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

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

am responsible for.

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

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

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

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

MR. SUELTENFUSS: Thank you very much, Denise. I appreciate that.

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

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

My comments are really -- I just want to

address the transparency concerns that continue to occur.

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

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

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

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

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

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

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

The community RAB members agreed the comments from the public would be summarized and read during the RAB member briefings. Subsequently, we requested the US Air Force allow the inclusion of the slides that were developed by the community and a read of the letter in the meeting to ensure that all parties were aware of the community input for the plan.

I was informed that the slides would not

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

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

MS. VARLEY: This is Catharine.

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

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

MR. SUELTENFUSS: Let me jump in, if I could. Thank you.

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

meeting for the public comments.

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

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

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

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

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

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

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

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

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

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

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

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

MR. SUELTENFUSS: Thank you, both.

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

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

You can move to the next slide as well.

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

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

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

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

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

MR. SUELTENFUSS: Thank you, Dr. Varley.

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

business?

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

MR. SUELTENFUSS: Always a good approach.

Let's move into our next topic, if we could. It's the Military Munitions Response Program Ordinance Training. And Kevin Nicholas with Bay West will be presenting.

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

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

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

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

So keep that in mind. Next slide.

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

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

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

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

condition.

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

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

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

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

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

What do you do if you encounter munitions? You have the three Rs. The first one is: Recognize that munitions are dangerous. Munitions may not look like a bomb or bullet. They may look harmless, but they are dangerous. They can be shiny or rusty. They may be clean or dirty. Regardless of whether a munition has been moved, it may still explode. In fact, most munitions can be more dangerous once they have been fired. Next slide.

The second step is retreat. Do not approach, touch, move or disturb. Carefully leave the area the same way you entered.

In remote surroundings, mark the general area where you encountered munitions so local authorities can locate. Do not go closer to the munitions when marking.

Last step is report. Report what you saw and where you saw it. You want to call 911. The authorities will clear an area and contact Explosives Ordnance Disposal, EOD, personnel to dispose of it. Next slide.

We have resources, DENIX.com. The DoD, Environment, Safety and Occupational Health Network and Information Exchange, is a

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

Next slide.

And thank you.

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

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

MR. NICHOLAS: Yes, definitely.

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

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

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

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

MR. SUELTENFUSS: Thank you. I appreciate that.

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

I see Mark Henry's hand up.

Go ahead, Mark.

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

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

So just be aware they're around.

MR. SUELTENFUSS: Thank you, Mark. I

appreciate that.

Kevin, anything else you have for us?

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

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

MR. LERICHE: Just to add to Mark.

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

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

MR. SUELTENFUSS: Thank you, Arny. Thank you, Kevin. I appreciate that.

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

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

Paula?

MS. BOND: Good evening, everybody.

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

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

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

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

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

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

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

and IRAs. Next slide, please.

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

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

Next slide, please.

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

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

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

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

Next slide, please.

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

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

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

running in February of 2022.

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

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

MR. SUELTENFUSS: Thank you, Paula.

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

Any questions to Paula on this update?

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

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

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

MR. GAINES: Bill Gaines.

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

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

December.

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

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

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

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

MR. SUELTENFUSS: Thank you, Paula. Thank you, Bill. I am seeing two other questions, one for Arny Leriche, another one Rex Vaughn. So,

again, asking RAB members for questions.

Arny, go ahead.

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

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

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

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

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

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

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

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

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

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

MR. LERICHE: That is correct.

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

information for what the team is working on.

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

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

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

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

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

MR. SUELTENFUSS: Okay. Well, Arny, thank

you for your question. I appreciate that.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MS. VARLEY: No.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

That is the bulk of what we're going to

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

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

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

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

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

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

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

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

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

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

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

towards Au Sable.

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

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

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

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

This is where the traditional network of

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

The key element is that your site

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

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

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

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

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

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

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

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

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

nailed this early on in the '70s.

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

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

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

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

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

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

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

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

Subsequent rise of lake levels, then,

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

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

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

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

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

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

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

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

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

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

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

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

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

So these are one-foot contours. And you

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

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

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

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

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

I am just going to keep going ahead,

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

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

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

But, Colin, back to you.

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

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

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

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

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

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

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

Just note that in each of these parings, the darker of the colors is supposed to indicate the lower permeability component. The lighter of the two colors is supposed to indicate the more permeable bases component.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

feature.

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

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

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

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

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

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

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

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

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

And the key thing to note here is what

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

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

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

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

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

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

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

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

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

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

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

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

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

the observed clay elevation.

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

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

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

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

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

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

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

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

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

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

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

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

If you go eastward, these gradients

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MW-07, which is located here, is notably

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

heterogenous than the surrounding beach ridge and deltaic deposits.

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

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

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

discharge.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

MR. PLANK: And that is coming shortly.

MR. SUELTENFUSS: I saw your hands up.

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

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

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

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

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

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

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

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

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

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

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

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

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

540-foot elevation.

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

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

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

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

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

underflowing all the way across the Au Sable River.

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

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

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

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

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

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

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

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

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

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

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

would be to the south.

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

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

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

And the current synthesis is groundwater

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

MR. SUELTENFUSS: Well, Colin, thank you. I appreciate that.

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

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

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

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

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

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

MR. SUELTENFUSS: We're good. Thank you, Colin. I appreciate that.

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

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

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

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

it.

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

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

And we do include that in our analysis.

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

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

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

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

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

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

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

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

MR. SUELTENFUSS: Great. Well, thank you, Colin. Thank you for the question, David.

Let me go to Beth Place.

Beth?

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

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

But we're still in the process of

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

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

If you could, zoom on it a bit more.

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

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

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

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

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

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

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

MR. PLANK: Yes, I can. It's slide 56.

You want the transducer data itself?

MS. PLACE: Yeah, this will work.

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

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

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

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

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

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

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

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

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

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

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

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

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

MR. SUELTENFUSS: Well, thank you, Beth.

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

Mr. Arny Leriche. Go ahead, Arny.

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

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

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

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

That was in 2019.

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

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

unsure about ancestral Pine River cut through the ridges.

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

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

MR. LERICHE: But it's still impermeable?

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

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

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

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

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

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

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

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

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

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

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

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

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

cleaned up if it needs to be. Thank you.

MR. SUELTENFUSS: Arny, thank you for your question, your comment there.

We have time for one more RAB member question.

So over to Mark Henry.

Go ahead, Mark.

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

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

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

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

the beach ridges.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Let me turn for a three-minute comment to

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

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

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

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

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

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

comments on these plans.

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

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

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

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

We still have to complete our remedial

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

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

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

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

MR. SUELTENFUSS: All right. Well, thank you very much.

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

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

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

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

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

Mark?

MR. SUELTENFUSS: Mark, can you hear me?

Mark, are you able to hear us?

MR. HENRY: Yes, I have you now.

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

MS. VARLEY: Thank you, all.

MR. SUELTENFUSS: All right. Well, thank you all very much.

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

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

CERTIFICATE

STATE OF FLORIDA)
COUNTY OF MIAMI-DADE)

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.

LILLIAN RIVERA, STENOGRAPHER
Commission # GG 978935
Expires: June 13, 2024

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