POLLUTION CONTROL HEARINGS BOARD
STATE OF WASHINGTON

WASHINGTON STATE DAIRY FEDERATION, the WASHINGTON FARM BUREAU, PUGET SOUNDKEEPER ALLIANCE, COMMUNITY ASSOCIATION FOR RESTORATION OF THE ENVIRONMENT (CARE), FRIENDS OF THE TOPPENISH CREEK, SIERRA CLUB, WATERKEEPER ALLIANCE, CENTER FOR FOOD SAFETY, and RESOURCES FOR SUSTAINABLE COMMUNITIES, individual,	)	NO. PCHB No. 17-016(c)
Appellants,	)	
vs.	)	
STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY,	)	
Respondent.	)	

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BE IT REMEMBERED that on Wednesday, May 23, 2018, at 9:00 A.M., at 1111 Israel Road SW, Tumwater, Washington, appeared the above-named witness before Laura L. Stewart, Washington State Certified Court Reporter, residing at Graham, authorized to administer oaths and affirmations pursuant to RCW 5.28.010.

WHEREUPON the following proceedings were had, to wit:

* * * * *

JUDGE FRANCKS: So we are in Day 3 of our hearing. As you may have noticed, we have a new court reporter today. So she's jumping into the middle of this. So let's try to help her out. And if you need anything, just let us know. There's a whole lot of acronyms in this case that people will be throwing around.

Okay. Let's go on the record. I said that already. Ms. Redding is on the stand, once again. Mr. Tebbutt is going to finish up his questioning.

Is that right?

MR. TEBBUTT: Yes. But before I do so, I would like to introduce and offer Exhibit A-74, which is the deposition transcript of Tom Tebb.

JUDGE FRANCKS: And you are moving for admittance?

MR TEBBUTT: Yes.

JUDGE FRANCKS: A-74 is admitted.

MS. NICHOLSON: We object to that on relevance grounds, Your Honor.

JUDGE FRANCKS: I was listening for an objection, and I didn't hear it. You guys have been quick up to now. Okay. Go ahead.

MS. NICHOLSON: This particular deposition has no relevance to the issues before the board. This regards a deposition in the Cow Palace case, and it regards testimony about that Cow Palace case to which neither of our clients was a party, and we don't feel it has any relevance to any of the issues before the court related to cattle.

JUDGE FRANCKS: Okay. And I -- this was the topic of a motion in limine. Not the relevance objection, but a different objection. But I have had a chance to look at the deposition, and I am going to allow it.

It's got designations by both PSA and Ecology, and I think it -- it's relevant to Issue 7, and the board can give it the weight it deserves, is the way I like to think of this.

MR TEBBUTT: So --

JUDGE FRANCKS: So with that, A-74 is admitted.

MR TEBBUTT: Thank you.

(Exhibit A-74 admitted.)

MR. TEBBUTT: And along with A-74, there are two exhibits, 68 and 76, which go along with it, which are

authenticated by Mr. Tebb in the deposition and are discussed thoroughly in the deposition. So those are also offered for admission.

JUDGE FRANCKS: What were the numbers again?

MR TEBBUTT: 68 and 76. 68 is the kick-the-can-down-the-road e-mail from Mr. Tebb. And 76 is another one that's relevant to his discussions regarding the CAFO permit.

JUDGE FRANCKS: Do we have objections to those?

MS. NICHOLSON: We are confused, Your Honor, because I think A-68 had been excluded prior.

JUDGE FRANCKS: Well, I think I had not admitted it at that point.

MS. HOWARD: Mr. Reck's deposition testimony also has a number of deposition exhibits attached to it. So at this time while we're talking about the Tebb's deposition and those exhibits, if they're going to come in, we should do the same with Mr. Reck, as well. It will save us some time, I think.

JUDGE FRANCKS: Are there objections to the exhibits to Mr. Reck?

MR TEBBUTT: Yes. Of course. There is an ongoing objection because Mr. Reck was just deposed three or four days ago before this hearing. So anything that comes in with Mr. Reck's deposition, we object to entirely.

I'll let Mr. Snyder address this, because he's been the one handling that directly.

MR. SNYDER: Judge Francks, in particular, we're objecting to all of the exhibits, but also to the Lawrence Johnson declaration. I understand that you ruled on this previously, and just for preservation of the record, we believe that NRCS fully rescinded it ability to participate in this hearing. That includes the declaration.

If you look at the definition of "appearance," as it is used in the CFRs, it includes any written testimony. The declaration is written testimony.

JUDGE FRANCKS: But that's not -- that's an exhibit to the Reck deposition?

MS. HOWARD: It is, Your Honor.

JUDGE FRANCKS: And it is also a separate exhibit; right?

MS. HOWARD: It is. And it was also included with our summary judgment briefing. It is a sworn affidavit. And if you look at Mr. Reck's testimony, what we were doing is we were asking him questions about the Johnson declaration and asking him to comment on those particular topics throughout the declaration. Not throughout, but there was a section where he was doing that.

MR. SNYDER: As Your Honor knows, when you review the transcript, you'll see that Mr. Reck actually testifies

that he provided some of the information for Mr. Lawrence to use -- excuse me -- for Mr. Johnson to use in that declaration.

So we feel they can get what they need to get through the Reck deposition, despite there were objections to that, as well.

JUDGE FRANCKS: Okay. I think I've heard enough.

MR. SNYDER: Thank you, Your Honor.

JUDGE FRANCKS: I am going to admit all of the exhibits to both of those depositions. I think they're relevant to the issues that I've talked about. And again, the board will give it the weight it deserves.

(Exhibits A-68 and A-76 admitted.)

JUDGE FRANCKS: Are you ready to carry on with questioning?

MR TEBBUTT: We are.

JUDGE FRANCKS: Excellent. So -- so that means that I've admitted 68 and 76.

MR TEBBUTT: Correct.

MS. HOWARD: Do you want the Reck deposition exhibit numbers, as well?

JUDGE FRANCKS: Yes. Can we --

MS. HOWARD: So one was I-5. I apologize. This is the order that they're in, in the deposition. So I-5 is Phil Reck's resume. R-9 is the Conservation Practice

Standard 313. That's Ecology's exhibit.

I-13 is also the Conservation Practice Standard. It's the Washington version of that. I-11, which is the declaration of Lawrence Johnson. R-6, which I think we've already admitted. That's Appendix 10D.

R-20, which is a Journal of Environmental Quality publication. R-8, which is the History of NRCS Philosophy. It's related to Appendix 10D.

I-14, Conservation Practice Standard 520, which is referred to in Conservation Practice Standard 313. And then I-15, which is another Conservation Practice Standard related to liners that is also referred to in 313.

R-7 has already been admitted. It's the one we were looking at yesterday that has that Appendix C with the diagram. And then I-16, which is the e-mail from Ms. Bredeweg with NRCS. That was it.

JUDGE FRANCKS: Okay. Let me just run through the list quickly. I-5, R-9, I-13, I-11, R-6, R-20, R-8, I-14, I-15, R-7, and I-16.

MS. HOWARD: Yes.

JUDGE FRANCKS: Those are all admitted.

(Exhibits R-6, R-7, R-8, R-9, R-20, I-5, I-11, I-13, I-14, I-15, and I-16 admitted.)

JUDGE FRANCKS: Mr. Tebbutt, please proceed.

MR TEBBUTT: I had to resist saying "bingo" along there.

JUDGE FRANCKS: I had the same thought.

CROSS-EXAMINATION (Continued)

BY MR. TEBBUTT:

Q. Good morning, Ms. Redding.

A. Good morning.

Q. I want to talk to you a little bit, to start off the day, about R-4.

And yesterday you testified that you did not believe that the dairies were a predominant source of the nitrogen contamination in the Lower Yakima Valley and the Sumas-Blaine aquifer contamination; correct?

A. No. That is not what I stated.

Q. Do you remember what you stated?

A. Well, I believe that dairies are a source, but we don't have good information to say what is a predominant source. We have a document that I included in the manure and literature review that talked about the contribution from dairies, and we have a draft of a nitrogen availability assessment that's being done in the Lower Yakima that's -- that's -- that's still under review. That's not very -- we're -- we're waiting for the findings on that.

And the EPA report that said that dairies in the

Lower Yakima were a contributor to nitrate contamination in the aquifer.

Q. Take a look at page 95 of R-4, please.

I would like you to look at -- under where it says, "Potential impacts of groundwater," I would like you to read out loud the very first sentence under that section.

A. Under -- in the first paragraph or under --

Q. It's the actual page 95.

A. But --

Q. R-4.

A. So you want me to read the last sentence of the first paragraph under, "Potential impacts to groundwater"?

Q. Correct.

A. Okay. "Research in both the Lower Yakima Valley and the Sumas-Blaine aquifer identify manure as a predominant source of nitrogen loading in these areas."

Q. Thank you. Now let's move to A-9.

A. Got it.

Q. Okay.

And this is an e-mail from you to Thomas Mackie dated September 8th, 2016; correct?

A. Yes, it is.

Q. Would you read the single sentence there, which is the second paragraph of your e-mail to Mr. Mackie?

A. Wait. Which --

Q. The one that begins with "Maia."
A. "Maia wants the permit finalized by December 31st. Bill and Kelly made it clear that they intend to meet this deadline."
Q. So is Maia Bellon, who you are referring to?
A. Yes.
Q. And how often did you talk with Ms. Bellon about the permit?
A. Never.
Q. How did you get the directive to get the permit out that you're referring to in this e-mail?
A. Through Bill Moore.
Q. Did she ever tell you or did you ever get word from any of your supervisors whether to include groundwater monitoring in the permit?
A. No.
Q. Who gave the order not to include groundwater monitoring?
A. Nobody gave any order.
Q. It was just a -- who made the determination not to include it?
A. Well, I think as John testified to, that there was a work group, and there were collaborative sessions where we developed the permit.
Q. Right.

So who made the decision not to include it? Somebody had to have made a decision.

A. I don't believe that we ever had a question before us on do we include groundwater or don't we include groundwater monitoring?

Q. Okay.

Let's go to A-18, please. Yes.

MR. TEBBUTT: I would like to move into evidence A-9, please.

JUDGE FRANCKS: A-9 is admitted.

(Exhibit A-9 admitted.)

BY MR. TEBBUTT:

Q. Let's take a look at A-18.

A. Okay.

Q. These are comments on the draft CAFO general permit by you dated 5/4/2016; correct?

A. Correct.

Q. I would like you to read the first three-plus lines of A-18 out loud, please.

A. "Good job. I know that drafting this permit is a difficult challenge with many competing interests. As a groundwater hydrogeologist, my focus is on groundwater quality protection and providing research and direction that will provide assurance that the groundwater quality standards Chapter 173-200 WAC are met."

Q. You can stop there.

I want to ask you, what are the competing challenges that you're referring to?

A. It's a complex permit with a lot of different pieces that we're trying to address. We're trying to address that land application is done in a manner that protects groundwater quality.

We're trying to look at lagoons that are protective of groundwater quality, where we have an opportunity for on-farm changes. So -- and when we're developing a general permit like this --

Q. Let me just stop you there. I mean, I'm not asking about the different parts of the permit.

When you're referring to "competing interests," aren't you referring to the different interest groups that are -- are lobbying the agency to do the right thing to protect human health and the environment, or the converse?

A. No, I'm not.

Q. You're not -- you're referring to the specific parts of the permit itself? Those are the competing interests?

A. So let me explain my role a little bit better.

Q. No. That's not what I'm asking. I'm asking just about the competing interests.

What -- what are you referring to, specifically, what you just testified to are the competing interests?

A. The scientific issues. Because I'm a scientist. I'm talking about the scientific issues that are on the table, that are all being considered as going into a general permit.

Q. I understand that.

Those are the scientific issues, the competing interests that you're referring to in this issue?

MS. HOWARD: Objection. Asked and answered.

MR TEBBUTT: I don't believe she's answered it.

JUDGE FRANCKS: You can ask one more time.

BY MR. TEBBUTT:

Q. Are the competing interests --

A. As I think --

Q. Are the competing interests the scientific interests, or are these the political interests that you're referring to here?

A. They are not the political interests. That is not my job.

Q. So they're the scientific interests? That's what you're referring to?

A. As I described the first time I answered this question --

Q. Just yes or no, please.

A. I already answered the question.

Q. All right.

Let's take a look at A-12. Have you seen this document before?
A. It's an e-mail from John Jennings to Bill Moore. I am not on the distribution list.
Q. Right.
But my question is, have you seen this document before?
A. I don't recall seeing it.
Q. Where it says, "Decision rules. What science will be included."
A. Correct.
Q. Do you agree with the criteria that are set forth there as to what credible data will be used to pose -- to answer questions about the science related to the permit?
A. I'm going to read it right now.
Q. Yes. Please do.
A. So, yes, I read the section on -- do you want me to read the entire --
Q. Just to yourself. No. Just that first part. Just the decision rules. What science will be included.
A. Yes. That's credible data.
Q. So you agree with those statements in A-12, that that's what "credible data" means?
A. Correct.
MR TEBBUTT: I move the introduction of A-12.

MS. BARNEY: Objection. Lack of foundation. She's not on the e-mail. She said she hadn't seen it before.

MR TEBBUTT: Before you rule, obviously, she just agreed with the statements in there, that this is part of the policy. The next question is, "Is this the" -- "what you agree is department policy?"

MS. BARNEY: Then her testimony is sufficient.

MR TEBBUTT: Her testimony should be sufficient, but this document describes in detail -- I could have her read into the record those things, or we could just use this document.

JUDGE FRANCKS: I -- because this is more than one page, and we're talking about one particular section, I think I don't want to admit this because I don't think there's enough foundation with this witness.

But if you want her to read the part that you were asking her about, that's fine.

MR TEBBUTT: Into the record?

JUDGE FRANCKS: Yes.

MR TEBBUTT: Okay. Let's do that.

BY MR. TEBBUTT:

Q. Then let's read, starting with, "Decision rules. What science will be included." If you'll start reading that and stop -- just go ahead and start reading, and I'll tell you when I would like you to stop. Okay? Out loud.

A. Oh, okay. "Decision rules. What science will be included. Credible data will be used to answer the questions posed about the science. Credible data is" -- and there's three bullets -- "data gathered using sound scientific methodologies. For example, creating hypotheses, testing hypotheses."

Second bullet, "Data that has quality control and assurance checks."

Third bullet, "Data gathered through methodologies that have been peer reviewed."

Q. Okay. That's enough. Thank you.

And you agree that that's the -- that's the -- Ecology's definition of what credible data means, for purposes of your -- the CAFO science; correct?

A. So this may be a paraphrasing of what exactly credible data is. We -- I know we have a directive from the legislature that specifically lines that out, and we have a very specific Ecology policy that was developed on exactly what credible data is.

I know it's much longer than three bullet points, so I hesitate to say this is Ecology's policy.

Q. Okay. But you don't disagree with anything stated right here; correct?

A. No, I do not.

Q. Okay. Let's move to A-74, please. A lot of stuff to

work with.
A. It's hard to get through this binder. Okay.
Q. Do you know Tom Tebb?
A. Yes, I do.
Q. Have you worked with him before?
A. Yes, I have.
Q. On a lot of different projects?
A. Not -- I wouldn't say "a lot."
Q. Have you worked with him or talked with him at all in the context of the CAFO permit?
A. Yes, I have.
Q. And have you read Mr. Tebb's deposition transcript?
A. Yes, I have.
Q. Do you take issue with any of the statements that Mr. Tebb sets forth in his highlighted testimony?
A. In his highlighted testimony?
Q. Yes.
A. So all the parts of the testimony that -- well, I've read his testimony, and there is -- there is nothing that I disagree with what he said.
Q. Okay. Very good.
Along those lines, one of the things that Mr. Tebb discussed was -- and this is at pages 64 through 66 of his transcript, if you'd like to move to that. There's a discussion about the USGS report that was done in the Yakima

Valley.
A. Hang on. You said "64"?
Q. 64 to 66. Yes. It's a condensed transcript. So it goes up and down a little bit.
A. Yeah. So exactly what is the USGS report that he's referring to?
Q. Just go ahead and, you know, take a look at that or refresh your recollection. Go ahead and read it to yourself.
A. Okay. So for my clarification, it says, "Did it come out right around this time?" What timeframe is "this"?
Q. This is 2014. 2/26/2014.
A. It's obvious there's a previous discussion that you're talking about a timeframe. And --
Q. Let me just ask --
A. -- I know the deposition was 2014. But what is the timeframe that --
Q. Let me just ask some questions, and we'll get to this.
A. Okay.
Q. You're part of the GMWA, you said; right?
A. I provide technical support to Ecology. Yes.
Q. Right.
You read the USGS report that came out as part of this report for the GMWA that discusses how the aquifer in the Lower Yakima Valley is connected to the Yakima River and

the Columbia River?
A. Can you give me the author and date of that document?
Q. I can't right now. No.
A. Because that would be helpful for me to know.
Q. It was in that timeframe, 2013/2014. John Vaccaro, actually, was the author.
A. That's helpful. I've read a lot of the documents that relate to the Lower Yakima Valley. There's an awful lot of them, and it's been a while since I've looked at that. But, yes, I know I've at least looked it over. Yes.
Q. Are you familiar with one of the conclusions in that report that the Lower Yakima Valley -- the higher water table, if you will, is hydrologically connected to the Yakima River?
A. I would really need to see the report to be able to --
Q. All right.
A. -- to say for certain.
Q. But that's what Mr. Tebb is referring to in his deposition transcript.
A. Okay.
Q. That's the USGS report.
A. Okay.
Q. And you don't disagree with anything that Mr. Tebb says there; correct?
A. Well, I have a high level of respect for Mr. Tebb.

And -- but I can't -- I'm not sure that I can necessarily verify everything that he's testifying to.

Q. I'm not asking you to do that.

A. Okay.

Q. I'm just asking whether you disagree with any -- you already said you don't disagree with any of the statements in his transcript; correct?

A. Nothing jumped out at me when I read his deposition --

Q. Okay. Thank you.

A. -- that anything was -- okay.

Q. Let's move back to R-4, please.

Before we move off this, how did you work with Mr. Tebb on the CAFO permit?

A. So I did not work on the 2006 permit. But I actually had a conversation with Mr. Tebb on -- this past week, because I saw that this was in the list of exhibits. And I called him to say, "Have you been keeping track of what we've been doing on this" -- "with the latest CAFO permit that's been issued?" And he said, "No, I haven't even looked at it."

So all I did was say, "Well, I think we've got a lot of protective provisions in there" --

Q. That's not my question. My question --

A. Oh, I'm sorry.

Q. You said earlier that you worked with Mr. Tebb on the

CAFO permit.
A. No. I don't believe I --
MS. BARNEY: Objection. Misstates testimony.
MR TEBBUTT: Let me ask it again.
BY MR. TEBBUTT:
Q. Did you work with Mr. Tebb at all or have any discussions with Mr. Tebb in the development of the CAFO permit that's before this board today?
A. No, I did not.
Q. Let's move on to R-4, then, please. Let's look at page 80 of R-4.
A. Okay.
Q. If you'll read the bottom sentence out loud, please. Bottom of page 80.
A. "Sampling the soil profile at one-depth increments down to the water table provides the best estimate of the total residual soil nitrate, as well as the estimated nitrate load that poses a risk of leaching to groundwater."
Q. So you're saying there that you could actually require testing of the entire soil profile from the surface down to the groundwater to see how nitrates move to the groundwater; correct?
A. Correct.
Q. And that didn't get in the permit, did it?
A. No, it is not in there.

Q. Okay. Let's move to A-18, please.

JUDGE FRANCKS: A-18?

MR TEBBUTT: A-18.

THE WITNESS: Okay.

MR TEBBUTT: Your Honor, just as a housekeeping matter, I would like to move in A-18. I thought maybe I did this morning, but maybe I didn't. A-18.

JUDGE FRANCKS: Wasn't that the one we just talked about?

MR TEBBUTT: We did. I'm not sure I offered it. According to my team, I didn't offer it.

JUDGE FRANCKS: Okay. A-18 is admitted.

(Exhibit A-18 admitted.)

BY MR. TEBBUTT:

Q. Particularly, let's take a look at page 7.

A. I did not put the page numbers on this.

Q. Yeah. They're on the bottom right.

A. Oh, okay. Okay.

Q. Do you have that in front of you?

A. Yeah, I do.

Q. Okay.

And Table 7 says that -- for -- under "Risk Level" -- on the left-hand column, the third one says, "High - 30 to 45 parts per million."

Correct?

A. Yes.
Q. It says, "Required action: Reduce manure application by 50 percent."
A. Yes.
Q. "Eliminate commercial fertilizer applications."
A. Yes.
Q. And, "Limit applications to growing season, as defined by," dot, dot, dot, "tools"; correct?
A. Correct.
Q. The permit doesn't require reducing manure application by 50 percent when residual nitrates are 30 to 45 parts per million, does it?
A. Can you state that again? Say the question again?
MR. TEBBUTT: Would the court reporter mind reading the question back?
(Record read.)
THE WITNESS: It doesn't have that exact statement in there.
BY MR. TEBBUTT:
Q. Right.
Next one, where it says, "Very high," and that's greater than 45 parts per million.
It says under "Required Action," "No manure application or commercial fertilizer application until soil nitrate levels decrease to medium levels."

Do you see that?
A. I do.
Q. That isn't anywhere in the -- in the CAFO permit, is it?
A. Actually, it is. It's on this chart here.
Q. It doesn't say, "No manure application," does it, anywhere?
A. It says, "Stop land application." (Unintelligible) "the field and continue the actions that are required for the other levels."
Q. But that's only after three years; right?
A. Correct.
Q. Right. Not immediately.
A. But that's --
Q. Not immediately; right?
A. You asked if it was in the permit, and it is in the permit.
Q. Okay. But the table here, Table -- table on page 7 doesn't say, "Wait three years and then stop the application," does it?
A. No, it does not.
Q. It also says as part of the very high, "Add soil moisture sensors," under, "Recommended actions."
Do you see that?
A. Yes. I see that.

Q. And that's not required in the permit, is it?
A. No, it's not.
Q. Let's move to R-4, please, again. Let's look at page 88. The actual -- where it says "page 88" at the bottom.
A. Okay. Got it.
Q. These are two tables, Tables 22 and 23, which discuss soil nitrate concentrations and projected concentrations available to leach groundwater in -- to leach the groundwater. One in Eastern Washington, that's Table 22; and Table 23 is for Western Washington.

Correct?

A. Correct.
Q. So if the soil nitrate concentrations are as low as four parts per million in Eastern Washington, that could translate with a .05 foot annual recharge to 11 parts per million of nitrate in groundwater; correct?
A. No. That is incorrect.
Q. How is that incorrect?
A. So what this table does is essentially -- I testified yesterday that we were trying to get a handle on what do the soil nitrate values mean?

And the first step was to take the soil that's in the nitrate and mix it with the recharge, essentially, and that is essentially, like, with an onsite sewage system. That would be what would be discharged.

So that's what's actually in the soil when it leaves the root zone. That would be the concentration. The discharge. That is not necessarily your impact at groundwater.

Q. Right.

But that's --

A. The rest --

Q. Let me --

A. -- of the stuff is --

Q. Let me stop you there.

But that's the amount of nitrate that would be heading down to groundwater. That would be the concentration of nitrate that's headed down to groundwater; correct?

A. Correct.

Q. So the table continues. And so with soil nitrate at 8 parts per million and one foot of annual recharge, you could also get 11 parts per million of nitrate headed to groundwater; correct?

A. Wait. State that again.

Q. Yes.

A. Where are you looking?

Q. Table 22. "Eight parts per million. One-foot annual recharge."

A. Yes.

Q. So again, 11 parts per million of nitrate could be headed to groundwater under that scenario?
A. That would be essentially like the effluent concentration.
Q. Right.
A. That is not an impact -- that is not a groundwater concentration.
Q. I understand that. You said that.
A. Okay.
Q. But that's what's heading to groundwater; correct? That's what you testified to.
A. Correct.
Q. So the table lays out all of these numbers -- I'm not going to go through every single one of them, but as you get higher in concentration, you get more potential impact to groundwater; correct?
A. No. I would not make that statement. What I would say is the effluent concentration is higher.
Q. Right. That's headed to groundwater. Effluent concentration in -- in the recharge that's headed to groundwater?
A. Well, I'm just trying to be precise with my words.
Q. I'm just trying to ask you if -- you know, it's my job to ask the questions. It's your job to answer them.
So the material that's headed -- the

concentrations -- this is the soil moisture concentrations, if you will; right?
A. Right.
Q. In the vadose zone?
A. Correct.
Q. That's the stuff that's headed to groundwater; correct?
A. It may head to groundwater.
Q. Where else -- does it magically disappear on the way down?
A. Well --
MS. HOWARD: Objection, Your Honor. Argumentative.
JUDGE FRANCKS: I'm going to overrule that objection, but let's take the level down a bit.
THE WITNESS: So remembering that these samples are taken in the one- or two-foot level, and oftentimes that's in the root zone. So depending upon where you are in the state and what happens, some of that nitrate may still be available in the root zone.
BY MR. TEBBUTT:
Q. All right. But once it gets below the root zone, it's destined to go to groundwater; correct?
A. Primarily. We've talked about other extenuating circumstances, so that's not an absolute.
Q. But in the criminal term, it's more reasonable -- beyond a reasonable doubt, isn't it? I mean, there has to

be some extraordinary intervening circumstance to prevent that; correct?

MS. BARNEY: Objection. Misstates prior testimony.

JUDGE FRANCKS: I'm going to sustain that.

MR TEBBUTT: I'm asking the question, not trying to rephrase testimony. Just asking the question.

JUDGE FRANCKS: I think you're mischaracterizing some of her testimony.

MR TEBBUTT: I'm not trying to. I apologize.

JUDGE FRANCKS: New question.

BY MR. TEBBUTT:

Q. So from a scientific perspective, it's far more likely than not that the water that is in the vadose zone is going to reach groundwater at some point; right?

A. If it moves below the root zone, yes.

Q. Let's go to A-20, please.

A. Okay.

Q. A-20 is an e-mail from you to Kelsey Dunne dated 2/24/17; correct?

A. Correct.

Q. If you would please read where it starts, "In the fall," in the first paragraph -- about halfway through the first paragraph, and read the rest of the paragraph out loud, please.

A. "In the fall, if the sample's going to be collected

after significant rainfall, then going deeper makes sense to capture the fraction that is migrating to groundwater. In Western Washington, where there's heavy precipitation, you may even consider having them monitor the entire soil profile in the fall every year. This would give you a sense of nitrogen levels from the land surface down to the water table, or even six feet to determine leaching to groundwater and evaluate if improvements in management are reflected in a reduction of nitrogen loss."

Q. And that soil column testing all the way down to groundwater is not in the permit, is it?

A. No, it is not.

Q. Let's move to R-15, please.

MR TEBBUTT: And move A-20, please.

JUDGE FRANCKS: A-20's admitted.

(Exhibit A-20 admitted.)

BY MR. TEBBUTT:

Q. Let's take a look at page 94, please, of R-15.

JUDGE FRANCKS: Do you have the PDF page, per chance?

MR TEBBUTT: Yes, I do, actually. It's 124.

JUDGE FRANCKS: Usually they're pretty close.

MR TEBBUTT: Doing a little better than yesterday. I didn't have it quite together yesterday. A lot of information to work with.

BY MR. TEBBUTT:
Q. Do you have that in front of you, Ms. Redding?
A. I do.
Q. If you would read the first paragraph under where it says, "Monitor to evaluate," please.
A. "A program is needed to determine how well current and future manure management practices are working to improve groundwater quality. Because there is no reliable substitute, direct groundwater monitoring using dedicated monitoring wells is a key component of an effectiveness monitoring program.

"Although groundwater monitoring is the only way to determine the amount or the concentration of nitrate that actually reaches the water table, soil nitrate monitoring in the fall is a necessary tool for on-farm nutrient management.

"If conducted with limitations in mind, soil nitrate monitoring can also serve as a screening tool for closer inspection of groundwater conditions."
Q. You can stop there. Thank you.

Let's move to R-4 again, please. Page 82, please.
A. Okay.
Q. If you would read under the "Summary" the first paragraph, please.
A. "The majority of researchers agree that groundwater

monitoring is the only way to definitively determine impacts to groundwater quality from residual soil nitrate. Monitoring other media, such as soils, can indicate whether manure management practices need to be adjusted, but it cannot conclusively determine the extent of impact to groundwater quality."

Q. Stop there and then read the fourth paragraph under the "Summary," please.

A. "Groundwater monitoring provides a direct assessment of impact to groundwater quality from land uses and is an important tool for determining how effective manure management practices are being implemented, and thus minimizing impacts to groundwater.

"Groundwater monitoring is also an effective verification tool used to help abatement and transport of nitrate in the subsurface."

Q. Thank you.

Now let's take a look at page 103.

A. Okay.

Q. If you would read, please, under, "Groundwater monitoring," the first paragraph.

A. "Animal feeding operations, AFOs, that apply manure to crops as part of their treatment system can adversely impact groundwater. Groundwater monitoring is the most reliable and direct means of measuring impacts to

groundwater from manure applications.

"Soil samples provide limited evaluation to evaluate nutrient management practices. They can indicate over application of manure, current available nitrate concentrations in the soil, and effectiveness of management practices.

"However, soil nitrates is not a direct or reliable indicator of impacts to groundwater quality."

Q. Thank you.

Is that it?

A. Did you want me to continue reading?

Q. You're done with that paragraph; right?

A. Yes.

Q. Okay. Thank you.

Let's move to A-21, please. Okay?

A. Okay.

Q. A-21 is -- did you draft A-21?

A. No. I did not.

Q. Are the handwritten notes on A-21 yours?

A. Yes, they are.

Q. On the second page of A-21, you have a statement at the bottom. Can you read that out loud, please, in your handwriting?

A. "Used in other states"?

Q. No. Where it starts "GW."

A. "GW," which is groundwater monitoring, "is standard for industrial facilities."
Q. Is that "is used in other states" part of that?
A. Well, they're two separate thoughts?
Q. They are? Okay.
So what's used in other states? What does that refer to in this document?
A. This is from 2016. I'm not quite -- I'm not entirely sure I remember.
Q. Isn't that relating to groundwater monitoring?
A. It could be, but I'm not positive.
Q. Okay.
MR. TEBBUTT: Your Honor, I would move A-21 into evidence.
JUDGE FRANCKS: A-21 is admitted.
(Exhibit A-21 admitted.)
BY MR. TEBBUTT:
Q. Ms. Redding, earlier -- or yesterday we talked about AKART and various permeabilities for lagoons, but I want to ask you some more questions about that.
You mentioned AKART for new or refurbished lagoons was ten to the minus six -- one times 10 to the minus six centimeters per second, without regard for manure sealing.
Is that a fair characterization?
A. Yes.

Q. Is that recommendation found in your manure and groundwater literature review? I'd suggest maybe you take a look, to make things quicker, at R-4, page 66.
A. So on page 66 I don't have recommendations.
Q. Okay. Let's look down at the bottom.
A. This is -- this is a summary of what's in the literature.
Q. Okay.
A. And there's a very limited section in the recommendations that are in the back of the document.
Q. Could you read, please, the -- I'm -- read under, "Liner permeability," please. Start reading that.
A. "The NRCS 2009(b) recommends an allowable seepage quantity of one times ten to the minus seven centimeters per second based on the historical permeability for clay liners. Ecology, Kimsey 2002" --
Q. That's you, by the way, isn't it?
A. Yes. That's a previous name of mine. "Appendix C specified that agricultural waste water lagoons have a final maximum liner permeability of one times ten to the minus seven centimeters per second or less."
Q. All right. Let's stop there.
Why doesn't one times ten to the minus seven centimeters per second appear in the permit as the final maximum liner permeability?

A. Because we have -- essentially, that's -- that's the same thing. We have one times ten to the minus six, with one order of magnitude from manure sealing.
Q. Okay.
So are you saying that manure sealing would result in a full order of magnitude reduction for new or refurbished lagoons?
A. Yes. And that's what I testified to yesterday.
Q. Do you remember testifying in your deposition that you did not disagree with NRCS that manure sealing may only reduce permeability by one-half order of magnitude?
A. I believe I stated that that's what the document stated. I didn't disagree with what was in the document.
Q. Right.
So you're not disagreeing with them that the permeability might only be reduced by half order of magnitude; correct?
A. No. I'm not disagreeing that that's what's written in Appendix 10D. But I think what I stated yesterday in my testimony was I looked at the 2008 Appendix 10D, where they did advocate for one full order of magnitude in 2009.
All the references are the same. NRCS did not add any new references that would change that from a full order of magnitude to a half order of magnitude. But they did cite some problems occurring in a few locations nationwide

of lagoons based on course grain soils.
Q. All right.
A. That was their basis.
Q. Very good.
A. I wanted to clarify.
Q. You were deposed in this case, were you not?
A. Yes, I was.
Q. Your deposition took place on July 12, 2017, here in Olympia.
Do you recall that?
A. I'm not -- I don't recall the actual date off the top of my head. That sounds about right.
Q. You were represented by counsel?
A. Yes, I was.
Q. Ms. Barney?
A. Yes.
Q. The dairy industry lawyers were present?
A. Yes.
MR TEBBUTT: Your Honor, I'm opening the original transcript. Sealed. Hermetically sealed. Too well hermetically sealed. It's all tied together. I guess we'll just keep it that way, then.
BY MR. TEBBUTT:
Q. You were under oath that day; correct?
A. Correct.

Q. You were asked the following question. My question is, "Does that clarify or does that change your opinion that manure sealing provides approximately an order of magnitude of additional protection?"

Your answer, "NRCS is suggesting that an order of magnitude might be too generous, and that maybe a half an order of magnitude would be more appropriate. But it does leave it up to the states for their criteria."

Question: "Would you disagree with NRCS there?" Answer: "I'm not disagreeing with them." Question: "Well, in terms of the additional protection that manure sealing would provide, are you disagreeing that it would. It's more along the lines of a half order of magnitude, as opposed to a full order of magnitude?

Answer: "No. I'm not disagreeing with it."

A. I believe that's in line with --

Q. I didn't ask a question.

A. Oh.

Q. Next question.

What is a half order of magnitude reduction from one times ten to the minus six centimeters per second?

It's only halfway to one times ten to the minus seven, isn't it? A half order of magnitude?

A. No. No. What it is, is -- so when we say there's one times ten to the minus seven, a difference of a half order

of magnitude would be 0.5 times ten to the minus seven.
Q. Right. So it would be --
A. An order of magnitude is when you add a zero.
Q. Right. So it's ten times; right? An order of magnitude is ten times better.
A. Correct.
Q. We're reducing.
A. Correct.
Q. So if you're only getting there half the way, you're only getting five times, you're not getting that ten times; correct?
A. No. No.
Q. That's a half order of magnitude, isn't it?
A. No. No. No. It's -- instead of one times ten, it's 0.5 times ten.
Q. Right. Very good.
And to confirm, AKART for existing lagoons is merely that there is two feet of vertical separation; correct?
A. Wait just a second. Can you slow down a second? Can you repeat that?
Q. AKART for existing lagoons is merely that there is a two-foot vertical separation; correct?
A. Correct.
Q. And there's no permeability requirements; correct?

A. Wait a minute. Just a second.
Q. For existing lagoons.
A. Oh, wait. No, no, no. For existing lagoons, we have not stated what AKART is.
Q. Okay.
A. So that's for new and refurbished.
Q. And there are no seepage limitations, then, for existing lagoons; correct?
A. Correct.
MR TEBBUTT: Your Honor, I'll put this under here just for safekeeping. I promise I won't alter it.
BY MR. TEBBUTT:
Q. Let's take a look at Section S3.
JUDGE FRANCKS: Are we still --
MR TEBBUTT: R-4. R-4 is the -- no, it's not. R-1 is the exhibit, please.
JUDGE FRANCKS: What page are we on?
MR TEBBUTT: We are at S3, which looks like page 12.
BY MR. TEBBUTT:
Q. S3 of the permit requires that permittees will not cause or contribute to a violation of the groundwater quality standards for nitrate; correct?
A. Correct.
Q. And so without groundwater monitoring, how will Ecology

know whether a permittee's existing lagoon is causing or contributing to a water quality violation?
A. It has to do with the way that we've set up with looking at the permeability requirements and the modeling exercise that I talked about yesterday.
Q. But you just said there are no permeability requirements for existing lagoons.
A. For existing lagoons? Oh. Well, that's why we're using Tech Note 23, is to try to get a handle on existing lagoons. What exactly their conditions are.
Q. Right.
But isn't the only way to know whether they're impacting groundwater to do groundwater monitoring?
A. Correct.
Q. How will Ecology know whether a permittee's application fields are causing or contributing to a water quality violation?
A. Through the adaptive management matrix.
Q. But isn't groundwater monitoring the only way to know for sure?
A. Correct.
Q. Let's take a look at A-22, please. Specifically, page 2. By the way, A-22 is a document written by you, isn't it?
A. Correct.
Q. Let's take a look at the very top. The introduction.

If you would read the first two sentences, please.
A. "Groundwater is a valuable and fragile resource which needs to be protected from contamination. More than 60 percent of Washington State residents rely on groundwater as their source of drinking water."
Q. This document is written in regard to onsite sewage systems; correct?
A. Correct.
Q. I would like you to also take a look at page 12 of Exhibit 22.

Do you have that in front of you?
A. Yes.
Q. If you would read the first three sentences under, "Options for reducing impacts to groundwater quality," please.
A. "Nitrate nitrogen has a maximum contaminate level, MCL, of 10 milligrams of nitrogen per liter, which is established to protect drinking water. However, the MCL is not always the groundwater protection goal.

"Many communities, including Washington State, protect all groundwater as a resource and have regulatory measures which preserve existing high quality groundwater."
Q. Right.

And these same criteria apply to CAFOs or any other industry that might be polluting; correct?

A. That might be discharging. Correct.
Q. Right. Let's take a look at R-5?
MR. TEBBUTT: Oh, I would like to move into evidence A-22.
MS. BARNEY: Objection on the grounds of relevance.
MR TEBBUTT: It was just established.
MS. BARNEY: No. As Mr. Tebbutt just discussed, this is related to onsite sewage systems. She read into the record what he wanted her to read. There's no reason to submit this entire document.
JUDGE FRANCKS: Do you have a response?
MR TEBBUTT: Yeah. No. I just laid the foundation that this is -- this is her writing about how groundwater quality can be impacted, and it applies equally to CAFOs as it does all other industries.
MS. BARNEY: That has not been established.
MR TEBBUTT: It just was through the question. I submit to you that it was.
JUDGE FRANCKS: I am going to allow its admission and restate my position that the board will give it the weight it deserves.
MR TEBBUTT: As it always does for any document that comes in. Right.
(Exhibit A-22 admitted.)
BY MR. TEBBUTT:

Q. Let's take a look at R-5 again, please. Again, R-5 is a document that you created; correct?
A. Correct.
Q. Let's take a look at page 9, which in the PDF is page 21. I'd like for you to read starting about halfway down that paragraph, "The groundwater quality standards."
A. Which paragraph?
Q. It's under, "Process." "2.1 Process." Where it says, "The general" -- I'm sorry. "The groundwater quality standards." Starting there.
A. "The groundwater quality standards are designed to be preventative in nature and to protect groundwater from contamination."
Q. Keep reading, please.
A. "The goal of the standards is to maintain existing high quality groundwater and to protect existing and future beneficial uses."
Q. All right. You can stop there.
On the column to the right, where it says, "The intent of the standards." That first full paragraph. Do you see that? Can you read that out loud, please?
A. "The intent of the standards is not to allow degradation of groundwater up to the criteria, but rather, it is intended to protect background water quality to the extent practical."

Q. Then I would like you to take a look at page 28 of R-5.

JUDGE FRANCKS: What's the PDF page?

MR TEBBUTT: 40.

BY MR. TEBBUTT:

Q. I would like you to read the paragraph that begins, "Unless a facility," please, which is the left-hand column, second full paragraph.

A. "Unless a facility can demonstrate site specific characteristics which will degrade or attenuate contaminates, it is assumed that all constituents which are discharged to the environment will eventually migrate to groundwater.

"A discharge must comply with the Groundwater Quality Standards at the point of compliance. In most circumstances, dilution by groundwater is not considered an acceptable form of treatment."

Q. Thank you.

Then I'd like to ask you -- A-11. I would like you to take a look at A-11. This is the preliminary draft of the CAFO general permit.

And you have some familiarity with that document, don't you?

A. Yes.

Q. I'd like you to -- on page 5, under S2.A --

A. Yeah.

Q. -- the -- read the second sentence of the first paragraph under S2.A, please.
A. Second paragraph.
Q. Second sentence of the first paragraph.
A. Oh, okay. Okay.
Q. Beginning "Ecology."
A. Okay. "Ecology has determined that if the CAFO has a lagoon that does not have a double geomembrane liner with leak detection system between the liner layers, that it is discharging to groundwater."
Q. And you agree with that statement, don't you?
A. Correct.
Q. Without groundwater monitoring, you won't know what the impacts are to groundwater, will you?
A. Correct.

MR TEBBUTT: Thank you. Done.

JUDGE FRANCKS: Okay. Why don't we take a 10-minute break now. So we'll be back at 10:15. We are off the record.

(Off the record from 10:04 A.M. to 10:15 A.M.)

JUDGE FRANCKS: Ms. Howard, are you going to do the questioning?

MS. HOWARD: I am, Your Honor.

JUDGE FRANCKS: So we're continuing with the

testimony of Ms. Redding.

CROSS-EXAMINATION

BY MS. HOWARD:

Q. Good morning, Ms. Redding.

A. Good morning.

Q. Elizabeth Howard here for the Dairy Federation and Farm Bureau. Let's start at, kind of, a more basic level, maybe.

So the type of lagoons or waste storage ponds that we're talking about here, what -- what type of ponds are we talking about? What sort of industry are we looking at when we're looking at the type of storage facility that is at issue under this permit?

A. So I think Ecology probably uses the term "lagoon" interchangeably with "ponds." But they're for the storage of animal waste.

Q. Are there other types of storage lagoons or storage facilities in Washington State?

A. Yes, there are.

Q. So for purposes of this particular permit, are we only focused on waste storage facilities for animal waste?

A. Yes.

Q. And is that because this permit is directed at the cattle industry?

A. Correct.

Q. Are there different types of standards that apply to animal waste storage facilities than there are for other storage facilities for other industries?
A. Correct.
Q. So let's talk about -- what is it about these storage facilities that actually acts to store what is in the storage pond?
A. So do you mean the liner?
Q. Yes.
A. So there's -- all lagoons are supposed to have a liner, whether it's a geomembrane, the plastic liner, or whether it's a compacted clay liner. They're supposed to have a liner. And in this permit, we talk about the -- we set a permeability requirement for those lagoons.
Q. The permeability requirement for the lagoon liners that we're talking about here is this one times ten to the minus six centimeters per second; correct?
A. Without consideration of manure sealing, correct.
Q. That is reflected in the permit terms specifically; correct?
A. Yes.
Q. S4.D, if I'm remembering it correctly.
A. I would have to verify.
Q. Let's do that really quickly. Let's look at R-1. That's on page 13. It's actually S4.B.

A. S4.B. Okay.
Q. Do you see it there at the bottom of the page?
A. Correct.
Q. So yesterday you talked about -- let's take a look at, actually, R-17. On page 1 of that -- this is an exhibit that was admitted yesterday. It's the guidance on land treatment of nutrients and waste water with emphasis on nitrogen.

On page 1 you were talking about what is AKART, and you talked about that last sentence in that first paragraph.

Do you recall that testimony?
A. Yes.
Q. And you talked about what was most important for AKART for land applications. What's the most important aspect of AKART for the storage lagoons?

You listed out three. Preventing, treatment, or control. Which aspects of that are most important from your perspective for the lagoons?
A. So for land treatment systems or land application, the second part of that sentence is, "The storage of waste water in properly lined lagoons that's produced in excess of a crop's requirement or outside of the growing season."
Q. My question for you -- sorry if that wasn't clear.

Yesterday you had said a particular aspect of AKART was important for land application. I'm asking you about

what is -- out of those three words which you had listed off yesterday, what are the aspects that's most important for lagoons?

A. Okay. So what you're getting at -- so when we're looking at a lagoon design, what's the most important aspect?

Q. Yes.

A. Yes. Permeability is the most important aspect. But there's other important components that relate to that, as well.

Q. How does permeability address the preventing aspect of AKART?

A. Well, so the permeability is actually the -- the -- a constituent of the media that allows it to be transmitted through that media. So it's a property of the media. So it's essentially a property of the liner.

And so with that, we know how much water or manure is leaking out of the lagoon. Seeping out of the lagoon. So that gives us a basis for what kind of a discharge might occur.

Q. And you expect permeability to prevent impacts to groundwater, for example?

MR TEBBUTT: Objection. Leading.

JUDGE FRANCKS: Well, since we're in the world of direct and cross, I think leading can be appropriate. So

I'm going to overrule that objection.

THE WITNESS: So --

MS. HOWARD: Do you want me to restate the question?

THE WITNESS: Yes, please.

BY MS. HOWARD:

Q. Trying to work through the preventing, treatment, and control aspect of AKART, permeability is obviously a term of the permit.

How does the permeability term relate to the preventing aspect of AKART?

A. Okay. I got you. So pretty much everything has a permeability. And if you put enough head on it, the driving force, you will get movement of water through that.

So one of the things that I did back in 1993 was look at what is the permeability of a liner, specifically a Katha liner, and how does that relate to potential impacts to groundwater. I talked about that yesterday.

I used a random mock model to look at what would those potential impacts be. Because Ecology wanted to know which -- what -- what are we talking about, ballpark? Or what's reasonable? And we actually determined that one times ten to the minus seven was in line with protecting groundwater, according to the groundwater standards.

Q. What specifically about that analysis led you to

determine that it would be protective of groundwater?
A. Well, looking at the resulting concentrations in groundwater, and -- so it gives us an idea. But it's not a site-specific analysis. It's just a ballpark kind of thing.
Q. But you thought that -- I'm going to shortcut and say ten to the minus six -- would actually prevent impact to groundwater?
A. Well, it's the combined, ten to the minus six, with the manure sealing. So we're essentially getting one times ten to the minus seven centimeters per second with those two components.
Q. Did you consider whether the permeability criteria in the permit would also have a treatment component to it? This is another aspect of AKART.
A. No.
Q. What about control?
A. Well, by restricting how much manure seeps out of the lagoon, you're controlling the discharge.
Q. So let's go back and talk about the different types of liners.

So can a clay liner achieve a ten to the minus six centimeter square -- I left off the one times ten to the minus six centimeter square permeability?
A. Yes. A clay liner can.
Q. How did you arrive at that determination?

A. Looking at NRCS documents, they -- they've got -- especially the Agricultural Waste Management Handbook -- we've talked about Appendix 10D. But the whole handbook talks about that. And they give very specific engineering design guidelines for how to construct a lagoon. All the different compaction rates. Things that are way out of my league, because I'm not an engineer. So we -- we typically rely on NRCS for those kinds of things.

Q. Let's take a look at Appendix 10D. That's Exhibit R-6.

A. Okay.

Q. Let's look at page 8. The bottom of the page. I apologize. It may not be the PDF page. I think the PDF page may be 10. Under "Definition of pond liner."

You see where it says "compacted clay liner"?

A. So what page --

Q. So look at page 10D-8 on your left-hand corner. That should help you find it.

A. Oh, okay. I got it.

Q. On the PDF, it's page 10. Can you read that first -- sorry we're making you do a lot of reading today.

Can you look at the first sentence there under, "Compacted clay liner." Could you just read that?

A. "Compacted clay liners are relatively impervious layers of compacted soil used to reduce seepage losses to an acceptable level."

Q. When we're talking about seepage losses, how does that -- sorry.

When we're talking about permeability, how does that relate to seepage losses?

A. Permeability is one of the factors that -- that influence -- that's a -- seepage -- the seepage rate is affected by essentially permeability of the liner, the thickness of the liner, the area -- the superficial area of the lagoon, and the hydraulic head. Or in other words, how deep is the manure in the lagoon?

So those four factors really go into determining what the -- what the seepage out of a lagoon would be.

Q. And this statement here is consistent with your testimony just a few minutes ago, that a compacted clay liner can achieve a certain permeability; is that correct?

A. Correct.

Q. Let's look at page 10D-2, which I think is probably going to be page 4 in the PDF. Under, "General design conditions" -- again, I apologize. I'm going to make you read here. Can you just read the first three sentences of that.

A. Under, "General design considerations"?

Q. Yes . Where it starts, "Limiting seepage."

A. "Limiting seepage from an agricultural waste storage pond has two primary goals. The first is to prevent any

virus or bacteria from migrating out of the storage facility to an aquifer or water source.

"The second is to prevent the conversion of ammonia to nitrate in the vadose zone."

Q. So again, it appears that the purpose of the clay liner, again -- if it's to limit seepage -- is to have these two affects -- would you agree that those two affects occur when you have a clay liner of the permeability that's required under the permit?

A. I'm not sure I can agree with that.

Q. What do you disagree with?

A. So I've seen one article that talks about coupled nitrification/denitrification under a lagoon, but there were still significant impacts from that lagoon to groundwater with that study.

And the -- the virus or bacteria -- I'm concerned about viruses because they're very, very small. They're nanogram -- they're, like, nano -- nanometers. They're very, very small.

So I'm -- and I haven't seen studies that have demonstrated that viruses have been removed from a manure storage lagoon. So I -- I can't -- I can't verify that statement.

Q. Did you review the deposition transcript of Mr. Reck?

A. Yes, I did.

Q. Let's look at that for just a moment, if you could. That's Exhibit I-6. Before we do that, actually, I just have a more general question for you.

Did you rely upon the NRCS guidance and literature in your literature review?

A. Yes.

Q. Did you specifically rely on this Appendix 10D in your literature review?

A. Yes.

Q. Did you also rely on other information from the NRCS in your literature review?

A. I must have.

Q. There are quite a few cites for the NRCS in your literature review, were there not?

A. Yeah. Yeah.

Q. Now let's look at Mr. Reck's deposition.

If you'll bear with me, I'm going to read some of this. So --

A. What page are we on?

Q. Let's start on page 32.

A. 32 of the deposition, or 32 --

Q. Well, it should be 32 of the deposition. What page is that for the PDF?

MS. HOWARD: Your Honor, I'm not sure which version you guys have on your screen.

JUDGE FRANCKS: We have -- we have the designated one.

MS. HOWARD: Okay. So it looks like it's page 30.

JUDGE FRANCKS: We just got it recently.

MS. HOWARD: Yeah. I'll give you guys a minute to pull that up.

JUDGE FRANCKS: Now we're ready.

MS. HOWARD: Just bear with me, because I -- sorry. Good to go?

JUDGE FRANCKS: Yes. We are good to go.

BY MS. HOWARD:

Q. Starting on page 11, I'm just going to read through this, so bear with me. Page 32?

A. Excuse me. Page 11 or page 32?

Q. Page 32, line 11.

A. Okay. Got it. Thank you.

Q. I seem to have trouble with my numbers. I apologize.

So the question. "Okay. So turning back to Appendix 10D, can you, in sort of layman's terms, if you will, put into words what the subject of Appendix 10D is."

Appendix 10D is what we were just talking about; correct?

A. Correct.

Q. "Yes. Appendix 10D covers the design of lined or clay liners for an impoundment, a pond, or a waste storage pond."

So question. "If you could just look at -- in your document will be page 3, which is sort of the first page. It says 'Introduction' on it. Does that -- does this appendix -- and again, I'm just looking at the first paragraph there -- does it talk about seepage rates from lagoons?"

So here I am specifically referring to the same paragraph that we were just looking at.

"It does, yes." "And can you just fill us in, if you will, on why seepage is addressed in this Appendix 10D?"

So, answer. "Yes. Historically, NRCS, when we have needed to line a waste storage pond or a waste treatment lagoon, you need to set criteria for what the liner needs to be.

"What is the -- you know, how -- what is the minimum criteria for that liner. That was set at ten to the minus six centimeters per second, historically, is what we want the liner to achieve over time.

"We also knew that when you put in a liner at that hydraulic connectivity, it will -- over time, conductivity will go down because of some manure sealing of the liner. So the hydraulic conductivity was our target for design for clay liners. Compacted liners." Let me just pause there for a minute.

You agree with Mr. Reck, that ten to the minus

seven centimeters per -- I'm just going to keep on fumbling over that -- per second -- that is actually the same permeability that is in the combined CAFO and the --

A. He states ten to the minus six, which is the same as what's in the CAFO general permit.

Q. Okay. That was my question. Thank you.

So let's continue. "Okay. And more specifically, why were you looking, or why was the NRCS looking at the issue of seepage? Was there some concern about seepage from these impoundments?"

"Yes. We -- you -- you line -- you put in a liner underneath a waste storage structure to slow down the seepage out of the waste storage structure and to achieve some other goals, such as filter out pathogens so that pathogens do not -- are not -- do not leak out of the waste storage structure.

"You're slowing down the rate of any nutrients that are in the water that will move through the liner. You're slowing the rate of that nutrient down to the point where groundwater will be minimally impacted."

"What is it about Appendix 10D, or I guess, if you will, back to 313" -- they're refer to Standard 313 -- "that provides these functions? So let's maybe start with the slowing of pathogens."

So again, here, do you understand the transcript to

be talking specifically about this issue of viruses or bacteria migrating out of the storage facilities -- let me ask that question a little bit better. Virus or bacterias -- or another term -- pathogens can encapsulate both of those things?

A. Pathogens are kind of a generic term for bacteria, viruses, and there's other kinds of larger ones. So there's --

Q. Yeah. So that would include -- pathogens includes virus and bacteria?

A. Well, it's a generic term.

Q. Perfect.

Then you asked me to restate the question. We read it back, and then the answer. "A compacted clay liner is a soil that's been -- it's -- it's a mixture of, you know, sand, silt, and high end clay that has been compacted to the point where the particles are very close together, and that slows down the movements of water through the liner.

"And the spaces between the particles is so small that no solids can get through the liner. And that -- the fact that no solids can get through the liner effectively filters out all particles, including any microorganisms."

So would you say you disagree with Mr. Reck's testimony there about the liner preventing or -- let me make sure I get it correctly -- -- preventing the seepage of

microorganisms or pathogens through the liner?
A. So I have not seen any literature that specifically addresses viruses, because viruses are very small. That's -- that's one of the things that we were looking for in the literature, was scientific evidence.
And Mr. Reck may have experienced, but until I see scientific research that talks specifically about viruses -- because they are so small -- I would have a hard time assuming that they have been filtered out.
Q. So you didn't find any literature, but let's look back at what Mr. Reck based Standard 313 and Appendix 10D upon. So that is also in the transcript.
Let's -- so let's look at page 21 of the transcript. Here we're talking about Conservation Practice Standard 313.
Are you familiar with that standard?
A. Yes.
Q. Do you have an understanding about how 313 interfaces with Appendix 10D?
A. My understanding is Appendix 10D is sort of the how-to.
Q. Yes.
A. And the -- 313 is sort of the high level -- "This is the performance standard we want you to meet."
Q. Right.
A. Is that correct?

Q. Yes. And I believe that was Mr. Reck's testimony, as well.

So here we're asking Mr. Reck to comment on -- I'm just trying not to have to read the whole thing in here. So hold on just a minute.

So here -- starting on page 21 of the transcript, line 11, I was asking him a question about developing this standard, and there was -- I was referring to the 313 standard. So let's -- "Thank you. I appreciate that clarification. So in developing this standard" -- and again, I'm going to represent to you that I was asking about 313 -- "did NRCS look to any particular research to determine the basis for the standard?

"So, yes, "is the answer. "As one of my job responsibilities, I am to stay on top of current literature having to do with our standard. So I am constantly reviewing pertinent literature, as well as we go through an extensive review process, both internal and external, and as a part of the revision cycle."

My question. "And would you say that research literature information that you have is the full basis for the standard, or are there -- is -- are there other considerations you take into account in developing the standard?"

Answer: "There are other considerations."

Question: "What are they?"

"Like I said, we go through a process of review with internal engineers who are using the standard at the State level, as well as we put the standard out for revision on the federal register and notify the public that we are revising the standards and take comments, as well as discuss -- have discussions with other professionals, the university professors. I've met with ARS scientists. That's the Agriculture Research Scientists, another branch of the USGS."

Question: "Would you say the NRCS's implementation of the standards over the years has been something that you also draw on for purposes of developing or revising the standards?"

Answer: "Definitely. NRCS maintains whenever there's a failure of a lagoon, we do extensive reviews of what was the cause of the failure. We have a series -- you know, we basically create an engineering report of what happened. And those reports are provided to the discipline leads for the standards that we need for review and for potential changes to the standard as a result of those failure reports."

My question. "And that information is incorporated into your determination about what the standard will be; is that correct?" "That's correct."

Sorry. That was a little bit long. But I wanted to confirm, if you will, that there is extensive research, analysis, experience, information, and input that goes into the background of the NRCS standard.

So with that in mind, would you say that when Mr. Reck is talking about the impact of these liners, that there is extensive information that goes into his statement that there will not be a seepage of pathogens through the liner?

A. I guess my concern is that I'm looking for specific research. I'm looking at -- when he talks about pathogens, that's a generic term. So bacteria are rather large. Viruses are very small. So bacteria might be attenuated, but I have concerns about viruses, which are very, very small.

And -- and before I can agree with his statement -- no doubt he's done extensive research. I'm not questioning that. But I'm -- I'm questioning what exactly was the specific research on manure lagoons with viruses.

Q. But you're not disputing that he did -- that this standard is based on extensive research, literature review, and experience?

A. No. I'm not doubting that.

Q. Okay.

And Appendix 10D does specifically say that one of the goals of the liner is to prevent virus or bacteria from

migrating out of the storage facility; correct?
A. Correct.
Q. Then you were also talking about the second statement back in Appendix 10D. "The storage is to prevent conversion of ammonia to nitrate in the vadose zone." We talked about the vadose zone. Just to make sure everybody's familiar about -- with that term, where is the vadose zone?
A. It's the unsaturated zone.
Q. Would that be located beneath the lagoon? Would you find that beneath the lagoon?
A. So you have the land surface, and you have groundwater, and in between there, is the unsaturated zone. And so the unsaturated zone really -- it depends upon what part -- how much seepage is happening out of the lagoon. Whether it's -- at what point it's saturated and what point it's unsaturated.
Q. And that unsaturated zone, again, is the vadose zone?
A. Correct. Correct. Sorry.
Q. No. That's fine.
So let's turn back to Mr. Reck's testimony. You said that you didn't agree with that statement; is that correct?
A. What I -- what I stated was because I have concerns about viruses, I would want to see specific research looking at that. And I think his comments are fairly generic.

Q. But I'm asking you about this other statement. The statement -- the second purpose of -- for limiting seepage through the liner. Let's look back at Appendix 10D. Sorry if that wasn't clear.
A. I'm sorry. I was confused.
Q. Right.
It says, "The second purpose, if you will, is to prevent the conversion of ammonia to nitrate in the vadose zone." That's another reason for limiting seepage.
Do you disagree that that is a purpose for limiting seepage through a liner?
A. I don't disagree with that as a purpose.
Q. Okay.
Would you say that is consistent with Mr. Reck's testimony, that the liner does accomplish that limitation?
A. So I can't say adequately. I've stated that I've seen one scientific research article on that. And so one -- I've seen one out of 170 that I reference in my literature review.
So I would -- I would want to have a broader base before I can say unequivocally, yes, I agree with that statement.
Q. Okay. That's fine.
Let's look at where he's talking about that in his declaration. Deposition. Let's turn to page 41 of the

deposition, line 11. Here we're actually talking about the -- specifically about the same paragraphs, so it will make it a little easier to follow.

My question. "Yes. It says limiting seepage from an agricultural waste storage pond has two primary goals. Do you see those?" "Yes. In that paragraph we were just talking about."

"Okay. The first is to prevent any virus or bacteria from migrating out of the storage facility to an aquifer water source. We've already talked about that a bit. And then it says the second is to prevent the conversion of ammonia to nitrate in the vadose zone." I trailed off a lot during this deposition. You'll see that a few times.

Okay. Sorry. "In the vadose zone," which I then spelled out.

"Can you explain that that second goal, if you will, how -- how limiting seepage relates to the goal of preventing conversion of ammonia to nitrate?" Again, they didn't hear me very well. So let's skip down to line 15, which is the answer.

"Yes. In the soil there are microorganisms that will convert ammonia to nitrate in the presence of oxygen. There are also other microbes that, in the absence of oxygen and the presence of nitrate, can convert that nitrate to --

eventually to nitrogen gas. That process" -- sorry. "That process -- if you -- what we believe happens when you are -- when the seepage rate is too fast, the thing that you need for microbes to make that conversion, you need the presence of microbes. You need a food source. And then you need the -- you need carbon and you need the nitrogen.

"When the seepage rate is too fast, we think the nitrogen gets flushed below the zone where there's microbes too quickly, and the microbes are not able to work on and treat the nitrogen and basically convert it from ammonia to nitrate, and eventually to nitrogen gas. By slowing down that rate you give that zone underneath the liner -- you give the microbes in that zone an opportunity to further treat the nitrogen that moves through the liner in the ammonia form."

"And is that process" -- this is my question -- "if you will -- one of the considerations that NRCS takes into account in putting together the CPS Standard 313?"

"So, yes, and no. Historically, we didn't know that process that occurred. We knew that putting in a liner at that rate impacted groundwater quality in a positive way.

"More recently, research has gone on that helped us to understand, you know, what actually happens microbically in these waste storage ponds."

Then I asked him if we could turn to -- let's go

ahead and do that for our purposes here -- to R-20. So if you could turn to R-20.

So let me ask you, are you familiar with R-20?

A. I am.

Q. What is this document?

A. This is the research article that I mentioned just a few minutes ago, that I had seen one research article that talked about this coupled nitrification/denitrification occurrence underneath a lagoon.

Q. What does "coupled nitrification/denitrification" mean?

A. So essentially, manure has two primary forms of nitrogen. There's -- there's a bunch of different forms. One of them is organic nitrogen, and one of them is ammonia. Those are the primary forms.

In order for ammonia to convert to nitrate, it has to have an aerobic environment. Oxygen. And before the nitrogen -- the nitrate can be denitrified into a gas, it has to have anaerobic conditions.

So what they're suggesting in this article that's happening is first you have an aerobic situation that converts it from ammonia to nitrate, and then an anaerobic condition that converts is from nitrate to nitrogen gas.

Q. You also discuss that same process in a paper that you've written; correct? You can say, "I don't know."

A. Can you -- I -- I discussed the nitrogen cycle in the

literature review.
Q. Earlier today we were talking about -- let's look at -- well, we have it as I-23. Is that easier to get to, rather than --
A. It's right here. Oh, I-23.
Q. This is the paper that you wrote estimating potential impacts to groundwater quality from nitrogen loading?
A. Yes. For onsite sewage systems, yes.
Q. Do you remember talking about a similar sort of process that can occur?
A. Yes.
Q. So the -- so have you seen that sort of a process occurring in Washington State?
A. I haven't done the research specifically to -- where I've noted that.
Q. But you talked about in this paper that it's a process that can occur?
A. Yes.
Q. Is it a process that can occur underneath manure lagoons?
A. Well, this is the -- the one study that I've seen that -- that I can recall that talks specifically about manure lagoons.
Q. Let's actually look at -- when you say "this study," you're talking about --

A. Baram 20.
Q. Baram --
A. Baram 12.
Q. I'm glad you said that because I'm never quite sure how to pronounce his name.
So Baram is the primary author on that?
A. Correct.
Q. You've read this article?
A. I have.
Q. Have you read it recently? Are you familiar with its contents?
A. I'd say it's been a couple months since I've read this.
Q. Let's look at page 7.
MR TEBBUTT: Your Honor, I'm going to object to this line of questioning. This is one of those very specific issues that we objected to before. The Baram study was done after all the NRCS 313 stuff was created.
So this is expert testimony by Mr. Reck. It's an attempt at expert testimony by Mr. Reck about a post-NRCS 313 study that has nothing to do with it. So this is exactly why this stuff should not be coming in through Mr. Reck.
MS. HOWARD: Your Honor, when we were asking Mr. Reck about the question -- I can read it a little bit more -- you'll notice that Standard 313, actually, was most

recently revised in 2016 or '17, I want to say.

So that, obviously, post-dates this 2012 study. And if it's helpful, I can continue to read into the record what he said about the study, and then we can come back to this question.

Would that be useful?

JUDGE FRANCKS: I think I'm going to just allow it. I think that with the revision, I think all of this is relevant.

MS. HOWARD: Okay.

BY MS. HOWARD:

Q. So we're going to give this a shot, Ms. Redding. If you aren't familiar enough with the study, please let me know and we'll move on in our questioning. Okay?

Looking back at the Baram article on page 7, that middle paragraph.

A. Okay. So the pages are -- start at 1623.

Q. It will be 1629 on yours. It's page 7 in the PDF.

A. Got it.

Q. You see that middle paragraph on the left-hand column? He's talking about examination of different forms of nitrogen. Profiles from other studies on seepage from earth and waste lagoons, and he refers to Ham and DeSutter. Ham and, again, DeSutter, and a few others throughout that paragraph, and a few other variations of those studies.

Do you see that there?
A. I do.
Q. Do you recall, does Baram rely upon those studies, as well, to conclude that coupled nitrification/denitrification occurs under lagoons?
A. So he's referencing Ham and DeSutter and Ham. But he's talking about ammonia profiles. And -- wait a minute. so --
Q. If you -- so -- that's okay. If you don't know the answer to this question, we can move on, if it's too specific about this particular study.
A. I don't know that Ham and Ham and DeSutter actually looked at the coupled nitrification/denitrification phenomenon.
Q. But in this paragraph he's explaining how he went back and relooked at those studies, and if you look at the bottom, he says, "Our calculation showed that in all of these studies, regardless of the clay content, greater than 90 percent of the end mass was removed."
Do you recall reading through this particular paragraph where he's talking about recalculating and relooking at those studies to make that determination?
A. I see that.
Q. And that it was supportive of his results and conclusions in the study that coupled

nitrification/denitrification was occurring beneath lagoons?
A. I see that.
Q. Okay. And let's look back at Mr. Reck's testimony -- his deposition testimony -- where he's talking about the 2012 publication, as well. This is back on page 44, line 9.
And he says -- I'm sorry. My question. "This document is a 2012 publication from the "Journal of Environmental Quality." Its author is, I think, Baram and others. And it's titled, "Infiltration Mechanisms, Controlled Nitrification/Denitrification Under Dairy Waste Lagoons."
I asked him if that was the document he had in front of me -- in front of him. He said, "Yes, it is."
"Are you familiar with this?" "Yes. Yes, I am."
"And does this particular paper speak to the processes that you were just describing under impoundment structures, liquid waste impoundment structures?"
"Yes, it does."
"And was this document one of the documents, if you will, that you were referring to when you said you now know or now understand from research more about what's going on underneath impoundment structures built to Standard 313?"
And what does he say in response to that? What is his answer? Line 6.
A. Oh, okay.

Q. I'll let you read for a minute here.
A. "This paper and other similar papers like it confirm for us the process that was occurring underneath liners. It -- it describes in more detail what we suspected."
Q. And my question was, "Is there any sort of a technical term that you would refer to that process by?" And what does he say?
A. "The author in this particular paper refers to it as 'coupled nitrification/denitrification process.'"
Q. So it does appear from this testimony, at least, that NRCS does have research and studies to support its view that nitrification/denitrification is occurring underneath lagoons.

Is that a fair assessment of the testimony?

A. Yes.
Q. If nitrification/denitrification is occurring under a lagoon, would that mean that some of the nitrates that make their way through the liner, if you will, would not make their way to groundwater?
A. Well -- so I do remember reading one -- an article that was talking about denitrification that happens under a lagoon, and they stated that -- this document specifically was looking for conditions where you would find that to test their hypothesis.

And while it can reduce the amount of nitrogen,

this study actually notes that there was -- I'm trying to look for the concentration. I believe it was something like 73 milligrams per liter increase in groundwater.

Q. Right. My question is more general for you.

My question is --

A. Oh, I'm sorry.

Q. -- if nitrification/denitrification is occurring under a lagoon, would that mean that nitrates that are seeping out of the -- that they are seeping out of the lagoon, some of those nitrates would not make their way to groundwater.

Is that correct, if that process is occurring?

A. Correct.

Q. So that might be another explanation for why seepage out of a lagoon wouldn't necessarily have a negative impact on groundwater; is that true?

A. Correct.

Q. So let's talk a little bit more about the NRCS Standard 313.

Are you aware that that standard -- let me make sure, actually, that it's real clear what Standard 313 is.

Is Standard 313 a standard for animal waste lagoons?

A. That's my understanding.

Q. And it's NRCS's standard. It's their Conservation Practice Standard for animal waste storage lagoons?

A. Correct.
Q. And I'm going to use the term "lagoon" loosely. I realize it's not precise, but I think that's what we're all referring to when we're talking about these manure storage lagoons or storage treatment.
A. Correct.
Q. So was Standard 313 the standard that was used for manure lagoons in the 2006 CAFO permit for Washington State?
A. I don't know.
Q. Let's take a look. This is Exhibit R-18. Look at page 21. Page 21 of the document -- I think it's also page 21 of the exhibit on the PDF. We can actually start on page 20.
Do you see there the reference under S5, "Waste Storage Facilities"?
A. Okay.
Q. Sorry. If I'm going too fast, let me know.
A. No. I was looking at "Termination of Coverage." So I was a little confused. But I see where it is now.
Q. Let's look at the waste storage facility term.
A. Okay.
Q. S5, page 20. Do you see that there?
A. I do.
Q. Then actually, if you'll turn to the next page, page 21.
A. Okay.

Q. What does that say for that -- in that first paragraph?
A. The top paragraph says, "All new or expanded waste storage facilities constructed after the issuance date of this permit must be sited, designed, and constructed consistent with NRCS Conservation Practice Standard 313 for Washington titled 'Waste Storage Facility.'"
Q. So does that appear to require Standard 313 as the standard for waste storage facilities in the 2006 permit?
A. Yes.
Q. Do you know why Standard 313 wasn't used in the current permits?
A. No, I don't.
Q. Would you agree that if Standard 313 was included in the 2006 permits, that it would have had to have gone through an AKART analysis?
A. You know --
MR TEBBUTT: Objection. Foundation.
JUDGE FRANCKS: I'm going to overrule that. I think she can answer whether she knows or not.
THE WITNESS: I wasn't involved in the development of the 2006 permit. So I can't say what -- how this got in or why it's in or what the process was that it went through. I just can't speak to that.
BY MS. HOWARD:
Q. As a matter of practice, would a term like this have

become a technology component of a permit if it hadn't gone through an AKART analysis?

A. Again, I wasn't developing that permit, so I really can't speak to that.

Q. In the 2017 permit that you went through in order to determine whether to fit technology into the permit, did you go through an AKART analysis as part of the group developing the permit?

A. Well --

Q. I think you've already testified that you guys -- that you did evaluate whether technology would be AKART or not before it went into the permit, or at least Mr. Jennings testified to that; correct?

MR TEBBUTT: Your Honor, I think the witness should be allowed to answer the first question.

BY MS. HOWARD:

Q. If you can.

A. So can you repeat the question?

MS. HOWARD: I don't remember it now.

(Record read.)

THE WITNESS: I think I was confused on the 2006 permit. So for the 2017 permit, yes, there was an AKART analysis done.

BY MS. HOWARD:

Q. Would it be fair to assume the AKART analysis would

have been done when developing the 2006 permit?

MS. BARNEY: Objection. The witness already said that she wasn't involved in the 2006.

JUDGE FRANCKS: I'm going to sustain that.

BY MS. HOWARD:

Q. Have you been involved with developing general permits before this particular permit?

A. Yes.

Q. And as a matter of practice, does Ecology do AKART analysis before it puts a treatment term into a permit?

A. So my experience with the permits that I've worked on has been from -- it hasn't been like this holistic, looking at every single piece.

I've helped with the water treatment general permit in a very limited way, and with a much earlier version of the CAFO permit back in the 1990s.

But specifically, the AKART process, whether it occurred, I couldn't say because my involvement may have been different than what the permit team did.

Q. I understand that that is your experience. I'm asking more generally, based upon your experience, is your experience that Ecology goes through an AKART analysis before it puts a treatment term into a permit, in your experience?

MR TEBBUTT: Objection. Asked and answered.

MS. HOWARD: I think it's a different question. At least I'm trying to make it a different question.

JUDGE FRANCKS: It's a different question, but I think this needs to be the last one. Because I think we are covering the same ground. But you can answer that one.

THE WITNESS: I would like to defer this to either John Jennings or Bill Moore, who are actually in the Water Quality Program, who actually work with permit development. I think that's a more appropriate question to them.

MS. HOWARD: Let's do that so we can move on.

BY MS. HOWARD:

Q. Would you say that the NRCS standards for lagoons does meet -- is a known standard?

A. Yes.

Q. Known technology?

Would you say that that it is also an attainable standard? Meaning, that it's something that a permit holder is able to do?

A. Yes.

Q. Would you say that it's also a reasonable standard?

A. Yes.

Q. Is that the definition of AKART? Is that the definition --

A. Those are different -- those are key components in -- in AKART. But --

Q. We already talked about the fact that a lagoon liner is also -- addresses the prevention part of AKART; correct?
A. Correct.
Q. Would you agree that the NRCS standard for lagoons is used across the nation?
MR TEBBUTT: Objection. Lack of foundation.
MS. HOWARD: I'm just asking for her understanding about this particular point.
JUDGE FRANCKS: I'm going to allow her to answer it.
THE WITNESS: Yes. That's my understanding.
BY MS. HOWARD:
Q. When you reviewed Mr. Reck's testimony, is that also what he said?
A. Yes. That's what he states.
Q. Let's turn to -- let's look at the 313 standard. That's, again, Exhibit R-9. Let's turn to page 3. I'm going to ask you to work off of memory here for just a moment, going back to the permit terms.
The permit term has a two-foot vertical separation term regarding liners; is that correct?
A. Correct.
Q. And that is measured from where? Where is that -- where is the two-foot vertical separation measured from?
A. That is from the bottom of the outside of the lagoon

liner to the top of the water table.
Q. Does the NRCS standard, if you know, also have a two-foot separation requirement in it?
A. Yes, it does.
Q. Let's look at that. This is, again, Exhibit R-9, page 3. See the language? It's about two-thirds of the way down. "Design bottom elevation."
A. Yes.
Q. I'm going to make you read this time, if that's okay. Can you just read that first sentence?
A. "Design bottom elevation. Locate the impoundment bottom elevation a minimum of two feet above the seasonal high water table, unless special design features are incorporated that address buoyant forces and how much seepage rate and nonencroachment of the water table by contaminants."
Q. Do you understand -- and again, if you need to refer back to Mr. Reck's testimony -- the reason for that two-foot separation in the NRCS standard?
A. I believe he cited, predominantly, buoyant forces.
Q. Let's look at that really quickly, so we can be more clear about that. Okay. This is page 61, line --
A. Wait a minute.
Q. I'm sorry. This is Exhibit I-6.
A. I've got it sitting in front of me.

Q. You're good. No. I'm glad you slowed me down.
A. Page 61.
Q. Exhibit I-6, page 61, line 20. This is my question. So right below that foundation discussion in Appendix -- or excuse me -- in Standard 313 is a paragraph that starts, "Design bottom elevation." So we're talking about the exact same paragraph here.

Do you see that?

A. Yes.
Q. And if you don't mind, would you read that paragraph, just for ease of the court reporter reporting. And I am not going to repeat that now. So let's skip down to line 11.

"Thank you. And I'd like to focus in on the language 'impoundment bottom elevation.'

"Can you explain where that is on -- I'm just going to use the term 'lagoon' for simplicity -- where is that located?"

"So, yes. That term is -- NRCS uses it, again, where the water stops and the liner begins. So it is the bottom of the water and the impoundment. And let me try this a different way." We then use a visual to have him explain what I talked about with Mr. Jennings yesterday about where that was.

And let's skip down. Let's skip down to page 67, line 18. And I apologize. I'm not sure what page this is

in the PDF.

MS. HOWARD: Are you guys finding this okay? No? Okay. What page is that in the PDF?

JUDGE FRANCKS: 66.

MS. HOWARD: Page 66. So it's off by a page, then. Line 17. I'm sorry. Line 18.

BY MS. HOWARD:

Q. Okay. "Looking back at the actual 313 standard itself, the design bottom elevation talks about a minimum of two feet and impoundment being a minimum of two-feet above the seasonal high water table.

"What is the purpose for that requirement, if you will, the 313 standard?"

To which he answers, "Primarily, the purpose is structural stability of the liner. If the water table is too, high several things can happen. If you have a geomembrane you can get what you call 'hold wails,'" which we confirm was correct, "which is trapped air under the geomembrane.

"If you have a clay liner and you have a water table elevation that's higher than the water level in the pond -- for example, when you empty out the pond. If you have a high water table, you can have buoyant forces that can cause basic structural failure of the clay liner.

"So first and foremost is structural stability of

the liner, and there are a couple of ancillary other than" -- excuse me -- "a couple other ancillary benefits.

"Number one, if you have a liner and you have a water table below that liner, it's a clay liner, you will actually see -- you know, you can reduce the seepage rate. Because as water moves down, when you move from a higher -- or slower hydraulic conductivity layer to a higher hydraulic conductivity layer, you will actually have water buildup, and that interface will stop before it moves. So there can be some slowing of the water down. Those are the two primary reasons."

So would you agree that Mr. Reck is describing the purpose of the design bottom elevation to be primarily for protection of the structure itself?

A. Yes. And I believe that's what I stated. That the -- his -- his definition of the use of the minimum vertical separation is for structural integrity.

Q. And the two-foot separation in the permit, is it measured from a different location than where this Standard 313 is measured from?

A. It is.

Q. Okay.

And what is sort of the variance of that difference?

A. So we're looking at the bottom of the outside of the

lagoon. And again, this is for treatment of viruses, because you need that unsaturated zone. And particularly --
Q. Pardon me. That's your view of what that purpose is for. That isn't consistent with Mr. Reck's view; correct?
A. Correct.
Q. As we read earlier?
A. Correct.
Q. So the two-foot difference just specifically -- I'm trying to get a sense of how the permit standard, given where it's measured from for, the two-foot vertical separation -- what the difference is between that and the NRCS standard, and where the two-foot vertical separation is measured from.

So what's kind of the variance in the -- in the spacing, if you will?
A. So I think -- I think the concern is that -- so say you have -- if we were to -- to measure from where Mr. Reck says and the NRCS, from where the water stops at the top of the lagoon, and say you have a two-foot liner, you would --
Q. I'm asking you -- I'm sorry. It was probably a bad question.

But the -- the question I'm asking, so what is the typical size of a clay liner? You talked about this yesterday in your testimony.
A. I don't think that I did.

Q. Okay. Let's look at that really quickly. Let's look back at Appendix 10D. This is Exhibit R-6. I'm sorry that I'm asking you bad questions. So bear with me just a minute. I would blame it on my eye, if I could. Wrong document. Let's try a different one.

A. Okay.

Q. I-14. If you could look at page 2. This is an exhibit we entered in earlier. I-14 is the NRCS Conservation Practice Standard 520, and this is for pond sealing or lining compact -- compacted soil treatment.

Let's look at page 2. At the top you see Table 1.

A. Yes.

Q. Have you seen that table before?

A. I may have. I don't recall.

Q. I thought you had testified yesterday that you had taken a chart from NRCS regarding the liner thickness and it was in your literature review.

Do you recall that testimony? No?

A. I don't think that this table -- if I stated that, I don't think this is the table I was referring to. But I'm not remembering that statement off the top of my head.

Q. Okay.

So let's just look at this table, and what is it describing here, Table 1?

A. Minimum liner thickness by design storage depth.

Q. And what is the variation in liner thickness?
A. 12 inches to 24 inches.
Q. So would you agree that those are typical sizes for a clay liner under a manure lagoon based on the analysis that you've done for purposes of developing this permit?
A. Well, again, I don't know that I quantified what liner thicknesses were in the process of doing the permit development. It states here that the liner thickness is anywhere from one foot to two feet.
Q. Okay. So let's say that it is a two-foot clay liner.
A. Okay.
Q. If we compared the NRCS standard with the State standard for the two-foot vertical separation, how many more feet would existing lagoons have to add in order to meet the State standard?
A. Well, this essentially -- like, if we were to assume that the liner thickness was two feet, it would be essentially saying there's no vertical separation between the liner and the top of the water table.
Q. Right.
So how many feet would you have to add in that particular situation in order to meet the State standard?
A. Two feet above unsaturated zone.
Q. So in that particular situation, if you had a two-foot clay liner, it would be in compliance with the NRCS

standard, but not in compliance with the State standard; correct?

A. Well -- and to be clear, the NRCS are guidelines rather than standards.

Q. Well, they're called "Conservation Practice Standards," so I'm using that nomenclature.

A. Well, but they're not -- in terms of -- I think there's a difference between a NRCS standard and a State standard, and I think John went over that in his testimony.

Q. I understand that. I'm just trying to compare the two right now.

A. So there's a difference between what NRCS is saying and what the 2017 general permit for CAFO is saying.

Q. And if a clay liner is typically -- let's say -- let's say it's the two foot that we're talking about here, would an existing lagoon -- if it met the NRCS standard, would -- in order to comply now with the State standard, would you have to add an additional two feet in order to meet the two-foot vertical separation required under the permit?

A. If there was no vertical separation between the bottom of the lagoon, the liner, and the water table, that would be a direct discharge of manure into groundwater.

Q. I understand that's your opinion. But my -- my question --

A. Okay. So, yes.
Q. -- is simply talking about the structure itself.
So under the State standard, you have to have two feet of separation from the bottom of the lagoon liner to ground -- the high groundwater table; correct?
A. Correct.
Q. Okay.
Right now, if under the NRCS standard that is not a requirement -- you have a lagoon right now that meets NRCS standards and that is not the requirement -- correct? We've established that.
Is that correct?
A. Correct.
Q. So if you have to now add on this additional two feet of vertical separation under the CAFO permit, are you not having to he create an additional amount of liner, if you will, or additional amount of soil in your lagoon in order to meet the State standard?
A. Well, okay. So I guess I'm thinking that -- I guess I'm thinking that if -- if a lagoon were constructed into the water table, that would be an issue.
So there's -- there's -- you're saying if that is the case, would they have to do some modifications in order to create that two foot of unsaturated zone to comply with the permit?

Q. Well, does the NRCS standard actually allow you to build a lagoon into the seasonal groundwater table?
A. But that's exactly -- if the liner intersects the water table, then that --
Q. My question was whether the NRCS standard allows you to build a lagoon into the groundwater table? Yes or no? Do you know?
A. Well, okay. So there's two things here. One, I'm looking at this table that says a liner thickness of two feet. So that conceivably could be you have two feet, and that's your vertical separation to the water table. Then that would be constructed right up to the water table.
Does the NRCS say you shouldn't do that? Yes.
Q. Thank you. That was my question.
A. Okay.
Q. Let's put a visual up. Maybe I can ask my question better that way.
Let's go to R-7, Appendix C. This is what we were looking at with Mr. Jennings yesterday.
A. Okay.
Q. That appears to be page 29 in the PDF. So looking at Appendix AC, do you recall this figure from testimony on Monday?
A. Yes.
Q. Again, the NRCS standard requires a two-foot separation

be from Point 1; is that correct?
A. So when I read this document --
Q. We already established this, I believe, with the testimony on Monday.
Is Point 1 the impoundment bottom elevation?
A. Point 1 is the bottom of the liquid, the top of the liner. Yes.
Q. So and is that what you consider to be the bottom of the lagoon liner?
A. No.
Q. Where is the bottom of the lagoon liner?
A. The small number "2."
Q. So when you're measuring the two-foot vertical separation, where are you measuring from under the permit terms?
A. From the little "2" down to the top of the water table.
Q. So if there is a one-foot clay liner between Point 1 and Point 2, would you agree that the State standard is requiring an additional amount of construction in the lagoon in order to make a two-foot vertical separation from what the NRCS standard requires?
A. Yes.
Q. Thank you. I'm sorry I was not asking a very good question before.
Let's look again at the permit terms. Let's look

at Part 1, page 36. This condition is S7B.

What is this condition for?

A. Existing lagoon assessment.

Q. What is the assessment that's required for existing lagoons?

A. Essentially, we're asking permittees to use the Washington NRCS Technical Note 23 to do an assessment of their existing lagoon.

Q. The fourth paragraph down in that section says -- it says what?

A. "If the lagoon assessment determines that there are less than two feet of vertical separation from the bottom of the lagoon liner, as measured from the outside of the liner, and the water table, including seasonal high water tables, the permittee has six months from completion of the lagoon assessment to develop a plan to address this deficiency."

Q. You can stop there.

The lagoon assessment that's listed there, is that developed under Tech Note 23?

A. Correct.

Q. Let's look at Tech Note 23. I'll get you an exhibit number real quick. R-10. Let's look at -- so it's -- does this one have page numbers on it? Page 22 in my version.

Do you have page numbers on the bottom?

A. Yes.

Q. Here we're looking at Tech Note 23. Can you see the chart on page 22?
A. Yes.
Q. What does the chart appear to be referring to?
A. It's -- the title is, "Waste Storage Pond Practice Standard Compliance Report Form."
Q. And the next -- the gray shaded portion of the chart there, what does it say?
A. "NRCS Practice Standard 313 Compliance Check."
Q. Does it appear that Tech Note 23, then, is relying on NRCS Practice Standard 313 to determine whether a lagoon is in compliance?
A. Correct.
Q. And Item No. 9 there, can you read -- read that?
A. No. 9 is, "Separation distance from waste storage pond bottom and seasonal high groundwater table."
Q. So would you agree if you're using the NRCS Standard 313 to look for separation between the storage pond bottom and the high groundwater table, would you come up with a different answer as to whether you're in compliance using the 313 standard than you would if you were using the permit standard?
A. Yes.
Q. But the permit does rely on this particular checklist in order to determine whether or not the lagoon is in

compliance; correct?
A. Correct.
Q. Let's look at Exhibit R-5. If you don't mind turning there, please. We've already talked about this a bit. This was your implementation guidance for groundwater quality standards.
A. Okay.
Q. Can you turn to page 25 in the document, and I think it's page 40 -- page 37 in the PDF. There at the bottom of that, 4.2.4 -- nope. 4.2.1.4.2 -- you had have fun with numbers on this document, didn't you? Let's see.

There at the bottom you make a statement. What's the last sentence there? The last complete sentence.
A. Okay. "All liners leak to some extent."
Q. Does that mean that all liners cause pollution of groundwater?
A. That's not what that sentence says.
Q. What's the distinction?
A. You can have seepage out of a lagoon. You can have a discharge. But that's different than an impact to groundwater, and then that's also different from pollution of groundwater.
Q. So just saying that a lagoon leaks doesn't necessarily mean that a lagoon pollutes.

Is that a fair summary of what you just said?

A. Correct.
Q. And you are the author of this document; correct?
A. Correct.
Q. When you are evaluating that question about whether liners leak -- if you could just turn to the next couple pages.

On page 27, which is page 39 on the PDF, do you see an equation in the middle of that page?
A. Yes.
Q. What is that equation?
A. It's essentially Darcy's law from looking at seepage from a lagoon through the liner.
Q. When you were evaluating that question about whether liners leak, did you rely on this particular equation here in this document?
A. Yes, I did.
Q. We had also talked about a couple of -- well, I think one study, in particular, the Erickson study.

Do you recall talking about that yesterday?
A. Dennis Erickson?
Q. Dennis Erickson.
A. Yes.
Q. And that was a study of four lagoons, if I remember correctly. Let's turn to that real quickly. I think that's R-11.

The results of that study -- again, I think you summarized them yesterday, but just for helping us to keep track here, there were four different lagoons evaluated, and did all of those lagoons cause pollution to groundwater?
A. He found that in -- that three of the four lagoons that he studied, that there were impacts to groundwater.
Q. Let's look at the chart on page 41 of that document. Page 51 on the PDF. Sorry about that.
Do you see the column that says "Leakage Detected"?
A. Yes.
Q. Out of those lagoons that were evaluated, did all of them have leakage detected?
A. No. The Sheridan Dairy in Lewis County did not have leakage detected.
Q. The remark right next to that says what?
A. "Designed with SCS assistance."
Q. Do you know what "SCS" stands for there?
A. It was -- it was what was formerly called the "NRCS data." They've changed their name.
Q. Was it Soil Conservation Service?
A. Yes.
Q. The lagoons above that, what was the comment about leakage detected?
A. "Leakage detected: Yes."
Q. And the column to the right, the remarks there. Do any

of those say that those were designed to NRCS standards or SCS standards?

A. The -- the remarks are, "Designed and constructed without SCS assistance."

Q. Right.

And my question was whether -- good point. But the question is really -- I mean, from these remarks, does it appear that any of those lagoons were designed to SCS -- or what are now NRCS standards?

MR TEBBUTT: Objection. Calls for speculation.

MS. HOWARD: I'm just asking her to look at the statements and tell us what she can discern from those statements.

MR TEBBUTT: Pure speculation.

MS. HOWARD: I don't think so. She can read those and determine whether or not they say that NRCS standards were used.

JUDGE FRANCKS: I'm going to allow her to the best of her ability.

THE WITNESS: So there's essentially four different lagoons that were looked at. Or -- or facilities. And one of them had a settling pond and a main lagoon.

So the first one, they detected leakage and it was designed and constructed without SCS assistance. The second one, leakage was detected, and it says, "Originally designed

with SCS assistance. Lagoon was widened without SCS assistance."

Third one, "leakage detected: Yes." It was designed by SCS, but construction was not overseen.

BY MS. HOWARD:

Q. Again, I realize these are just the remarks in the document. From those remarks, does it appear that these lagoons -- is there any indication from these remarks that those lagoons were designed to SCS or NRCS construction standards?

A. It's tough to know with the first two because it says that SCS wasn't involved. The second one says it was involved with the design, but I think there's -- they don't know how exactly it was constructed. So I can't speak to whether or not it was actually designed and constructed that way.

Q. There's no affirmative representation here --

A. No.

Q. -- that it was designed to NRCS standards?

A. So I can't speak to that. Then the last one, no leakage was detected, and it was designed with SCS assistance.

Q. Okay. Thank you.

Earlier today you were asked a question about soil moisture probes and whether those are conditions in the

permit, and I believe you said that they are not; is that correct?
A. Correct.
Q. Do you know why they are not? Is there a particular reason why soil moisture probes are not a condition in the permit as not anything that you looked at?
A. I think that the -- what the permit talks about is that's an issue that needs to be addressed. But the permit allows flexibility in how that's done. So we don't specifically state that you have to use a certain method.
Q. So if the soil moisture probes would be helpful in complying with the terms of the permit, Ecology would be fine with using that technology?
A. Correct.
Q. But it's not mandated by the permit?
A. Correct.
Q. Even without that condition, Ecology would still expect the permit holder to comply with the terms of the permit; is that correct?
A. Correct.
Q. Yesterday you talked about the acronym as "ARM."
What does that stand for?
A. Applied Risk Management.
Q. You made a statement -- correct me if I get this wrong -- that your concern with that -- or at least one

concern -- excuse me -- was that it allowed applications at a time they are at low risk for surface water but high risk for groundwater.

Am I getting that correct? Is that what you said?

A. Correct.

Q. And what's the -- what was the concern with regards to groundwater? What was -- that made it high risk for groundwater.

A. So when you've got a storm event, the water's going somewhere. And it's either running off the land, or it's infiltrating into groundwater. So when there's not a crop that's actively taking up a large portion of that, the water's going somewhere.

Q. What is it specifically about the ARM protocol that caused you to have the concern about high risk to groundwater at the same time that there was low risk to surface water?

A. Okay. So I'm trying to think back. Because this was put in front of me years ago. And actually, I was not part of -- there was a small group of people that were actually specifically involved with the EPA, the USGS, and Whatcom County Conservation District, in terms of reviewing their proposal, and I was not one of those. So I'm sort of struggling to remember the specifics of -- of that.

Q. Okay.

So ARM is used by the Whatcom Conservation District; is that correct?
A. Correct.
Q. What do they use it for?
A. They use it for finding windows of time to apply manure during essentially the winter months, when normally they wouldn't be applying.
Q. Are they doing that as part of the Dairy Nutrient Management Program?
A. You know, I can't say off the top of my head.
Q. Okay.
A. Because, again, my involvement is very limited.
Q. Okay.

And T-sum 200. We also talked about that a bit yesterday. Is that -- have you seen T-sum 200 used on the east side of the State to determine when to implement applications?
A. I'm trying to recall how T-sum 200 came into the permit. Because I know I reviewed it in the literature review. And I don't know if it was -- we had a meeting with -- with industry scientists.

I know Larry Johnson from the NRCS was there, and Kevin Lindsey was there. We were talking about -- about a lot of different technical issues. And so I don't know if the T-sum 200 was brought up in that meeting -- I think that

was 2016 -- or whether it was brought up in comments that were received on the final draft permit. I'm trying to -- I'm trying to recall.

Q. That's okay. My question was maybe a little bit more specific, related to whether you reviewed any information confirming for you that T-sum 200 had been used on the east side of the state for purposes of making decisions about when to apply?

A. No. I have no -- no, I have not.

Q. Do you recall that issue coming up in discussions when you were developing the permit, that specific consideration about whether T-sum 200 was used on the east side of the state for purposes of making decisions about land applications?

A. Well, I believe our discussions were, because it involved temperature units, that it allowed for the variances that you would have on the east side versus west side.

So I believe the thought process was, is that does take into account site-specific conditions.

Q. And that was your internal discussion?

A. Correct.

Q. When you talked yesterday -- or you talked about Exhibit R-15. Let's turn to that. That's the Carey and Harrison report.

A. R-15?
Q. Yes. I'm just having you turn to it so you can recall which document that was.
A. Okay.
Q. You reviewed this document; correct?
A. Correct.
Q. It was part of the literature review that you put together for purposes of the permit development?
A. Correct.
Q. Do you remember in reviewing this document whether there was any discussion about whether the land applications that were being made were being made at agronomic rate?
A. So they -- they did talk about whether it was -- the applications were at agronomic rate or --
Q. Do you recall if they were?
A. They had some years where they were and some years where they weren't.
Q. Are you familiar with the process of "mineralization"?
A. Yes.
Q. What is that?
A. So mineralization is a transformation which when you have organic nitrogen, which is fairly immobile, and that's a biologic process where it converts it into ammonium, which is then a plant available form.
Q. In the nutrient budgets that are required under the

permit, are the permit holders required to take account for mineralization in their N loading and nutrient budget?

A. Yes, they are.

Q. Let's look at the literature review for just a moment. That's R-4. You probably all have that memorized at this point. If you could look at page 46. The PDF on that -- PDF page is page 48.

Is this where you begin your discussion about spring and soil nitrate tests?

A. Yes.

Q. Here you say the purpose -- can you just read that first sentence of the purpose for the spring soil sampling? I'm sorry. That first paragraph under, "Spring soil nitrate test," the big, blue bold.

What does the first sentence in that first paragraph say?

A. "Spring soil sampling is used to assess conditions before the growing season and to calculate the application rates based on the crop needs."

Q. When exactly are you anticipating that the spring soil sample would occur under the permit terms?

A. So it's -- it specifies in the permit when that has to occur.

Q. Let's turn to that.

A. Yeah.

Q. Can you tell me where that is?
A. Is that R-1?
Q. Yes. R-1. Let me try to get you the page number, as well.
A. Is it 18?
Q. 18. Yes. Well, that's where it talks about spring soil sampling.
Do you see a date in there?
A. There is no date for spring soil sampling. It uses the T-sum 200.
Q. So in general, when would that be during the year? Do you know?
A. So again, T-sum 200 is based on average maximum and average minimum, and as soon as you -- the cumulative heat units -- as soon as you add those up and reach 200, that would be the starting point. And that's site-specific, because it really depends on the temperature.
Q. Do you have a sense for when T-sum 200 is normally reached on the west side of the state?
A. Off the top of my head, I couldn't say.
Q. Okay.
Mineralization -- is the extent of mineralization impacted by temperature?
A. Yes, it is.
Q. So would there be a connection between how much

mineralization would have occurred at a particular time based on how warm it has been?

A. The research that I've seen talks about it's temperature dependent, but that it continues even in freezing temperatures. So some mineralization is continuing throughout the entire year, but it's definitely -- more is occurring in the warmer -- in warmer temperatures.

JUDGE FRANCKS: Ms. Howard, we're approaching the lunch hour. I'm just wondering whether you're close to done or whether we should take a break now?

MS. HOWARD: I am actually close to done. So maybe I can just wrap it up with just a couple more questions.

JUDGE FRANCKS: That would be fine.

BY MS. HOWARD:

Q. You talked some about the food processors and that you had done some work with food processors and land application yesterday.

You're nodding your head "yes"?

A. Correct.

Q. Do you remember that?

A. Yes.

Q. With the food processors that you worked with, did they have a cover crop during the winter months?

A. I believe they did. But I --

Q. Do you recall what it was? It's okay if you do not.

A. Not off the top of my head.
Q. Just -- when they were doing winter applications, were they always doing it on a field with a crop? Do you remember, in your experience?
A. I can't -- I can't remember off the top of my head.
Q. Okay.
A. I believe those documents were submitted as part of discovery. So they are -- they're somewhere.
Q. All right.

With regards to fall soil samples, we talked about that yesterday, as well. And I'm referring to the Sullivan and --

A. Cogger.
Q. -- Cogger document, which is one of the documents we've admitted. I think it's R-12. Let's look at that, just to make sure we've got that confirmed.
A. Yes.
Q. You pointed specifically to this document as having an October 1st date.

Do you recall that?

A. Yes.
Q. Did you look at other literature when you were trying to determine a date for when soil -- fall soil sampling should occur in your literature review?
A. Yes, I did.

Q. Do you recall whether there was any other literature that you looked at that had an October 1st date?
A. So there's a report that I cited in the literature review, and I believe it's Barry -- Barry and -- I'm not quite sure who the other authors were. Off the top of my head, I can't remember the date.
But he -- he talks about -- I believe it's, like, August 15th through October 1st is when a fall soil nitrate sample should be taken.
Q. And do you recall what area of the country he was looking at when he made that recommendation?
A. I believe he's out of Western Oregon, also.
Q. Let's look at that so we can identify it more specifically. Again, this is R-4.
A. So in the "Reference" section, it's Barry, Cogger, and Sullivan.
Q. What page are you looking at?
A. The "Reference" section on page 105.
Q. Just a minute. Let me get there with you.
A. Okay. It was developed in the year 2000, and the title is "Fertilizing with Manure," and it was done out of the Washington State University Extension.
Q. And this is also the Cogger and Sullivan that were in Exhibit R-12, as well?
A. Correct.

Q. Again, you're recalling that they had talked about an August to when timeframe?
A. I thought it was August 15th to October 1st.
Q. Was that also based on trying to get a soil sample prior to the heavy rain?
A. It was -- it was trying to get it after maximum crop uptake. I showed the chart yesterday, where you have the peek nitrogen uptake by a crop.

It was getting that -- taking it in between -- right after peek crop uptake and before heavy rains.

Q. So it was trying to have the fall soil sample prior to heavy rains?
A. Correct. Correct.
Q. Was that the driver on that timeframe for that particular study? Do you recall?
A. I think it was the combination of the two. And looking at how -- how do we -- I think the concern was that -- when you take the fall soil nitrate sample is pretty critical. Because if you take it too late, you potentially could miss the nitrate that's in the soil column.

And if we're using the -- the fall soil nitrate sample to drive our adaptive management matrix , we need an accurate accounting. So we want to make sure that we're capturing what the true fall residual soil nitrate value is. And that's why, then, we also had the allowance that if you

went after the October 1st date, that you could -- you could still collect a sample and be in compliance. We would just ask you to go deeper into the soil. So we would capture anything that maybe had leached.

Q. So again, your goal with the fall soil sample is to collect it before there are too heavy of rains so that you can make that analysis; is that correct?

A. Correct.

Q. Then you also want to make sure that you're collecting a sample that is representative of how much nitrate you have in the soil going into the winter months; is that correct?

A. Correct.

MS. HOWARD: Your Honor, I think I'm done. Thank you. 12:01.

JUDGE FRANCKS: Let's break for lunch. Come back at 1:00, and we will proceed. We are off the record.

(Lunch recess.)

JUDGE FRANCKS: I think we're ready for board questions of Ms. Redding.

MS. BARNEY: Your Honor, Ecology at this point would request a brief redirect.

JUDGE FRANCKS: Okay.

MR TEBBUTT: Your Honor, there are a few questions I would like to ask based on Industry's direct based on new issues.

JUDGE FRANCKS: All right. Ms. Barney and Mr. Tebbutt.

REDIRECT EXAMINATION

BY MS. BARNEY:

Q. Good afternoon, Ms. Redding.

I think a moment ago you said if someone refers you to the binders again, you're going to get upset. That's going to be me.

A. I'm just trying to clean them up.

Q. If I can refer you to Exhibit A-20 that you discussed with Mr. Tebbutt a little earlier today.

A. Okay. I'm there.

Q. Can you tell us again what this exhibit is?

A. This is an e-mail from me to Kelsey Dunne, who is in our Waste -- Waste Resources Program. Essentially, our Solid Waste Program.

Q. Can you tell us the date of this e-mail?

A. This was February 24th, 2017.

Q. Was that before or after the CAFO permits were issued?

A. It was after.

Q. Can I ask you to turn to the top of the second page, please. Sort of the very bottom of the first page, but to the top of the second.

Is this the earlier e-mail in this chain?

A. Correct. So Kelsey sent me the first e-mail, and then the top portion is my response to Kelsey.
Q. Can you tell us the context of the top portion of your response, then?
A. So the Waste Resources Program deals with bio solids land application. And Kelsey had seen my manure and groundwater literature review and noticed that there were similarities between other land treatment systems that I had reviewed, like for manure, and what they were dealing with bio solids.

So they have a very specific case in Shelton that I believe is going to the PCHB -- or has -- and she was asking for some advice with the context of this.
Q. So would that be at the top of the second page, where she says, "This relates to the facility we spoke of last week"?
A. Yes.
Q. So your discussion there of the depth of sample collection, is that specifically related to that facility?
A. Yes, it is. This is -- Waste Resources was issuing an individual permit. This is a land application facility that had been in operation for lots of years. A lot of over-application. And so she was asking my advice about how -- from a land treatment perspective.
Q. Thank you.

Mr. Tebbutt asked you to read from several different documents, Ecology documents, with regards to the use of groundwater monitoring. And I know you had testified to this yesterday.

Could you please remind us, what does groundwater quality monitoring tell us?

A. So groundwater monitoring can tell you what's in the groundwater at the time that you take the sample, and it -- it's limited in terms of what it can tell you, depending upon the constituent that you sample.

Like, if we're only looking at nitrate, it can't tell you the source, and it can't tell you when that nitrate was discharged to the land surface. All it tells you is a concentration in groundwater.

Q. So can you give us your understanding of why groundwater monitoring is not in the permit?

A. Well, groundwater monitoring -- it's -- it's a complex undertaking, and there's a lot of things that have to be taken into consideration.

So, for one, there's that lag time. So we talked about yesterday about what happens at the land surface, and by the time it actually goes through the vadose zone, reaches groundwater, and then in groundwater travels horizontally to the well, that takes a certain amount of time, and that time is based on site-specific

characteristics.

So if we want to get immediate feedback on what a facility is doing and how they can improve from year to year, groundwater monitoring isn't going to tell us -- or tell the permittee how to improve their manure management practices.

Q. Thank you.

Then in response to Ms. Howard's questions, she asked you if you relied on NRCS standards in the literature review, and your response was yes.

What did you mean by "relied on"?

A. Well, we -- we took a look at a lot of NRCS documents, because they do relate to manure management. And so we would be remiss if we didn't look at those documents.

But I think what we need in a permit might be different than what NRCS is proposing in one of their guidance documents.

So we use that information, and it certainly was used in my literature review. But we didn't necessarily use that as our only basis for developing a permit or permits.

Q. Thank you.

Just one last question. If you'll look at R-1, the combined permit, on page 36.

A. Yes.

Q. So this is the section of the permit, S7.B, that's

discussing the existing lagoon assessment?
A. Yes.
Q. If you'll look at the fourth paragraph down, that starts, "If the lagoon assessment determines." I'll just read it.
A. Okay.
Q. "If the lagoon assessment determines that there are less than two feet of vertical separation from the bottom of the lagoon liner as measured from the outside of the liner and the water table, including seasonally high water tables, the permittee has six months from the completion of the lagoon assessment to develop a plan to address this deficiency." Then it lists some elements the plan must include.

So is it your understanding that after a facility completes its Tech 23 assessment, that what's required is a plan?
A. Yes.
Q. No particular action is dictated at that point; correct?
A. Correct.

MS. BARNEY: Thank you. That's all I have.

JUDGE FRANCKS: Mr. Tebbutt?

MR. TEBBUTT: I'll just do it from here. It will be a little simpler. Just a few questions.

RECROSS-EXAMINATION

BY MR. TEBBUTT:

Q. Ms. Redding, you've read the Erickson expert report in the Cow Palace case. You testified to that earlier; correct?

A. Yes, sir.

Q. So I want to just take a look at A-1. Pull up A-1, please. A-1 is Mr. Erickson's report, in this case, which also has the Cow Palace report attached.

MS. HOWARD: Your Honor, I'm just going to object, and maybe this will be easily addressed, but this doesn't seem to be redirect on any of the questions I asked. I don't recall specifically addressing Cow Palace in any way and Mr. Erickson's report.

MR TEBBUTT: This goes to the questioning about impact to groundwater. This is one of those real-life situations.

Ms. Howard asked about impacts to groundwater. So I just wanted to ask Ms. Redding about real-life impacts to groundwater.

JUDGE FRANCKS: I'm going to allow it. Do you need to go into the expert report to ask it?

MR TEBBUTT: Yes, we do.

JUDGE FRANCKS: Okay.

MR TEBBUTT: But it will be quick.

BY MR. TEBBUTT:

Q. Let's take a look at Exhibit A-1, page 59, based on the numbers down at the bottom right corner.

JUDGE FRANCKS: Do we have a PDF page?

MR TEBBUTT: PDF number is 59, strangely enough.

BY MR. TEBBUTT:

Q. Do you have that in front of you?

A. I do.

Q. So these numbers -- if we look at the last column for nitrate -- do you see that?

A. Um-hmm.

Q. Do you see under -- let's just pick, for example, YBD 10.

Do you see that? It's about three-quarters of the way down.

A. YBD 10?

Q. Where it says -- well, that YBD 10.

A. Okay.

Q. That, I'll represent to you, is one of the monitoring wells.

A. Okay.

Q. And the nitrate number is 123 parts per million.

A. I'm having trouble going across.

Q. Yes. I understand. Lots of little stuff.

A. Oh. So -- oh. There's a validation code next to that

one that says "HTQ." And when I look at the abbreviation, it says "holding time violation."

Q. All right. Well, let's pick a different one, then. We can pick a lot of them. Let's pick YBD 14R.

Do you see that?

A. Yes.

Q. That shows at 91.1 parts per million nitrate; right?

A. Yes.

Q. You wouldn't consider that to be a minimal impact at groundwater, would you?

A. No, I would not.

Q. Next, you were asked some questions -- we're done with that one for now.

A. Okay.

Q. Well, in fact, it's more than nine times the safe drinking water standard for nitrate; correct?

A. Correct.

Q. You were asked some questions by Ms. Howard about nitrification/denitrification under the -- in the Baram study.

A. Correct.

Q. And you testified, I believe, that nitrification/denitrification is a site-specific type of situation; correct?

A. Correct.

Q. The Baram study was done in Israel; correct?
A. Correct.
Q. There is no evidence of any nitrification/denitrification of any significant level in Washington; correct?
A. I have not seen any reports to that effect.
Q. That there is any significant nitrification/denitrification; correct?
A. Correct.
Q. And last, let's take a look at R -- second to last -- R-11.

Do you have R-11, page 47? 57 in the PDF. 47 at the bottom right of the page.

A. Okay.
Q. These are the recommendations from that study; correct?
A. Correct.
Q. Where it says -- I'll just read this into the record. It says, "To fill data gaps, the following studies are recommended." Bullet point. "Conduct groundwater monitoring at several SCS designed and constructed ponds to insure that the ponds adequately protect groundwater. Ponds should be located over shallow groundwater, with groundwater velocities of about one foot per day or greater."

So the recommendation is even if the facility is built to SCS standards, in order to know whether those ponds

are causing contamination, you still need to do groundwater monitoring; correct?

MS. HOWARD: Objection, Your Honor. That actually misstates the document here.

THE WITNESS: When I read this --

JUDGE FRANCKS: Well --

THE WITNESS: Sorry.

JUDGE FRANCKS: In what way does it misstate?

MS. HOWARD: Can you repeat the question again? I'm sorry. There were just -- there was some added words there at the end that were not in the actual bullet point that he was reading. So maybe we could just reread the bullet point. And I apologize.

MR TEBBUTT: Let me just ask the question again to speed things up.

BY MR. TEBBUTT:

Q. In order to know whether a pond's even built to SCS standards, or contributing to groundwater contamination, this report still recommended the groundwater monitoring be done; correct?

A. My -- can I answer?

JUDGE FRANCKS: Yes.

BY MR. TEBBUTT:

Q. Please.

A. My read of this is he's recommending additional

studies, and it may be to verify how effective the SCS design and as-builts are.

Q. Right.

A. But it would be a groundwater monitoring study. Is that what --

Q. Yes. That's what I was asking, for groundwater monitoring.

A. Yes. Correct.

Q. Again, you were asked questions about the table, and it said "design SCS standards."

Do you remember that?

A. Was that from Appendix 10D?

Q. No. From this document.

A. Oh, yeah. Yeah, yeah, yeah.

Q. So those are design, but you don't have anything that says, "We have as-built drawings," do you? Just design?

A. It just says "design," and then there was notes about construction was not overseen.

Q. Right.

A. So --

Q. So no as-built information; correct?

A. Correct.

Q. No engineering stamp saying, "We did this this way"?

A. Well, from that table. So I don't know what else is in the report off the top of my head.

Q. Then let's go to I-13, page 8, please.
A. Hang on.
Q. Sure.
A. Okay. I-13, page 8.
Q. Down towards the bottom of the page it says, "Considerations for Minimizing the Potential of Waste Storage Pond Liner Failure."
Do you see that?
A. Yes.
Q. It says, "Avoid using sites with categories listed below, unless no reasonable alternatives exist." First bullet point, "Underlying aquifer is at a shadow depth and is not confined." And the second one, "Aquifer is a domestic water supply."
These conditions exist in the Sumas-Blaine; right?
MS. BARNEY: I'm going to interpose an objection here. This document was not referenced before. This is the NRCS 313 standard for July 2017.
The previously used document was the May 2016 version. So this was not referenced in Ms. Howard's direct examination.
MR TEBBUTT: I think it was. I think I-13 was in. It's what was used. We're using the same document.
MS. BARNEY: No, it wasn't.
MR TEBBUTT: What -- what did I get wrong?

MS. BARNEY: This is also NRCS Standard 313, but it's a different date. So this is the Washington-specific one that's dated July 2017.

MR TEBBUTT: So this is the updated version, then?

MS. BARNEY: Correct. It's the Washington State specific one. Not an updated national one.

MR TEBBUTT: So this is different than -- oh, you gave us a different -- you substituted a new one or --

MS. BARNEY: No. What she used earlier was the one from Ecology's exhibits, which is R-9.

MR TEBBUTT: Okay. Well, this is the Washington 313 standards; right?

JUDGE FRANCKS: Right. But this is redirect. So it needs to be based on what she was asking to begin with.

MR TEBBUTT: She was asked about 313. That's -- Ms. Howard spent a whole bunch of time on that.

JUDGE FRANCKS: But let's look at the exhibit that she was shown, unless there's some reason you need a new exhibit.

MS. BARNEY: It's R-9.

BY MR. TEBBUTT:

Q. Let me just ask it this way.

The aquifer in the Sumas-Blaine area is used for drinking water for thousands of people; correct?

A. Correct.

Q. So that aquifer is a domestic water supply; correct?
A. Correct.
Q. Same with the Lower Yakima Valley. The aquifer in the Lower Yakima Valley is a domestic water supply; correct?
A. Correct.
Q. So in order to determine whether manure is a likely source of nitrate, there are other parameters that you can test for, as well, to correlate manure with other constituents; correct?
A. Correct.
Q. And there's a whole lot of them; correct?
A. Correct.
Q. Like chlorides, for instance, would be one?
A. Yes.
Q. Bacteria would be another one?
A. Correct.
Q. Pharmaceuticals?
A. Correct.
Q. Hormones?
A. Correct.
MR TEBBUTT: That's all I have. Thanks.
JUDGE FRANCKS: So board questions?
MS. MARCHIORO: I'm trying to get a sense of interplay between Washington's water quality laws and the NRCS specification. Why don't you look at R-10.

THE WITNESS: Okay.

MS. MARCHIORO: So that looks like it's --

MR TEBBUTT: Board Member McGowan, would you mind using the microphone so we can all hear?

MS. MARCHIORO: No. I just wanted to have a little confab.

THE WITNESS: I can hear her just fine.

MS. MARCHIORO: R-10. So -- do you have it?

THE WITNESS: Yes.

MS. MARCHIORO: I was trying to figure out -- you testified about this document, and it looks like it's a Washington-specific NRCS tech note; is that right?

THE WITNESS: Correct.

MS. MARCHIORO: So NRCS comes up with ones for different states or regions? Is that how it works?

THE WITNESS: So NRCS has, like, national standards and national guidance, and then the individual states can come up with their own thing for actually enhanced -- be more stringent in their own documents.

MS. MARCHIORO: So that maybe answers my question a little bit.

If you want to look on page 1, the second paragraph, it says, "The NRCS assessment should not be construed to provide any regulatory certainty from State regulatory agencies. State of Washington laws and rules

prohibit pollution of waters of the state, including groundwater. The state requires a permit for discharge of waste water to waters of the state. This document does not supersede these requirements."

So I'm trying to understand -- discussing all of these NRCS documents, how that particular -- in your understanding, how that particular paragraph is pinpointed.

THE WITNESS: Well, I think the -- that -- that paragraph is an important paragraph. Because if we -- no matter if you're doing this, we can't violate water quality standards in Washington State.

Ecology is -- was trying to find a tool that was available and was well-known to actually do these lagoon assessments to try and get a handle on how are they constructed? Are there deficiencies? And get a better idea just across the state, what is the state of these lagoons? Because we don't know.

And so when you look at the permit, it's really used as an assessment tool, rather than a compliance tool.

MS. MARCHIORO: So in terms of the -- the location where -- the measurement of the two foot, that's -- the design standards for NRCS, their design standard says use the bottom of the liquid --

THE WITNESS: Correct.

MS. MARCHIORO: -- but Ecology for the assessment

is saying measure from the bottom of the liner.

Is that right?

THE WITNESS: That's right. And our concern -- and this goes back to -- there's an issue paper that we wrote specifically commenting to NRCS -- it's in the literature review -- about construction of manure lagoons below the seasonal high water table. And we lay out there that we want to see a minimum of two feet of vertical separation per pathogen removal.

So my understanding from Bill Reck's deposition is that primarily their two feet -- they made -- they may define that differently than we do. We're looking for ours for treatment of pathogens, and they may be looking at it as sort of a -- looking primarily for the buoyant forces and the structural engineering integrity of the liner.

MS. MARCHIORO: Do you know, are -- are dairies in Washington required to comply with NRCS tech notes or standards? Are they under a requirement, or are those just guidance for them when they're operating their facility?

THE WITNESS: It's guidance.

MS. MARCHIORO: In your -- you were asked about Mr. Erickson's study, R-11, and there were some notes -- you don't need to look at it to remember this -- whether there was leakage in three of the four and whether they had worked with SCS, the predecessor to NRCS.

In your experience, does the Soil Conservation Service or the NRCS need to be involved in designing a lagoon, or can you just go and hire an engineer who is qualified to come up with a design and then go ahead and construct it?

THE WITNESS: There are consultants that do that exact thing. What -- I mean, there's -- there should be more detail about exactly what -- how are these lagoons constructed. I would find that more helpful.

In fact, I'm not sure that's not in this document. I just don't recall seeing it. But that would be very helpful information to know. What are the specific conditions that we saw leakage, that we saw impacts to groundwater quality.

MS. MARCHIORO: In talking about the pathogens, would you consider a liner a filter?

THE WITNESS: I would, actually. And so that's why I think that the bacteria -- that might actually get filtered out. But the viruses are very, very small. And I do have concerns about those getting through a liner of ten to the minus seven centimeters per second permeability .

And I've done work with viruses in the past. And I know that all it takes is -- it's a very low number of viruses -- like one -- to infect someone.

And once they're in groundwater, they can move a

long distance. They remain viable. They remain infectious, I guess, to humans for a long time.

So that's -- that's where we have concern with the minimum vertical separation and just wanted to make sure that we're -- we're creating a system that we account for something like that.

MS. MARCHIORO: In terms of -- I'm familiar with some non-dairy lagoons, in terms of ways to treat what's in the lagoon. Aeration, flocculent.

Is there anything that's available in a dairy context that can address the phosphorus, nitrogen, whatever the contaminant is of most concern prior to leaching into the soil or being spread on -- seeping into the soil or being spread?

THE WITNESS: I think that the simple answer is no. The -- the treatment technology that's a -- like a municipal waste water treatment plant would use are pretty expensive, and I don't know if that I've heard of any of those being used at a dairy lagoon, but I can't say for sure.

MS. MARCHIORO: You were asked -- I'm going to have you go to R-20. That was that tech note -- technical report from Baram.

THE WITNESS: Um-hmm.

MS. MARCHIORO: And you were asked about page 1629. We talked about -- in the context of getting to that

document, you were asked about nitrogen removal under a lagoon.

Do you remember that?

THE WITNESS: Yes.

MS. MARCHIORO: How would you determine if that was actually happening?

THE WITNESS: The nitrate from the lagoon?

MS. MARCHIORO: Yes.

THE WITNESS: You would have to do some kind of monitoring. Whether it's soil monitoring -- which is hard to do under a lagoon -- and, again, groundwater monitoring. But again, that's hard to do under a lagoon. And off the top of my head, I can't -- I'd have to go back and reread this paper to find out exactly what they were looking at.

MS. MARCHIORO: Just out of curiosity, in terms of the EPA studying of the Yakima Valley -- Lower Yakima Valley aquifers, what other sources are there in addition to the dairies that have been identified?

THE WITNESS: They looked at commercial fertilizer use on agricultural fields. They also identified on-site sewage systems as a source. Maybe they classified that one as a probable or potential source.

I know they basically looked at all the different sources. I can't remember if they looked at atmospheric deposition.

MS. MARCHIORO: Then finally, in terms of the permeability requirement, the one times ten to the minus six centimeters per second, how is that tested so you know whether your lagoon is actually doing that?

THE WITNESS: So it really has to be done -- well, there's actually a couple ways. You can -- the best way is it's tested when you install the lagoon.

The other way is you can -- you could empty the lagoon and take a core. But then you'd compromise the lagoon.

And then a third way is you do a water and mass balance on the lagoon. But the -- but that requires a lot of -- sort of very precise instrumentation, because the differences that you might see over a day are very, very small.

So you have to be able to capture that on a very exact basis in order to actually determine, like, what are your inputs, what are your outputs, what's going up from evaporation.

So that's -- that's a tough thing to do, and you'd have to have a lot of expensive equipment. But people have done it.

MS. MARCHIORO: In terms of -- say you're going to put in a new lagoon. Is there a -- you're going to use a -- either amended soil with clay or a clay liner. Is

there a design thickness that would then generate the ten to the minus six?

THE WITNESS: Well, we're -- how -- we have certain flexibility in the permit. We said, "This is what we want the permeability to be." So if whatever they need to do to make that -- the compaction and the thickness in order to get that, that's up to them. So we're trying not to be too prescriptive and give them flexibility.

MS. MARCHIORO: So that could be a synthetic liner as opposed to a clay liner?

THE WITNESS: It could.

MS. MARCHIORO: That's all I have. Thank you.

JUDGE FRANCKS: Ms. Brown?

MS. BROWN: I just have a couple.

I think you said sometime in the last day that there isn't AKART for existing lagoons.

Did you say that?

THE WITNESS: Yes, I did say that.

MS. BROWN: Can you tell me a little bit more about that?

THE WITNESS: So my understanding, from previous permits, is we don't -- because we don't have a good -- we didn't have a lot of facility to cover the permit, we don't really know what the state of those lagoons are.

We've heard anecdotal information from different

sources saying it's either good or it's bad, but we really don't know.

And so what this Tech Note 23 in this assessment is trying to do is get a handle on how are these lagoons constructed, and then also to try and prioritize, like, which ones are the worst ones? And then maybe work with them to -- you know, in the future, work with them to try and make improvements.

But trying to get a handle on it -- if we don't know that information, it's -- it's kind of a challenge. We might know it from one specific facility, but that -- this is a general permit, and it's designed to apply to all the facilities statewide. So it's tough to make real prescriptive requirements that apply to everybody. So we want to be cautious about what we're putting in the general permit.

MS. BROWN: Does that mean, then, that there aren't -- I think you also said there aren't seepage limits on the existing lagoons.

Is that right?

THE WITNESS: Correct.

MS. BROWN: I know maybe you weren't too involved with the 2006 permit, but do you know what the requirements were for lagoons in 2006?

THE WITNESS: So we looked at that earlier, and it

refers to the NRCS Practice Standard 313.

MS. BROWN: Okay.

THE WITNESS: But it does not -- it does not give a permeability.

MS. BROWN: Okay.

The last one is, you mentioned several times viruses.

THE WITNESS: Um-hmm.

MS. BROWN: And I'm just trying to understand how viruses would be in this context. Like, for a CAFO.

THE WITNESS: So any animal is -- their waste contains bacteria, viruses. And so whether we're looking at an onsite sewage system, or whether we're looking at a manure lagoon, they're present. And bacteria's different because it's larger, and it can get filtered out. But viruses are very, very small.

MS. BROWN: Are these viruses that would affect humans?

THE WITNESS: Yes.

MS. BROWN: Great. Thank you.

JUDGE FRANCKS: Mr. Wise?

MR. WISE: Good afternoon.

THE WITNESS: Hi.

MR. WISE: I'm just trying to get a better feeling for what happens to nitrogen and phosphorus when it gets in

the soil.

I understand the plants, the crops, or whatever's growing there will uptake a certain amount of the nitrogen as it passes through.

Do they take in phosphorus, as well?

THE WITNESS: Yes, they do.

MR. WISE: So some of it is pulled out by the plants. If it gets down below the root layer, does the soil itself bind with any of these chemicals?

THE WITNESS: So, yes. Phosphorus pretty much binds in the soil. So it's -- it's uncommon for us to see phosphorus in groundwater. We -- it's more we're concerned in terms of when it's in runoff, going to surface water. But that's why we've included it in the -- the nutrient budget, so that we're looking at both nitrogen and phosphorus.

And so if there -- if they reach their limit with phosphorus before they do with nitrate, they have to either stop application or find some other fertilizer source that doesn't have phosphorus. So it's in the budgeting portion of the permit.

MR. WISE: Okay.

Are there any microorganisms that would take up any of these chemicals in that soil there?

THE WITNESS: So the nitrogen cycle is what -- what

gets land applied is typically in the form of organic nitrogen and ammonia. So the conversion of -- of the organic nitrogen to ammonia to nitrate uses microbes. It's a biological function that happens. But they're converting it rather than utilizing the --

MR. WISE: This is that nitrification --

THE WITNESS: Exactly.

MR. WISE: -- you were talking about?

THE WITNESS: You rely on those microbes to help with the process, but they're not actually using the nitrogen.

MR. WISE: You also mentioned that the vadose zone would -- the pathogens would die in that zone, or that would filter them out somehow.

What happens to them in that zone?

THE WITNESS: So the unsaturated zone is unsaturated. And viruses like cold, wet climates. So if they're in an area where they will dry out and get stuck, like in the vadose zone, they will die off.

MR. WISE: Okay. So essentially, they just dry out and get stuck there?

THE WITNESS: Yeah. Yeah.

MR. WISE: I think I asked about this before, but I'm still struggling with it.

Say a person is doing a lagoon assessment. How are

they going to know where the water table is? How deep it is?

THE WITNESS: So there's -- there's wells in the area, and you could look at well logs that Ecology has online, or you could actually go to a nearby well and take a water level measurement.

There is also -- I believe it's in Appendix 10D -- or maybe just in the Chapter 10 of the Animal Waste Management Practices Handbook from the NRCS -- that talks about looking at soils.

So you can determine if you had a water table that's come up by things like modeling in the soils. So you can do a visual observation and say, you know, "Water's been here, so we need to" -- "we think that water will come back up, like, say, in the wintertime." So that's another visual way that they can determine the seasonal high water table.

MR. WISE: So I mean, they would, like, see that when they dig the hole or something?

THE WITNESS: Yes.

MR. WISE: They would see the mottling on the sides?

THE WITNESS: Exactly.

MR. WISE: Okay. And once you found the water table, there's supposed to be this two-foot zone up to the bottom of the -- of the liner.

How do they know how deep the liner is? How do they get that two-foot distance measured once they found the water table?

THE WITNESS: So that really would have to go to the as-built, knowing exactly what -- when you put your lagoon in, where it's located. Where your water table is. How thick your lagoon is.

MR. WISE: So they'd have to, like, keep some sort of record of how deep it was and how much clay they put in the bottom or whatever?

THE WITNESS: Correct. And that's part of the problem with the existing lagoons, is we don't know how many facilities have these records.

MR. WISE: Okay. I just wanted to ask a couple questions about the land treatment concept.

I guess that's essentially taking the manure and spreading it out on the fields. And I understand that that -- you try to achieve a rate that won't, sort of, overwhelm the plants taking it up.

Right?

THE WITNESS: Correct.

MR. WISE: And if you exceed that, you run the risk of having some leaching into the groundwater?

THE WITNESS: Correct.

MR. WISE: And the excess manure, I guess that's

what the lagoons are for, is to store that?

THE WITNESS: Exactly.

MR. WISE: And is that -- that's the agronomic rate that you were talking about?

THE WITNESS: Correct. We want to make sure that they're applying just enough to keep the crop viable, growing, but we also want them to be mindful of putting on too much that there's leaching to groundwater.

So it's kind of a fine line, what we're looking for. And that's why we don't use the term "agronomic rate," because some people -- their definition of agronomic rate is maximized yield. That's not Ecology's definition of agronomic rate.

So we just found it would be better to use the term "application rate," and then be clear about what we're looking for.

MR. WISE: Thank you very much.

THE WITNESS: Okay.

JUDGE FRANCKS: Questions based on the board questions?

MS. BARNEY: Nothing from Ecology.

JUDGE FRANCKS: Mr. Tebbutt?

MR TEBBUTT: Yes. I have a few.

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FURTHER RECROSS-EXAMINATION

BY MR. TEBBUTT:

Q. Let's start in reverse order of Mr. Wise's questions.

You said one of the things that you could rely on to determine depth to groundwater was use of existing wells; correct?

A. Yes.

Q. So -- but people -- if the water table is at five feet and somebody's installing a well to drink from, they're not going to stop at five feet. They're going to go to a deeper aquifer, aren't they?

A. Not necessarily.

Q. You think people are going to drink at the top of the first water table they experience?

A. So public water supply wells are constructed differently than private domestic wells. Private domestic wells -- typically, they look for the first water and they might go a little bit below.

But when you're taking a water level measurement, you're seeing what level the water rises to. So even if it's screened lower, you can tell where the water level is based on taking a water level measurement.

Q. But you would have to actually go into the well to look at it; right?

A. Yeah. And that's easy enough to do.

Q. Right.

But you wouldn't want to drink from a well that's tapped into a five -- you know, an aquifer that's five feet below the surface, would you?

A. There's a lot of people that do.

Q. But you don't want to, do you, because of the increased risk of harm from bacteria and viruses and such moving down to those shallow water tables? Especially where there's manure.

You wouldn't recommend somebody doing that, drinking from that?

A. It's not my recommendation. And we -- we don't tell --

Q. I'm not saying it's a recommendation. I'm just saying, as a professional hydrogeologist, you wouldn't recommend people drink from that, would you?

A. Well, private domestic wells, most people do -- we don't regulate them. Department of Health --

Q. That's not my question.

You wouldn't recommend that you drink from a well that's put into a five-foot water table, would you?

MS. HOWARD: Objection. Relevance. And I think this has strayed beyond the questions.

JUDGE FRANCKS: I'm going to sustain that objection.

BY MR. TEBBUTT:
Q. Board Member Brown asked you -- confirmed there is no AKART for existing lagoons, but the permit authorizes discharge from existing lagoons; correct?
A. Correct.
Q. You also said that you would work with them in the future -- meaning, the dairies -- for -- have them do an assessment of their lagoons and that you'd work with them in the future.
Right?
A. Correct.
Q. You've already testified that you read Mr. Tebb's testimony; correct?
A. Correct.
Q. And one of the things that he testified about was a memo that he wrote where he talked about the 2009 Court of Appeals decision and how that decision was just kicking the can down the road further for Ecology; correct?
A. I read that e-mail.
Q. Right.
And isn't what you just suggested, that you'll work with dairies in the future just another form of kicking the can down the road further?
MS. BARNEY: Objection. Argumentative.
JUDGE FRANCKS: I'm going to overrule the objection

and let her answer it.

THE WITNESS: No. I don't see this as kicking the can down the road at all. I see Ecology actively working to address something that may or may not be a problem.

BY MR. TEBBUTT:

Q. But you already know that the facilities are discharging?

A. Correct.

Q. And you know that water goes down to groundwater?

A. Correct.

Q. So you already know there's a problem, don't you?

A. A discharge does not equate to a problem.

Q. Okay.

A. You can have a discharge and still meet the groundwater quality standards.

Q. Right.

A. That's why it's additionally authorized discharge.

Q. Even without AKART?

A. Even without AKART.

Q. And then lastly, remember -- well, two things.

Board Member Marchioro asked you about R-20 and how you would detect leakage from a lagoon. And you said you couldn't. It's very difficult to put a monitoring well under a lagoon.

No. 2, there's two ways you could do that. You

could angle a well under a lagoon, couldn't you? Hydrogeologically?

A. You could.

Q. But you could also put a well just slightly downgrade and determine what's coming from that lagoon, couldn't you?

A. Yes.

MS. HOWARD: Objection, Your Honor. Lacks foundation.

JUDGE FRANCKS: I'm going to overrule it.

BY MR. TEBBUTT:

Q. And lastly, Board Member Marchioro asked you about a liner acting as kind of a filter.

If the filter is saturated -- the liner is saturated because it's in the groundwater table, then that filter -- the chance of pathogens transferring through that filter increases; correct?

A. I don't believe that's true.

Q. So -- all right.

Let me ask it in the context of the two-foot filter. The two-foot separation from the bottom of the lagoon to groundwater. That's -- that's the standard that you have; correct?

A. Correct.

Q. And so if that two-foot area between the bottom of the lagoon and the water table is saturated, that would increase

the risk of pathogens transferring, wouldn't it?
A. So if it was no longer an unsaturated zone, but it was two feet of saturated zone, would the pathogens migrate to groundwater?
Q. Aren't they more likely to migrate to groundwater?
A. If it's saturated, yes.
Q. And if part of that two-feet minimum separation were to be saturated, then the risk of pathogen transfer goes up, as well, doesn't it?
A. Correct.
MR TEBBUTT: That's all I have. Thanks.
JUDGE FRANCKS: Ms. Howard?
MS. HOWARD: I have a few. Thank you.

RECROSS-EXAMINATION

BY MS. HOWARD:
Q. So one of the questions we were talking about are NRCS guidance, and what -- what are they for and how do they relate.
So are you aware of any other state agency in the State of Washington that does actually require compliance with NRCS guidance?
A. Requires compliance?
Q. Yes. Uses NRCS guidance as part of their criteria for implementing a program.

A. No. I -- I don't -- I'm not familiar. I can't answer that, I guess is what I'm saying.
Q. Are you aware that the NRCS guidance is a required prerequisite in order to get federal funds? That you have to follow that guidance in order to get federal funds?
A. I have heard that before.
Q. Did you -- when you reviewed Mr. Reck's testimony, do you recall the portion of his testimony that talked about the fact that there is no other similar animal waste lagoon storage standard -- comparable standard in the nation?
A. Yes, I believe he states that.
Q. You talked about viruses. Are you -- is your testimony that bovine viruses will transmit to humans?
A. So what limited research that I have seen identifies discharges from a manure lagoon or animal waste practices viruses from those practices as a threat to public health. They did not specifically talk about lagoon standards. So it's -- so that's -- that's what I've seen.
Q. I don't mean this to be rude, but are you a microbiologist?
A. No, I'm not. I have done a study -- when I worked in Arizona, I worked with one of the world experts, Chuck Berva out of University of Arizona. He helped me do a study looking at viruses in drinking water.
Q. Were you studying bovine viruses?

A. No, I was -- not specifically bovine viruses. We were studying viruses.
Q. And that was -- just -- my question was just specifically related to bovine viruses, which is what we would expect to see in a manure lagoon; correct? "Bovine," meaning cows.
A. What I'm not clear about is because there's some bacteria, and there's some viruses that are -- can come from -- from both animal sources and human sources.

So when you say "bovine viruses," it may be common to humans, also.
Q. But you don't know?
A. Off the top of my head, no.
Q. So when you were looking at this issue about viruses, you weren't necessarily distinguishing a concern between viruses that would be coming from animals and viruses that might actually have an impact on humans. You didn't actually do that analysis?
A. No. I -- like I said, one of the studies that I looked at identified animal waste as a threat to groundwater. And so in my mind, if bovine viruses were completely different than human viruses, that would not have been in that article.
Q. And then one other question -- I think we just need to clarify this.

So the studies that you relied upon to make the recommendation about separation, this two-foot vertical separation, were any of those studies, studies that look specifically at the issue about whether or not animal waste lagoons would filter viruses?

A. No.

MS. HOWARD: Okay. Those are all my questions. Thank you.

JUDGE FRANCKS: Ms. Redding, you are completed. You are excused. Thank you very much.

(WITNESS EXCUSED.)

JUDGE FRANCKS: Mr. Tebbutt, where do we go from here with a witness? With a live witness? With a telephone witness? With a video witness?

MR TEBBUTT: We have a live witness. Ms. Kinn will introduce the next witness.

JUDGE FRANCKS: The court reporter is going to swear you in.

* * * * *

SUE JOERGER, having been duly sworn by the court reporter, testified as follows:

JUDGE FRANCKS: Proceed when you're ready.

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DIRECT EXAMINATION

BY MS. KINN:

Q. Good afternoon, Ms. Joerger. As you know, my name is Katelyn Kinn, counsel for Puget Soundkeeper.

Can you hear me?

A. Yes.

Q. Please state your full name and spell it for the record.

A. My name is Sue Joerger. Last name is spelled J-O-E-R-G-E-R.

Q. What is your occupation?

A. I'm the field director at Puget Soundkeeper.

Q. What does that role involve?

A. So my job is make sure that the Clean Water Act is enforced on the ground. So that involves traveling by boat or by vehicle to track down -- to look -- document illegal pollution and identify sources of pollution.

Q. Do you ever report those pollution concerns to authorities?

A. Yes. I -- if I see a pollution event, I document with photographs, and then I will contact either the Department of Ecology, local governments, like a county office, or oftentimes, a city office, depending upon the relevance. Coast Guard, as well. So I do report to the regulatory agencies.

Q. How long have you been in this particular role?
A. I have been in the role of field director since March of 2015. So a little over three years.
Q. Prior to assuming this role, what was your experience with monitoring pollution around Puget Sound?
A. I was the executive director and Puget Soundkeeper for the Puget Soundkeeper Alliance from 1999 to 2009. And then I -- and during that time, I did hundreds of pollution detection patrols around Puget Sound.

I've also started volunteering back at Soundkeeper -- I couldn't stay away -- in 2012, and in 2013 and 2014, I was -- got on contract to do field investigations, and then rejoined the staff in 2015.
Q. How many hours would you say you have spent in the field monitoring pollution sources?
A. Thousands. Thousands.
Q. Are you familiar with a place in Puget Sound called Padilla Bay?
A. Yes, I am. It's a bay -- if you're not familiar with it -- that's east of Anacortes and Guemes Island.
Q. Is this place important to the health of Puget Sound?
A. Yes. It's identified as one of the largest eel grass meadows in the lower 48 states, and I think on the West Coast, it's the second larger eel grass meadow. So it's very important.

Eel grass, as you probably know, is important for general salmon, herring, and crabs. Padilla Bay is also a fantastic water fowl over-wintering site, and there's a lot of migratory birds that pass through there in the winter. It's great bird watching.

Q. Is there any shellfish harvest from Padilla Bay?

A. Yes. My understanding is that there is a small commercial farm called Padilla Farms up in the northeast corner of the bay, just below Samish Island.

And then there used to be a recreational shellfish harvest there, as well, from Bay View State Park, as well as March Point. East along the beach shore of March Point. But those have been closed because of bacterial contamination.

Q. Who closed those?

A. I believe the Department of Health is in charge of closing or opening beaches.

Q. To your understanding, based on the Department of Health and their notices to you, what was wrong with the bacterial levels?

A. They were --

JUDGE FRANCKS: Let me just interrupt for a second. There's no photographs without permission in front of me. So if you want to have photographs, you need to ask me ahead of time. Thank you. Please proceed.

BY MS. KINN:
Q. Based on what you read from the Department of Health notices as to why shellfish was closed, what's wrong with the bacterial levels?
A. The bacterial levels were too high for human health. So you'll get sick if you eat the shellfish.
Q. Why would these areas have high levels of bacteria?
A. There's many potential sources there. I think we discussed them. But -- today -- but draining into the bay, there are a number of very large dairy operations.

MS. HOWARD: Your Honor, I'm going to object. I think we did raise this issue in our motion in limine, and we did object, in particular, to the relevance of this testimony as it pertains to the permit terms.

Specifically, I recall that Puget Soundkeeper represented in their opposition to our motion in limine that they were, one, not going to offer Ms. Joerger as an expert witness. And they also did not intend to elicit testimony from her, other than about surface water discharges.

And again, I just want to be thoughtful of the time here. Our objection is on the relevance, and -- and whether or not this testimony actually relates to the issues before the board.

MS. KINN: Ms. Joerger is being offered as a fact witness, Your Honor, and at this point I'm simply providing

some background and building foundation for questions that she will answer next as to surface water discharges aligned with Issue 10 of the environmental health case.

JUDGE FRANCKS: I'm going to allow it. But, yes, she needs to be a fact witness. It needs to relate to the issues.

MS. KINN: Thank you.

BY MS. KINN:

Q. So what are your thoughts about the bacteria issues and how they might affect you?

A. Well, I wouldn't eat shellfish from many regions of Puget Sound because I would be afraid I would get sick.

Q. What waterways flow into Padilla Bay?

A. There's a number of waterways. Starting from the north end, there's Joe Leary Slough. Then there's No Name Slough. Indian Slough, but sometimes it's referred to as "Big Indian Slough." Telegraph Slough, and the Swinomish Channel Slough.

Q. Do you monitor Joe Leary for pollution discharges?

A. I have.

Q. What flows into Joe Leary Slough?

A. Joe Leary Slough has a number of ditches and waterways that flow into it. It used it be wetland, and so I think there's just -- it's quite a network now of ditches.

Q. Based purely on what you have observed in the field,

what land areas drain to these ditches?
A. There's -- if you start at the headwaters and -- off to the east, there's a number of dairies. Then it moves into agricultural land. Some homes. And then cattle operations, blueberry fields, to Padilla Bay.
Q. How long have you been observing Joe Leary Slough?
A. I first became aware of Joe Leary Slough in 2010.
Q. Is Joe Leary Slough salmon habitat?
A. Yes, it is.
MS. HOWARD: Objection, Your Honor, again. This really is going beyond the scope of what a fact witness would normally testify to. Testifying as to whether something is salmon habitat or not is something you would normally ask of a fishery biologist or State agency that would have some knowledge about that.
JUDGE FRANCKS: I'm going to sustain that. It needs to be her personal knowledge.
BY MS. KINN:
Q. Do you sometimes take photographs when you're in the field?
A. I do. I take a lot of photographs.
Q. Is this one of those photos?
A. Yes, it is.
Q. Did you take this on or about April 17th of 2018?
A. Yes, I did.

Q. From where?
A. I'm standing on Chilberg Road, which is near Con -- La Conner in Skagit County, and I'm looking north, and this is a drainage ditch that drains to Joe Leary Slough. And in that drain to the ditch, on the left-hand side, is a white pipe referred to as a "tile drain."
Q. Do you see tile drains often in the field?
A. I do. Sometimes they are not as clear as that one, or as new looking as that one. Sometimes they're broken off and covered in vegetation.
Q. Are they sometimes, obviously, draining dairy operations?
A. Yes. I have seen that.
Q. Is this a true and accurate depiction of what you saw on April 17th, 2018?
A. Yes, it is.
MS. KINN: Your Honor, I would like to move Exhibit A-50 into evidence.
JUDGE FRANCKS: Which number?
MS. KINN: A-50.
MS. NICHOLSON: Objection, Your Honor.
JUDGE FRANCKS: Yes. Go ahead.
MS. NICHOLSON: The prejudicial value of this type of photograph does not outweigh the lack of relevance of this to the permit terms.

How does this relate to the issues before the board? She sees a -- what she's claiming is a tile drain, but we don't know that, and she doesn't know that. And she's saying that that is leaking water into this ditch. But how does that relate to the statewide CAFO permit and those issues before the board?

MS. KINN: Your Honor, this photo is offered purely for illustrative purposes to help the board members better envision what a tile drain might look like. We're not actually alleging particular discharges from this specific tile drain.

MS. HOWARD: You also haven't established a basis for how she would know that this is actually a tile drain. This isn't her property. It isn't her farm. So we actually haven't laid the foundation for that either. So I'm going to object on relevance and foundation.

JUDGE FRANCKS: Can you ask her some foundational questions?

BY MS. KINN:

Q. Have you seen, over your course of 20, 30 years' experience observing pollution in the field all around the Puget Sound, various types of conveyances into surface water?

A. Yes, I have.

Q. How many different types?

A. All kinds of types. Pipes, catch basins, pipes, PVC pipes.
Q. Have you worked closely with engineers and had them explain to you what different types of conveyances are so you know what type to look for?
A. Yes. I've been on site visits on numerous -- over a hundred lawsuits over the years where we were on site, looking at all sorts of pollution conveyance systems. So I'm very familiar.
Q. Is this the type of an outfall that would be consistent with a large municipal storm water outfall?
A. It's different, but it's -- it's a pipe that's draining water into a water body. So it -- it's -- it's in -- whether it's a municipal pipe or a pipe from an -- an agricultural field, it's a pipe draining water into surface water.
Q. Are other types of drainage conveyances to surface water generally constructed of white PVC plastic like this one in the photo is?
A. I have seen others, yes. Duwamish River.
Q. Would the appearance and size of this pipe lead you to believe that it is a tile drain?
A. Yes, I would. Because it's a smaller pipe rather than a -- like a giant storm water pipe or overflow pipe.
Q. Would its depth from the surface of the land lead you to believe that it's a tile drain as opposed to some other

pipe?
A. By "depth," you mean the height?
Q. Yes.
A. Yes. Absolutely.
MS. KINN: I would move for entry of Exhibit A-50.
MS. NICHOLSON: We would renew our objection, Your Honor. Again, you cannot tell and she cannot tell where the other end of that pipe is, and she cannot establish that that is a tile drain pipe.
JUDGE FRANCKS: Okay. I -- first of all, I just want to remind counsel that one person -- one attorney for each party is going to be able to object at a time.
MS. NICHOLSON: Sorry, Your Honor.
JUDGE FRANCKS: I am going to allow this for illustrative purposes, but this is -- we need to keep in mind the issues in this case relate to the permit.
MS. KINN: Certainly, Your Honor. Thank you.
JUDGE FRANCKS: A-50 is admitted.
(Exhibit A-50 admitted.)
BY MS. KINN:
Q. Ms. Joerger, do you ever take samples of discharges from tile drains when you are in the field?
A. Yes.
JUDGE FRANCKS: Ms. Kinn, will you tell us as you go along what exhibit you are looking at so we can look at

it?

MS. KINN: Sure. We are looking at Exhibit A-29.

BY MS. KINN:

Q. Is this a photo taken of you, Ms. Joerger, on or about March 6th of 2013?

A. Yes.

Q. Where were you here?

A. I am standing on the edge of Gear Road, which is just north of Burlington in Skagit County.

Q. What does this photo depict you doing?

A. So I have a long pole. My hands are gloved, and there is a tile drain at -- by the end of the long pole, that I had seen running water out of and came back with sampling equipment.

There's a small bottle at the end of the pole that you can't see. And I took a water sample from this tile drain.

Q. What type of property is this drain coming out of?

A. This is the -- the property behind there is a dairy farm.

Q. Can you actually see the tile drain in this photo?

A. You cannot. It's tucked into the vegetation. But you could see it pouring like a little waterfall out of there.

Q. Where does the water that you can see in the ditch in the photo flow to?

A. So if you follow the ditch to the left, it goes under the railroad tracks. It's the Old Highway 99, right by I-5, and it intersects with Joe Leary Slough.
Q. How do you know that?
A. You can drive right along it and see it. You can also confirm it with satellite photos.
MS. KINN: Your Honor, I would move to admit A-29 into evidence.
MS. HOWARD: Your Honor, same objections as before. Standing objection, I guess, on relevance.
MS. KINN: The relevance of this photo will become apparent with the next line of questions.
JUDGE FRANCKS: Okay. I'm going to allow it.
MS. KINN: Thank you, Your Honor.
JUDGE FRANCKS: A-29 is admitted.
(Exhibit A-29 admitted.)
BY MS. KINN:
Q. Ms. Joerger, did you, in fact, collect a sample on this day?
A. I did, yes.
Q. A sample of the water that you saw discharging from this tile drain at this dairy operation?
A. Yes. I did sample that.
Q. What did you do with that sample?
A. I -- I took it to Fremont Analytical Labs in Seattle,

transporting it on ice, as required, in a cooler, and got it to the -- to the -- Fremont Analytical in time -- within two hours.

Q. Were you trained by that lab in how to collect that sample?

A. Yes, I was.

Q. Did you follow that protocol?

A. Yes, I did.

MS. KINN: Your Honor, we are now pulling up Exhibit A-27.

MS. HOWARD: Your Honor, the same objection here. I guess I'm just having a hard time understanding how sampling and -- and the water samples are related to the permit terms. So again, another objection on relevancy grounds.

JUDGE FRANCKS: That objection I'm going to sustain because I think this is outside of her personal knowledge. And I think it was clear in the motions in limine that we were going to limit this to Ms. Joerger's actual personal knowledge of these things.

And I think I've been pretty lenient with this. But this is beyond the scope of the permit terms, which are the issues that are before the court today.

MS. KINN: The discharges of bacteria coming from a dairy operation into surface water would be squarely within

Issue 10, though.

JUDGE FRANCKS: Issue 10 is whether -- is it not whether surface water discharge monitoring should be happening under the permit?

MS. KINN: Yes.

JUDGE FRANCKS: So she can talk about how she thinks that surface water -- there's some problem. But the lab results from 2013 are not related to the 2017 permit.

MS. KINN: Okay. I can move along, Your Honor. But I am simply trying to illustrate facts known by Ms. Joerger about the discharges that she has observed for many years in the field and the impacts of those discharges on the community that we seek to represent.

JUDGE FRANCKS: Okay. There's a line. And this is beyond the -- my line.

BY MS. KINN:

Q. Do you recognize this photo, Ms. Joerger?

A. Yes.

MS. KINN: This is Exhibit A-33, Your Honor.

BY MS. KINN:

Q. Who took this photo?

A. I took this photo.

Q. Was it taken on or about October 13th of 2013?

A. It was October 31st. Halloween.

Q. 31st.

Does this accurately depict what you saw on that day?
A. Yes, it does.
Q. What does it show?
A. I'm standing at the end of Green Road. This is, again, north of Burlington. And this is -- we talked a lot today about manure application to ground. This is a -- what's called a "big gun," and it's pumping -- there's manure from a lagoon, and it's being spread on a grassy field.
And you can see that the -- where the manure has been spread, both in the foreground and where the actual spray is going is -- is extremely covered in manure.
Q. What month is this?
A. This is October 31st. It had been raining and was predicted to rain.
Q. Where is Joe Leary Slough in comparison to where you're standing?
A. Joe Leary -- I had to really zoom in on this. But Joe Leary is in the -- is in the foreground. And my concern with this photo is that the volume of manure laying on the field at the beginning of the rainy season was going to move into Joe Leary Slough.
MS. HOWARD: Your Honor, we're going to object to that testimony. And, again, this line of questioning. There's been no correlation between this testimony and the

actual permit terms, and I'm struggling with how a photo at one dairy, on one day, four years before the permit was actually issued, has any relevance to the permit terms itself. So, again, an objection on relevancy grounds.

JUDGE FRANCKS: I am -- I'm going to allow it. And I -- I'm going to allow a little bit of leeway to demonstrate what the concerns are with the -- with PSA and the various appellants. But I do think the board is going to give it the weight it deserves.

MS. KINN: Thank you, Your Honor.

BY MS. KINN:

Q. What concerns --

JUDGE FRANCKS: So A-33 is admitted.

MS. KINN: Thank you.

(Exhibit A-33 admitted.)

MS. KINN: We are now opening Exhibit A-41. Another photo.

BY MS. KINN:

Q. Ms. Joerger, do you recognize this photo?

A. Yes, I do.

Q. Is this a photo that you took in April of this year, 2018, just last month?

A. Yes. April 11th.

Q. Where were you standing when you took this photo?

A. I'm standing on Kelleher Road, which is north of the

City of Burlington, and I'm looking kind of to the southeast.

Q. What does this photo depict?

A. Okay. So in the foreground is vegetation around Thomas Creek, and it indicates there's a -- you can see a manure hose that's attached to what's called a "manure injector."

You can see a little bit of puddles on the surface of the -- of the soil, and very little vegetation.

Q. Is this a true and correct depiction of what you saw that day?

A. Yes, it is.

Q. Do you know the name of the dairy farm that was conducting this operation?

A. Yes, I do.

Q. What is the name?

A. It is DeBoer Dairy.

Q. Do you know about how many cows DeBoer has?

A. I believe they have over a thousand cows.

Q. What concerned you about this photo?

A. I was concerned that there was no vegetation at the time that there was -- that the manure was being injected. I was also concerned about the -- the puddles on the surface of -- of the water and whether there would be any transport of bacteria.

Q. Into Joe Leary Slough?

A. Into Joe Leary Slough.

MS. HOWARD: Your Honor, I'm sorry. Objection. Again, Ms. Joerger is not here to testify as an expert. We have not established that she would have the ability to make that determination and so, again, I'm going to object as this being well outside the scope of the testimony that she was intended to offer today.

MS. KINN: Your Honor, this evidence illustrates that the current permits in the no pollution prevention plan requirements are inadequate, leaving people like Ms. Joerger in Washington to sometimes guess about what they're seeing.

But given all the information known to us by the agency and by this permit, this does not seem to be in compliance, allowed, or -- the community and the waterways are not protected from activities like this because the permit is inadequate. And that's exactly why environmental counsel have appealed and are here this week.

MS. HOWARD: We have stipulated to standing in this case. We're not objecting to whether they have standing to bring their appeal.

But again, my concern here is that we're -- testimony is being offered where there hasn't been the type of foundation that is necessary to be laid in order to make a determination about whether the permit terms are adequate or even if the permit terms were applied here or not.

So again, we're really far, far away from a fact witness type of testimony.

JUDGE FRANCKS: I'm going to sustain the objection to the extent that the witness is making some conclusions about whether the permit is being complied with. Because this -- it's a -- it's hard to see from the photo what's happening.

I -- I am happy to have her testify about what she saw and what she took a picture of. But I think the conclusions that she's drawing are beyond a fact witness.

MS. KINN: Understood. Thank you, Your Honor. We are pulling up Exhibit A-43 at this time.

JUDGE FRANCKS: So I excluded A-41.

BY MS. KINN:

Q. Do you recognize this photo?

A. Yes, I do.

Q. Did you take this on or about March 28th of this year, 2018?

A. Yes, I did.

Q. What does it show?

A. It shows a manure injector with a hose attached to it on a bare field, with water puddled on the ground and water in a ditch.

JUDGE FRANCKS: What number are we on? I'm sorry.

MS. KINN: A-43.

BY MS. KINN:
Q. And from where were you standing when you took this photo?
A. I am standing on Hickox Road, which is between -- south of Mt. Vernon and north of Conway.
Q. Do you see a ditch in that photo?
A. Yes. There's a ditch that's in the foreground.
Q. Where does that ditch lead to?
A. That ditch -- if you look at the line of trees in the back, that's the location of the Skagit River, and there's a dike along that, and I've traced that ditch using satellite photos and my vehicle to -- to the Skagit River.
Q. Does this photo concern you?
A. Yes. Yes. I was concerned because of the amount of volume of water and the bare ground on which the manure was being injected.
MS. KINN: Your Honor, I would move to admit Exhibit A-43 as illustrative of this fact witness, Sue Joerger's, observations in the field.
MS. HOWARD: We'll object, again, based on relevance and foundation.
JUDGE FRANCKS: I'm going to admit A-43.
MS. KINN: Thank you, Your Honor.
(Exhibit A-43 admitted.)
BY MS. KINN:

Q. Ms. Joerger, aside from what you've observed in terms of the spreading of manure onto areas of land, are there any other areas of CAFOs that concern you in terms of pollution?
A. Yes. I'm concerned about manure lagoon failure. I was -- visited Sunnyside, Washington, where I was shown houses where a manure -- that were downstream when a manure lagoon failed. I'm concerned about pumping of -- of water into waterways and also production.
MS. KINN: Your Honor, we're pulling up Exhibit A-46 for reference.
BY MS. KINN:
Q. Do you recognize this photo?
A. Yes, I do.
Q. Did you take this in November of 2014?
A. 2013, yes.
Q. What does this photo show?
A. This is a little heifer operation with cows eating on one side and defecating on the other side. A significant amount of rain water puddled on the -- on the ground. In the foreground is a drainage ditch that leads directly to Thomas Creek, which flows into Samish Bay, where there's a number of commercial shellfish and -- operations.
And my concern here was that with the significant rainfall at this time, that -- that some of the feed and

manure could be transported into the ditch.
Q. Can you explain to us where the puddle is that you're seeing between the heifers and the ditch?
A. It's the shiny -- the shiny --
Q. Kind of right in the middle, where the road bends?
A. Yeah.
Q. Have you seen water coming down into the ditch from areas like this?
A. From areas like this, or this area?
Q. Areas like this --
A. Yes.
Q. -- in general.
A. I have seen that. Yes.
Q. How do you know that this ditch leads to Thomas Creek?
A. You can drive right along it and stop on the bridge and look back and see the -- the pipe.
Q. How many feeding operations like this have you observed?
A. There's -- I've looked at most every dairy in Western Washington, and a number in the Yakima area, and there are many open feeding areas.
Q. Is this a typical example of what you might see?
A. Yes.
MS. KINN: Your Honor, I would move to admit A-46 into evidence.

MS. HOWARD: Same objections. Relevance, foundation, and some of that actually was going beyond the scope of a fact witness, as well.

JUDGE FRANCKS: I'm going to admit A-46.

MS. KINN: Thank you, Your Honor.

(Exhibit A-46 admitted.)

MS. KINN: We're now pulling up A-47.

BY MS. KINN:

Q. Do you recognize this photo?

A. Yes, I do.

Q. What does this show?

A. This shows another animal -- covered animal feeding operation. And the -- the structures on the left are where the cows are kept. And this is -- I took this photo because I saw water running off from the barn area and the area in front of that, and was concerned about any transport of manure from the facility into the ditch, which goes horizontal across the -- the photo there, and eventually drains to the Skagit River.

Q. You took this photo; right?

A. I did. I took that on April 17th.

Q. Of this year?

A. 2018. Yes. This spring.

Q. Were you able to stand and clearly watch that trickle of water go from that area into the ditch?

A. Yes.
Q. Do you know the name of this dairy?
A. I do.
MS. HOWARD: Objection, Your Honor. Relevance. I don't think we need to put the name of the dairy into the record. It's not relevant to the CAFO permit.
MS. KINN: We're happy to leave names out if that's what the board and Your Honor prefers. We were just trying to connect this directly to the permit terms, which is what I thought Ms. Howard was making a necessity in terms of relevance, which we can do.
MS. HOWARD: Again, I would just say that the dairy name is not relevant to that issue.
JUDGE FRANCKS: I'm going to sustain that part of the objection. So we don't need to use dairy names. But I do think it's important that Ms. Joerger was the person taking the picture and can tell us where it is.
MS. KINN: Thank you, Your Honor.
BY MS. KINN:
Q. Where does this ditch lead?
A. This ditch -- I'm standing on Beaver Marsh Road, which is near Rexville. Little town of Rexville. Rexville store. And -- and it does -- it leads to the Skagit River.
Q. How do you know that?
A. I've studied where the ditches run along the road, as

well as satellite photos that show the connections.

MS. KINN: Your Honor, I would move to admit A-47 into evidence.

MS. HOWARD: Same objections. Relevance.

JUDGE FRANCKS: I'm going to admit A-47.

MS. KINN: Thank you.

(Exhibit A-47 admitted.)

MS. KINN: We're now pulling up A-39.

BY MS. KINN:

Q. Ms. Joerger, do you recognize this photo?

A. Yes, I do.

Q. Did you take this in April of 2018?

A. Yes. I took it on April 17th.

Q. Where were you standing when you took this?

A. I was standing on Chilberg Road and sort of looking to the northwest. And this is near La Conner.

Q. What does this photo depict?

A. This is a tractor pulling some kind of machine -- pumping machine that was running at the time. You could hear it running. And there's a white hose that goes into some kind of muddy puddle or attached to something in the ditch there, and there's another hose that is where the -- the darker hose where the water is going out.

So this was running, and it attracted my attention. I was on my bicycle at the time.

Q. Based purely on what you observed on this day when you took this photo, what was happening on the land on this which was occurring?
A. Well, it -- it -- there was just a lot of water on the land. There had been a considerable amount of rain, and it was puddled. And -- and I was concerned because the hose was -- was where the -- what they were pumping and where they were pumping it to.
Q. Was this a dairy operation?
A. Yes. This is a dairy.
MS. KINN: We're opening A-38. They kind of interconnect.
BY MS. KINN:
Q. Ms. Joerger, do you recognize this photo?
A. Yes. I took this on the same day. It's just, like, one frame over from the equipment that you just saw, also on Chilberg Road.
Q. Thank you.
What does this show?
A. Well, if you could -- it's hard to see from -- with the lights on here, but the hose wanders across the field, and then there's a dike in the distance, and that is a channel that leads to the Swinomish Channel. There's a waterway there. And you can see the hose actually go up over the dike and -- and -- yeah.

Q. How do you know there was anything in this hose?
A. Well, the hose is what they call "charged," because it's full. If it had nothing in it, it would be flat. So -- and the pump was also running.
Q. How do you know that ditch that the other end of the hose is in goes to the Swinomish Channel?
A. I confirmed it by looking at aerial photos of the -- satellite photos.
MS. KINN: Your Honor, I move to admit A-38 and A-39.
MS. HOWARD: Objection, Your Honor, on relevance. Again, we -- we have no idea what this tractor is doing. We don't know what the conditions of this field are.
So we could have had a heavy rainstorm the day before, and we just -- we have no foundation for how this -- these photos are actually relevant to any of the permit terms.
JUDGE FRANCKS: I'm going to sustain that objection. I think there's a lot of speculation in that description of what is happening. So I'm going to exclude A-38 and A-39.
BY MS. KINN:
Q. Did you report what you saw in April 2017 as depicted in those photos to anyone?
A. Yes. I reported it to the Department of Ecology's

Earth's Reporting System for the Northwest Regional Office. It's a paper form that you fill out online, and I also included these photos.

Q. And then what happened?

A. Nothing. And then I contacted the Department of Ecology and asked who had been assigned to do the inspection of the site, and found out it was given to Kyrre Flege who is an inspector for the Department of Agriculture.

So I -- I can't remember -- I e-mailed or called Kyrre and asked him what the follow up was on the situation.

MS. KINN: We're pulling up Exhibit A-45, Your Honor.

BY MS. KINN:

Q. If you scroll to the second page of this exhibit, Ms. Joerger, is that your e-mail to Mr. Flege in which you inquired about several pollution discharge incidents that you had reported?

A. Yes.

Q. If you scroll up to the first page, did Mr. Flege provide you the response in the first paragraph of that e-mail as to the photos that were just shown?

A. Yes.

Q. Can you read his response, omitting the name of the dairy operation, please?

A. I would, if I could --

Q. I'm sorry. Please turn to A-45 in the binder.
A. "I contacted the dairy and let them know that this was likely a violation of state water quality laws, specifically, the criteria for salmonid spawning, rearing and migration, with turbidity in mind. This is not something that we have done much enforcement with in the past, but is certainly something to keep an eye on. I'm visiting the farm tomorrow afternoon to discuss it further. Still under investigation. Enforcement decision pending. Great photos, by the way."
Q. What was your impression of Mr. Flege's response?
A. I was -- I was excited, actually. I've worked with other Department of Agriculture inspectors in the past --
MS. HOWARD: Your Honor, objection. Again, this is so, so far beyond the scope of this hearing at this point. Enforcement, reporting enforcement, concerns about enforcement, well, well beyond the scope of the issues before the board.
JUDGE FRANCKS: I think we are on the edge of relevance, but I'm going to let you go a little bit further.
MS. KINN: Thank you.
BY MS. KINN:
Q. Were you surprised that Mr. Flege didn't bring up the CAFO permit in his response?
A. I was -- I was surprised that he didn't -- that he actually responded. So I didn't have any expectation

about --

Q. And he affirmed it was a pollution issue of concern?

A. Yes.

MS. KINN: Your Honor, I would move to admit A-45.

MS. HOWARD: Objection, Your Honor. Relevance. It's based upon hearsay, as well. So I guess that's a foundation objection, as well.

JUDGE FRANCKS: So in our board, we can take hearsay evidence if it's information that's based on something a reasonably prudent person would rely upon.

I don't think this raises to that level. So I'm going to not admit it at the moment.

MS. KINN: Your Honor --

JUDGE FRANCKS: Especially because there are a number of other things that are discussed in that e-mail.

MS. KINN: I believe this e-mail is a public record, having coming from a Washington Department of Agriculture employee to Ms. Joerger. It's a matter of public record, which would make it admissible.

JUDGE FRANCKS: Here's what we're going to do. It's 2:30. So it's a good time for our 10-minute break. I'm going to reserve ruling on this, and I will rule on it when I get back.

(Off the record from 2:34 P.M. to 2:50 P.M.)

JUDGE FRANCKS: We were talking about --

MS. HOWARD: Your Honor, we're going to withdraw our objection. This is Exhibit 45.

JUDGE FRANCKS: 45.

MS. HOWARD: We'll withdraw our objection to this document.

JUDGE FRANCKS: All right, then. 45 is admitted.

MS. KINN: Thank you, Your Honor.

(Exhibit A-45 admitted.)

MS. KINN: Your Honor, I have in my hand several copies of a document that was not on the list because Soundkeeper just received it only recently.

It is a Department of Ecology publication that came out in the last couple weeks that we just received, and I would like the opportunity to ask Ms. Joerger a couple of questions about it.

JUDGE FRANCKS: Do we have objections to this? Has everybody seen it?

MS. HOWARD: We did. We got it Saturday, maybe.

MS. KINN: Friday.

MS. HOWARD: Pretty late in the day on Friday. It's well outside of the time limit of when exhibits were due. And again, we have some relevancy objections, as well.

MS. BARNEY: Ecology's objections are based on relevance.

MS. KINN: I think the exhibit speaks for itself.

MS. HOWARD: Your Honor, we're going to object to it as a demonstrative exhibit, too, if that's what we're discussing now, because of the lateness of time and relevancy.

JUDGE FRANCKS: How many pages is it?

MS. KINN: Two. Very quick.

MS. HOWARD: The document that we received was about 40 pages. So this is not the same document.

MS. KINN: This is an excerpt. This is the cover and a relevant page of a 38-page document of high-resolution photos taken by Department of Ecology. So again, this would be aerial photos all around Puget Sound. It's a monitoring program that Ecology administers.

JUDGE FRANCKS: And does it have something to do with this permit?

MS. KINN: It does. And the question that Ms. Joerger just answered. It shows an aerial depiction of the very ditch into the Swinomish Canal that Ms. Joerger was showing photos of and e-mailing Mr. Flege about it, and it shows the appearance of the water coming out of the ditch and what it did to Swinomish Canal.

Department of Ecology happened to take this photo the exact day after Ms. Joerger documented what she documented happening at that site.

MS. HOWARD: And this would go, again, also well outside of the scope of what a fact witness would be testifying to, looking at a Department of Ecology photograph and trying to interpret what that photo means. Further grounds for objection.

JUDGE FRANCKS: I am going to sustain the objection. I -- there's a limit to how many late-produced documents you can have in the case, and if -- if you haven't gotten everyone's buy off, then I don't see the relevance of this. So I'm going to exclude that.

Was it marked?

MS. KINN: No. It would be marked --

JUDGE FRANCKS: So it wasn't on your list. Okay.

MS. KINN: I would return to Exhibit A-27 for a moment. Your Honor, I would like to make an offer of proof as to this lab report from Fremont Analytics. A-27.

If Ms. Joerger is allowed to testify to this, we would show that tile drains, in fact, discharge in a manner that causes pollution in surface water, which is very much in issue in this case. It's wrapped into Issue 10.

The board has already heard testimony that tile drains are not monitored or controlled by this permit, even though they constitute discharges.

JUDGE FRANCKS: I've already excluded the lab report. I think that's beyond the relevance of the issues

in this case. So I don't think that's necessary.

MS. KINN: That concludes my questions.

JUDGE FRANCKS: So, Ms. Joerger, other people get to ask you questions now.

THE WITNESS: Great.

JUDGE FRANCKS: So who is going next?

MS. BARNEY: Me.

CROSS-EXAMINATION

BY MS. BARNEY:

Q. Hello. My name is Phyllis Barney. I'm representing the Department of Ecology. Can we turn back to Exhibit A-33.

So, Ms. Joerger, I think earlier you testified to this as a practice that you observed and photographed?

A. Yes.

Q. Are you familiar with the 2017 CAFO permit?

A. No.

Q. So can you tell us if this facility -- I understand that this dates back to 2013.

Can you tell us if this facility was under the previous form of the permit -- the 2006 permit?

A. This dairy's not under a CAFO permit.

Q. In terms of what practices are appropriate or what practices are found in the 2017 CAFO permit, you said you

weren't familiar with the permits. You can't speak to whether those practices were being applied at this particular facility?

A. This was 2013, and what I observed was -- I -- is an excessive amount of manure being spread on a grassy field so that it's covered up -- obscured during the rainy season. And I don't believe that's the best management practice.

Q. Can we look at Exhibit A-39, please.

I believe you testified that you observed that just recently, April of this year?

A. Yes, I did.

Q. Is this facility a facility that you are aware that is under the CAFO permit?

A. I do not believe it's under -- there are very few dairies under the CAFO permit. So this is not -- it is not under the CAFO permit.

Q. Again, because you stated that you're not familiar with the CAFO permit, you couldn't describe to us whether or not this facility has applied any of the land application best management practices?

A. I don't know if it's applied or not. This was the first time I observed this facility with any kind of operation going on.

Q. Thank you.

MS. BARNEY: A-45 is the ERTS report we were just

discussing?

JUDGE FRANCKS: Yes.

BY MS. BARNEY:

Q. Take a quick look at that.

I believe you testified, when Ms. Kinn asked you, after you made these ERTS reports what happened, and you said nothing. And then you said you then contacted Ecology, who in turn, put you in touch with the WSDA inspector?

A. Correct.

Q. This information that you received from the inspector, do you interpret this as still -- that nothing was done on the basis of your ERTS report?

A. No. My comment on nothing was done was that Ecology did not get back to me on who was assigned to do the inspection, what the ERTS number was, and that I had to contact Ecology to find out what happened to my pollution report.

Q. Have you been back in touch with Washington State Department of Agriculture since this e-mail that is this exhibit?

A. I e-mailed Kyrre to say, "Thank you," and let me know how he followed up on each of those, and I have not heard back from him.

MS. BARNEY: Thank you. That's all Ecology has.

JUDGE FRANCKS: Ms. Howard?

MS. HOWARD: Yes, thank you, Your Honor.

CROSS-EXAMINATION

BY MS. HOWARD:

Q. Let's stay on Exhibit 45, if you don't mind. Do you have that in front of you?

A. I will reopen the book. I do now.

Q. Perfect. Thank you.

So it looks to me like on Exhibit 45 there are five different ERTS reports that are at issue; is that correct?

A. That's correct.

Q. Were those reports that you made?

A. Yes.

Q. Were those reports reflected in any of the -- connected to any of the photographs that we saw today?

A. Let's see. Yes.

Q. Which ones are those?

A. I'm just reading through again, just to make sure.

Q. No problem. Take your time.

A. So I believe there are -- in addition to the first one, that there are three other ones.

Q. Which ones were those?

A. The -- the second one, the third one, and the last one.

Q. Okay.

The first one here, do you recall which photographs

those were? I'm sorry. I'm not able to get that connection from your testimony.

A. It was -- I don't have the photo references. But it was the one where the water was being pumped by machinery from the field, over the ditch, into the Swinomish Channel.

Q. Can you read the last two sentences of the paragraph related to that one? Sorry. The last -- the second and third to last sentences of that paragraph.

A. "This is not something that we have done much enforcement with in the past but is certainly something to keep an eye on."

Q. Then the next -- actually, the next two sentences. Thank you.

A. "I'm visiting the farm tomorrow afternoon to discuss further. Still under" -- "under investigation. Enforcement pending."

Q. "Enforcement decision pending."

So it does appear that the Department of Agriculture was following up on your concerns?

A. Yes.

Q. And they were considering whether to issue an enforcement decision or not?

A. That's how I read that, yes.

Q. Okay. Let's look at the next paragraph. Which photograph does that particular one refer to?

A. I believe that was the one that was excluded. That was -- I don't have a way to tell which photograph.
Q. They are actually in the binder right there in front of you. The exhibits are.
A. Which exhibit would that be?
Q. I'm not sure.
A. I don't know where they are. So someone will have to tell me.
Q. It should be in your binders. This is A-39 and A-38.
A. Sorry. I'm not as familiar with the bindering system.
Q. No problem.
A. Again, tell me which number.
Q. I am not sure. Because you indicated that these were linked to some of your photos, but I don't know which ones. So you'll have to tell me which photos these correspond to.
A. Where would I find the photos?
Q. They're the photos that we just looked through. So the exhibits are A -- so those photos begin at A-33.
A. A-33. All right. Thank you.
Q. You bet. Sorry. I'll try to be more helpful. It looks to me like --
A. A-33. Well, this is not -- this is --
Q. So I think from your -- the exhibit list that we have here, it might start around A-38. Because those appear to be April photos and March photos of this year.

A. So ask me what your question is again. I've kind of gotten lost in what we're trying to do here.
Q. No problem.
So do these photos correspond with the ERTS report that's being -- or the ERTS issue that's being discussed in paragraph 2 of this April --
A. No. That's from ERTS -- the first ERTS. 680759. Those are the photos from that.
Q. Okay.
Now let's -- then if we could find the photos that correspond to the second ERTS in this e-mail. Are you not finding them?
A. I am not finding them.
Q. Okay.
A. I can describe the photo. It was manure injection off of Kelleher Road.
Q. Okay. That will work. Let's just go with that so we can keep on moving.
A. Okay. I'm sorry.
Q. No. That's okay. No problem.
Do you see the second line there, where -- is it Kyrre? Am I saying that correctly?
A. I don't know if I'm saying --
Q. Kyrre Flege?
A. I'm not sure if I'm saying it correctly.

Q. Department of Agriculture says, "We've been watching that area closely because of some high counts observed on Kelleher Road which drains to Thomas Creek."

Then the line underneath that it says, "I've found that the dairy made a safe application to that area with no evidence of discharge, including subsurface injection, generous setbacks from waterways, and disking edges before application."

Do you see that paragraph?

A. Yes.

Q. So it appeared that the Department of Ag did do an investigation and found that was actually a safe application.

Is that your understanding of this e-mail?

A. That is my understanding.

Q. Look at the third paragraph. ERTS 680760 is being referred to here.

Did you provide photos of that, as well?

A. Yes. That was the red barn photo with the discharge from the production area.

Q. Perfect. So A-47.

A. Um-hmm.

Q. You see, again, in the middle there where she writes -- or he. I'm not sure.

A. It's a he.

Q. -- "While it looks risky from the road, that area is managed pretty carefully."

Do you see that language there?

A. I see that language.

Q. So again, it would appear that the Department of Agriculture did look into this issue and came to a different conclusion than you did, at least?

A. I don't believe --

Q. I'm asking you for -- Department of Agriculture, what they're saying here.

A. I understand what they're saying, but I say looking at that does not tell me anything about whether there's bacteria in that discharge.

Q. They came to a different conclusion than you did; is that correct?

A. Well, I don't know that looking at -- looking at water can tell you whether there's pollution or not.

Q. But they came to a different conclusion than you did; is that correct?

A. I --

Q. You're disagreeing with the language on the --

A. No. I'm not disagreeing with the language.

Q. Thank you.

Then the next paragraph down -- ERTS 679726. Did you also provide photos on that today?

A. Not today, no.
Q. The last paragraph or second to last paragraph. Pardon me.
A. Yes. I provided photos. That was the -- bare earth photo from Hickox Road.
Q. Thank you.
And again, do you see the sentence about a third of the way down that starts, "This is an interesting one because of the time of the application, weather was good and it may not have been an issue"?
A. I also see that it says, "My sampling and investigation of 4/10 indicated that there had been a discharge a few days prior."
Q. Right. But with regards --
A. This was still under investigation with the enforcement decision pending.
Q. So they were investigating the issue?
A. Yes.
Q. And they were following up on it?
A. Yes. Correct.
Q. But with regards to the report that you made, they indicated that they didn't -- they thought it might not have been an issue?
A. Based on the dairy saying that the application occurred on March 15th.

Q. That information isn't in this e-mail, is it?
A. It's right there. It says, "It turns out the application occurred on 3/15." So this follow up was nearly a month later.
Q. Okay.
When you took the photos here today, did you take account for rainfall within the timeframe when you took the photos?
A. I did note when it was raining and when it hadn't been raining, yes.
MS. HOWARD: I have no further questions, Your Honor. Thank you.
JUDGE FRANCKS: Any redirect?
MS. KINN: Yes, Your Honor.

REDIRECT EXAMINATION

BY MS. KINN:
Q. I'm going to turn to Exhibit A-33, please, Ms. Joerger. Ms. Barney asked you about this photograph just a minute ago; right?
A. Yes.
Q. Is your impression that this facility should be covered by a CAFO permit?
MS. HOWARD: Objection, Your Honor. Calls for expert witness testimony or certainly technical testimony.

JUDGE FRANCKS: I'm going to sustain that.

BY MS. KINN:

Q. Ms. Joerger, have you observed discharges from this dairy operation of surface water?

A. Yes, I have.

Q. Has an agency covered this facility by a permit, to date?

A. No, it has not.

Q. Even though you've reported those discharges to that agency?

A. Yes.

MS. BARNEY: Objection. Relevance.

MS. KINN: Your Honor, we heard yesterday from an agency employee that in terms of how they evaluate whether a discharge occurs, one of the items they depend on is reports from the community. Mr. Jennings told us that yesterday. Reports often come from people exactly like Ms. Joerger just testified about.

JUDGE FRANCKS: But how does this relate to the permit?

MS. KINN: The permit covers only a small handful of facilities when there are actually some 500 that potentially discharge. And that many more of those facilities should be covered for the permit to have any effect at all.

JUDGE FRANCKS: Which issue is this addressing?

MS. KINN: Well, there are elements of many of the issues. I would say Issue 10, that the permit does not adequately protect against discharges to ground and surface water, in violation of state and federal law, because the agency has a permit.

It knows there are sites that should be covered by that permit which are discharging and coverage is not being required.

MS. BARNEY: Objection. Facts not in evidence.

JUDGE FRANCKS: I think that's beyond the relevance of the permit that we're talking -- in terms of the permit that we're talking about today.

MS. KINN: For the record, I would reflect that this was directly relevant to an issue that Puget Soundkeeper did not prevail on in summary judgment but which may be heard at some future date. So we'll turn now to A-39.

Your Honor, I would remove to admit this photo, given that both Ms. Barney and Ms. Howard asked Ms. Joerger about the photo. I would not quite understand why either of them would ask her about the photo and what it depicts if it was not relevant to the proceedings we're here about today.

JUDGE FRANCKS: Well, I excluded it because I thought it was irrelevant. So, no. We're going to keep it

excluded.

MS. KINN: Even though they asked about it?

JUDGE FRANCKS: Yes.

BY MS. KINN:

Q. Ms. Joerger, what you observed in this photo is clearly a discharge to surface water; is that correct?

A. That's correct.

MS. HOWARD: Your Honor, objection. It calls for expert witness testimony. We have not laid the foundation for that.

MS. KINN: I laid the foundation in my direct examination of Ms. Joerger, and it does not take an expert to see when water is gushing and flowing into surface water. It's very obvious in this case.

MS. HOWARD: Again, we have --

JUDGE FRANCKS: A, this is a photo that we've excluded. So let's not talk about that anymore.

MS. KINN: Your Honor, I would remove to admit this exhibit into evidence, given that both Ms. Barney and Ms. Howard asked about the details and -- never mind.

JUDGE FRANCKS: 45. Yeah. So 45 is in.

BY MS. KINN:

Q. In the third paragraph of this e-mail, Ms. Joerger, Mr. Flege is referring to his response to the incident that you reported depicted in A-47; isn't that right?

A. Yes.
Q. Isn't it true that nobody from Department of Agriculture was there to observe what you saw that day?
A. That's correct. As far as I know.
Q. To elaborate just a hair more on what you saw that day, in A-47 you actually saw water trickling down from the puddle in that process area into the ditch that led to surface water; right?
A. That's correct.
Q. Moving to the fourth paragraph of this e-mail from Mr. Flege, was it your impression that he was -- or anyone from Department of Agriculture was there to observe what you saw that day?
A. This is the fourth paragraph?
Q. Yes. I'm sorry. The fifth paragraph.
A. Fifth paragraph. Okay. Let me -- can you ask the question again?
Q. Was it your impression from Mr. Flege, during your e-mail communications and any phone calls you may have had, that anyone from Department of Agriculture was there to observe what you saw that day?
A. No.

MS. KINN: That's all, Your Honor.

JUDGE FRANCKS: Ms. Joerger, now the board members can ask you questions.

MS. MARCHIORO: Nothing.

MR. WISE: No questions.

JUDGE FRANCKS: They don't have any questions. So you are excused. Thank you very much.

THE WITNESS: Thank you.

(WITNESS EXCUSED.)

JUDGE FRANCKS: Mr. Snyder, do we need a five-minute break?

MR. SNYDER: Just a minute, Your Honor.

MR TEBBUTT: At this time, Soundkeeper Alliance, et al., move for judgment as a matter of law with regard to -- under -- this is under CR 50(a).

You've heard repeated testimony from Ms. Redding today that there is no AKART for existing lagoons, which are authorized to discharge pollutants to groundwater under this permit. We have no dispute about that.

State law requires AKART for discharges, RCW 90.48.010, the regulation under which the permits are issued. WAC 173-226 requires the application of AKART prior to any discharge into the State's groundwater.

WAC 173-226-070(1) states, "Any general permit issued by the Department shall apply and insure compliance with all of the following, whenever applicable.

"Technology-based treatment requirements and standards reflecting all known available and reasonable

methods and prevention, treatment, and control required under RCW 90.48.010; 90.48.520; 90.52.040; and 90.54.020 may be imposed through any or all of the following methods." That includes, 4, the relevant one here.

"Permits issued or reissued by the Department shall be conditioned in such a manner as to authorize only activities that will not cause violations of this chapter."

Ecology admits as much in their briefing before the board. Ecology's response PSA's summary judgment motion on page 12.

In addition, the State's groundwater quality standards require imposition of AKART. That's WAC 173-200-100(3), which reads, "This chapter shall be enforced through all legal, equitable, and other methods available to the department, including but not limited to issuance of state waste discharge permits, other departmental permits, regulatory orders, court actions, review and approval of plans and specifications, evaluation of compliance with all known available and reasonable methods of prevention, control, and treatment of a waste prior to discharge, and pursuit of memorandum of understanding between the department and other regulatory agencies."

The evidence before the board is that no AKART is applied to existing lagoons. This is a direct violation of statutory and regulatory law, and it's my understanding that

the board makes the decisions on legal issues. And so we put this before the board members, Wise, Brown, and Marchioro. Thank you. Would you like to respond now or shall we hold it for later?

JUDGE FRANCKS: Well, would the other parties like to respond?

MS. BARNEY: Yes. Ecology has a response.

Mr. Jennings' testimony yesterday was that -- he testified yesterday that the entire permit as applied is AKART for CAFOs in the State of Washington. That also is included in our briefing.

Ms. Redding's testimony today with regard to AKART for existing lagoons was on this specific issue of permissible -- the performance standard of the ten to the minus six.

Part of the requirement of the permit is for the facility to undertake the evaluation that is in Tech Note 23. That evaluation is what Ecology is utilizing as a method of control here to try to determine what the status of existing lagoons are.

Because there is no information on this, the idea that those lagoons are meeting the same performance standard as a newly constructed lagoon, where there is control over what the permeability would be, is impossible to state at this point.

You heard testimony from both Mr. Jennings and Ms. Redding that at this point in time, Ecology does not have the information to ascertain the condition of these lagoons. Ecology's meetings prior to -- in discussions with industry and in discussion with the environmental appellants, their -- Ecology's understanding is that there are a lot of lagoons in operation out there, but there simply is no information available to determine those lagoons' compliance with any particular performance standard at this point.

So the permit, as part of the application of AKART, to the -- by the permit as a whole is requiring the evaluation of existing lagoons. And that's the basis where the permit itself is applying AKART. Although there is not a specific performance standard, the same way that there is for -- for new lagoons that are going to be newly constructed.

JUDGE FRANCKS: Thank you.

Ms. Howard, do you have a response, as well?

MS. HOWARD: No, Your Honor, we do not.

JUDGE FRANCKS: So I believe we need to take a break, then.

MR TEBBUTT: May I just raise two other points in response?

JUDGE FRANCKS: In response?

MR TEBBUTT: First of all, Ecology can't issue a

permit without AKART. They issued a permit, they shouldn't have done that, for existing lagoons. Not all.

Secondly, this is in direct response to Board Member Brown's question, where Melanie Redding confirmed for the second, third, or fourth time that there is no AKART for existing lagoons. Thank you.

JUDGE FRANCKS: And we will take a break and we'll be back.

(Off the record from 3:24 P.M. 3:42 P.M.)

JUDGE FRANCKS: So the board has considered the motion and the grounds presented and denies the motion. So let's move forward.

MR TEBBUTT: That was quick. All right. Well, the environmental appellants call Dave Erickson to the stand, and Mr. Erickson is at the stand.

JUDGE FRANCKS: Mr. Erickson, the court reporter will swear you in.

* * * * *

DAVID ERICKSON, having been duly sworn by the court reporter, testified as follows:

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DIRECT EXAMINATION

BY MR. TEBBUTT:

Q. Mr. Erickson, would you state your full name for the record?

A. David Erickson.

Q. Sir, what state do you reside in?

A. Montana.

Q. What town?

A. Butte, Montana.

Q. What's your occupation, sir?

A. I'm a hydrogeologist for Water and Environmental Technologies.

Q. Tell us a little bit about Water and Environmental Technologies.

A. It's an environmental consulting company that I started in 2000. We have about 60 employees now. We operate in about a seven-state area.

Q. What kind of work do you do, sir?

A. It varies, from civil engineering projects, to environmental permitting, to storm water, mediation, lagoon design, waste water treatment. We've got a very diverse group of engineers and scientists that cover a lot of ground.

Q. What types of scientists do you have on staff?

A. Biologists, geologists, hydrogeologists, and then

multiple engineering disciplines, such as civil, environmental, chemical, mechanical, and hydrogeological engineers.

Q. What companies or what entities do you work for, typically?

A. It ranges from large industrial clients to -- down to homeowners. We do a lot of work with septic systems and permitting septics. We've got a group that does that.

Industry includes coal fire generator plants across the west. Companies like Agrium, that process phosphorus in Silver Springs, Idaho. Multiple mineral companies, like telemining operations. It's varied over the years to encompass a lot of different companies and project types.

Q. Where do you live, sir?

A. I live outside of Butte, about 15 miles on a ranch.

Q. What kind of ranch?

A. Beef cattle ranch.

Q. How long have you lived there?

A. All but -- all but two years of my life.

Q. Have you had any dairy cows in your life?

A. I have not. My -- my grandparents, great-grandparents moved to Butte as dairy farmers to supply milk to the mines in Butte. That's been a few years ago.

Q. Just to avoid cross-examination by a couple of other people, how did we meet, sir?

A. About eight years ago you sued a client of mine over a mine site, tailing site in Colorado, and I was brought in to arbitrate that suit.
Q. What was the name of that company?
A. Pacific Core Energy.
Q. Are they -- who are they a subsidiary of?
A. Berkshire Hathaway.
MR TEBBUTT: Your Honor, at this time I would like to move the resume of Dave Erickson, which is A-3.
MS. HOWARD: No objection, Your Honor. I have a really hard time hearing the witness, though.
JUDGE FRANCKS: Can you pull that closer to you and speak up?
THE WITNESS: All right. Is that better?
JUDGE FRANCKS: It's better for me. Can you hear now?
MS. HOWARD: Yes, thank you.
JUDGE FRANCKS: A-3 is admitted.
(Exhibit A-3 admitted.)
BY MR. TEBBUTT:
Q. Sir, have you done an expert report in this case?
A. I have.
Q. Let's -- showing you what's been marked as Exhibit A-1. If you need to look at it, there's a binder in front of you you. Is this the expert report that you prepared for this

particular case?
A. It appears to be, yes.
Q. Do you want to look through it real quick and just make sure?
A. It looks like it, yes.
Q. Inclusive of your expert report are some exhibits; correct?
A. Yes.
Q. Will you please identify those for the board?
A. All of them?
Q. I believe there are three exhibits. Is that correct?
A. Are they all under A-1, or are they separated?
Q. I believe they're all in A-1. Let's just try to speed this up.

Attachment 1 to your report is a list of authorities that you relied upon in issuing your opinions. That's page 57. I'm sorry. Page 48.
A. Correct.
Q. Then that goes on for a couple of pages. Quite a few pages. Then we get into Attachment 2 to your expert report, which is on page 59.

Do you see that?
A. I do.
Q. Tell us what Attachment 2 is, please?
A. The groundwater data from the dairy cluster monitoring

wells.
Q. When you talk about the "dairy cluster," tell us what the dairy cluster is, please.
A. So there's a group of five dairies in the Lower Yakima Valley that the EPA identified as a cluster of dairies that they did further investigation on.
Q. So for the purposes of this hearing, when we discuss the "cluster dairies," let's define who they are. Who are they by name?
A. There's un -- one is the Cow Palace Dairy. There's a Liberty Dairy, a Bosma Dairy and two DeRuyter dairies.
Q. Is that George DeRuyter and Sons and D&A Dairy?
A. That's correct.
Q. And the Bosma and Liberty Dairy are both essentially Bosma dairies, and they're really kind of one operation; correct?
A. Yes. They are adjacent to each other. Application fields overlap.
Q. And they share manure management; correct?
A. Correct.
Q. George DeRuyter and Sons and DNA Dairy both share manure management; correct?
A. They do, yes.
Q. Let's take a look at Attachment 3 at page 96. What's Attachment 3, sir?

A. It's my expert report for the Cow Palace litigation.
Q. When was that done? I think on the last page it will tell you.
A. It's dated September 22nd of 2014.
Q. Thank you.

This report was one you did for the federal court in the Care and Center for Food Safety versus Cow Palace case; correct?
A. Correct.
Q. That was in front of Judge Rice in the Eastern District of Washington Federal Court?
A. Yes.

MR TEBBUTT: Your Honor, at this point I would move A-1 into evidence.

MS. HOWARD: Your Honor, we will object, particularly on the relevance ground. As you may recall, this was the subject of our motion in limine, as well.

Attachment 3 and portions of the report and the attachment to, as well, relate to the Cow Palace matters and the cluster dairies. Our concern is that it hasn't been established how any of that information is actually relevant to the issues that are on appeal before the board, and in particular, any issues that are -- that remain before the board. I do not believe that has been established yet at this point, either.

MR TEBBUTT: Your Honor, I can assure you that this goes to the heart of the matter. This is all about groundwater monitoring. It's the most comprehensive set of information that has been compiled in the State of Washington, perhaps, other than an EPA report that is also the basis for this. And it will all be established through the next, probably, day's worth of testimony of Mr. Erickson.

JUDGE FRANCKS: So what's it relevant to?

MR TEBBUTT: It's relevant to the groundwater monitoring issue, the lagoons leak, that over application of fields causes contamination of groundwater. That animal pens cause contamination of groundwater. That compost areas constitute another source of contamination of groundwater. It goes to the central issues of the case.

These are five of the largest dairies in the state. Cow Palace is considered one of the best in the state, and it was found to cause an imminent substantial endangerment to health and the environment by a federal district court judge, and this court should give great deference to that decision and the discussions that will go on around this.

MS. HOWARD: And again, Your Honor, none of those facts are yet in evidence. So at this point, we continue to object on the basis of relevance.

JUDGE FRANCKS: Well, I'm going to admit the

report, and I'm going to include the attachments, and I assume you'll proceed with things that are relevant to the issues that are before us.

MR TEBBUTT: We absolutely will.

(Exhibit A-1 admitted.)

BY MR. TEBBUTT:

Q. Mr. Erickson, are you also familiar with -- I believe you mentioned the EPA report that was done in the Yakima Valley. That was done between the period of about 2010 to 2012; correct?

A. That's correct.

Q. Is that a report that you have studied?

A. It is.

Q. Is that one that you've relied on in forming your opinions in this case?

A. Yes.

Q. And it's cited in your Cow Palace report?

A. Yes.

MR TEBBUTT: Your Honor, at this time I would -- we did not include the EPA report as an exhibit because it is so voluminous. But we would ask this board to take judicial notice of it. It's available on EPA's website. It's been available on EPA's website for some six years now. Counsel has been made aware of that for -- since the beginning of time in this case. That that document is important and

relevant to this case. And we would ask the court to take judicial notice of it, as it will be discussed in this case, as well.

MS. BARNEY: Ecology objects to that request. It might have been cited in the expert report, but if Soundkeeper wanted it as an exhibit in this case, they could have included it, voluminous or not. We certainly have voluminous exhibits here.

MS. HOWARD: Your Honor, we would also object that it does not actually meet the standard under WAC 371-08-510 for the material facts that this board can actually take official notice of. And nor does it meet the matters of law that this board is able to take official notice of.

JUDGE FRANCKS: It's a report?

MR TEBBUTT: It's a report --

JUDGE FRANCKS: It's not a reported case?

MR TEBBUTT: No. It's a report on the -- done of 330 wells in the Lower Yakima Valley. Some 3300 groundwater wells -- well testings of those 330 wells over a period of a number of years, and the conclusions made in it were that the dairies were a significant source of contamination to the groundwater.

JUDGE FRANCKS: Well, it's not the type of document that we would take judicial notice of, and I think Ms. Barney's point that you could have added it as an exhibit is

well taken. So -- and it is now too late to do that. So I -- I'm not going to take judicial notice of it.

MR TEBBUTT: Okay. We think that, too, is improper, in that this board could take judicial notice of that large document.

BY MR. TEBBUTT:

Q. Sir, have you made general conclusions about whether large CAFOs in the State of Washington are more likely than not causing or contributing to groundwater quality standard violations?

A. I have.

Q. What is your opinion or conclusion?

A. Based on the investigation work that we did at multiple dairies, we found large groundwater plumes, extensive soil contamination, not just of nitrate but of multiple compounds emanating from these facilities.

Q. To reach your conclusions, what did you rely on? Let's go through the list.

Is the EPA report one of them?

A. The EPA report was the base document, because they had done some of the first investigation at and around these sites.

The second piece of information would have been the investigation that we completed on all of these sites.

Q. Tell the board a little bit more about that particular

set of investigations that you did.
A. Based on what we learned from the EPA report and the potential sources of contamination from the dairy, we went on these five dairies and collected soil samples in the pens, in the compost areas, around the lagoons, and in the application fields as part of a field effort that my team took on.

We collected literally hundreds of soil samples from all of these locations. They're all documented in my report and in this litigation report.

We combined that with -- and I won't have the exact number, but 40-plus monitoring wells around the facility, which we've added 12 in the last -- or 14 in the last two years. And we've collected -- or been part of the team that collects ongoing groundwater monitoring data from all of these sites on a quarterly basis, underneath the direction of the EPA and under a quality assurance plan approved by the EPA.
Q. So about how many people from your team -- from your shop were present on the site for the site inspection and sampling that you did in, I believe it was, May of 2014?
A. We had -- we had six scientists, total.
Q. Okay.
A. And two drilling rigs that collected soil samples and water samples.

Q. So the drilling rigs, what did you do with the drilling rigs? Let's talk about field sampling first for application fields.

What kind of activities did you do? How deep did you go with the equipment? Just describe for the board the kind of equipment that was used and what you did.

A. So there was probably 30 different identified fields between the five dairies, and we picked a subset of those fields -- about 10 or 12 -- and at each location we collected 10 samples, 10 feet deep, broke them down into one-foot intervals, composited them and then analyzed them for the nutrient -- nutrients of concern, if you will.

Q. What depth did you go down to?

A. We went to -- all the way to 10 feet, with all the samples, and then separated them into one-foot intervals so we could see the exact concentrations with each foot in each field.

Q. So what did that enable you to do?

A. Identify both the concentrations that were still within the root zone of the plants and concentrations that were below the root zone, headed towards water. It gave us a really good breakdown of -- of where the nitrate was in the field, as far as depth.

Q. So you tested the nitrate all the way down to the 10 feet in the fields?

A. Correct.
Q. And other constituents, as well?
A. Yes.
Q. What other constituent?
A. Other forms of nitrate, such as ammonia, Kjeldahl, nitrogen, organic nitrogen, phosphorus. And I think there's a few other -- Ph -- just general measurements.
Q. Then there are other metals and chlorides and things that were tested, as well?
A. I believe so, yes.
Q. For today's purposes, we're really focused on nitrate, ammonia, other nitrogen sources and phosphorus. Okay? So we'll focus on those for the purpose of this permit, because those are the most relevant issues.
Okay?
A. Okay.
Q. So you tested fields at all five of the operations? Cluster operations?
A. That's correct.
Q. And that took about a week to do all that work?
A. Yes. We were on site for a week.
Q. That was pursuant to the long, drawn out process with the federal court, where the lawyers argued over what the scope of the inspection was, and the court set up the parameters of what that inspection could allow.

Is that --

MS. HOWARD: Objection, Your Honor. Leading the witness.

MR TEBBUTT: Just background.

JUDGE FRANCKS: I'm going to allow it, in the interest of time.

THE WITNESS: That is true. We started out with the scope. It was pared down by the attorneys, by the judge. We arrived at a final scope, and then provided the documents to the defense attorneys -- the quality assurance project plan, sampling plan, all the information they requested -- and then we did the work. And I have to backtrack a little bit.

A bulk of the work was done over a week, but we have been -- we were back at different times to do an additional compost boring or collect some additional samples in locations where we may not have gotten as much data as we would like.

BY MR. TEBBUTT:

Q. And the attorneys for the dairies were present and the attorneys for the plaintiffs were present?

A. Yes. Attorneys and experts for both sides. Video camera crew. There was about 20 people total watching us collecting samples.

Q. So you split samples with the industries or the

dairies, as well; correct?
A. We did.
Q. That tells us what you did in the field. What about what inspections did you do of the lagoons?
A. A combination of visual inspection and borings around the edge of a couple lagoons. One boring in the middle of one lagoon.
Q. Is that --
A. We were limited on what the -- the defense would allow. They were concerned about dike stability and a few other issues that kept us off the lagoons and doing the borings that we wanted to do around those.
Q. Did you originally want to do some diagonal testing under the lagoons?
A. We did. We -- with the sampling equipment we use, we can easily just tilt the mass of the rig and take about a 20-degree angle. Get alongside the lagoon and go down and get samples below it, but we were not allowed to do that either.
Q. At that time were you allowed to do groundwater monitoring of wells around the lagoons?
A. We were not.
Q. Okay. Let me stop you there.
Had there been a number of wells put in place by EPA already on and around those facilities?

A. Yes. EPA had put in probably about 20, 25 wells, total.
Q. How did EPA -- if you know, how did EPA get the ability to put those wells on the property? Was it through the administrative order on consent with the dairies?
A. I believe it was. A lot of them weren't allowed to be on property. They were in county right-of-way. So there were some on the actual dairy property and some that were not.
Q. Some downgrading; some upgrading?
A. Correct.
Q. So those wells were installed starting when? 2013?
A. I think it might have been a little earlier than that. 2012 --
Q. Okay.
A. -- through 2014.
Q. Has data been collected from those wells on a regular basis since about 2013?
A. Yes, it has.
Q. Is that information included in the Cow Palace report, some of that?
A. Some of it's in the Cow Palace report, and some of it's, I believe, the second attachment to my expert report in this case.
Q. The EPA work that's being done, that's continuing

today?
A. It is.
Q. Under the "AOC," we'll call it?
A. Yes. There's two things going on. There's work under the AOC, which is continued groundwater monitoring. Then there's additional work under the consent decree that is additional monitoring of wells that are being sampled by the dairies.
Q. And the consent decree you're referring to is the consent decree between Care and Center for Food Safety and the dairies; correct?
A. Correct.
Q. Is information from the groundwater monitoring wells being collected on a quarterly basis?
A. It is. So all the wells were sampled quarterly for a list of analytes, that include nitrate and a lot of major minerals. Water quality parameters so we can learn a lot more about the aquifer and what -- what sources are contributing to the aquifer.
Q. Are those -- is that data being collected under a QAPP?
A. It is an approved QAPP with EPA.
Q. What's a QAPP or a QAPP?
A. It's a document that goes into great detail to explain how you're going to collect your samples, how you're going to handle your samples, what analysis you're going to run

with your samples.

That includes everything from the -- the way you're removing them from the well. What kind of pump you're using, to how you ship them to the lab. In a cooler, with ice at 40 degrees, to what type of preservatives you add to water samples to make sure that the -- the parameters within the sample are preserved until it gets to the lab where they can do analysis.

So it's a fairly lengthy document telling EPA how we're going to do it. Then there's usually follow up to say that the sample round met the requirements of the QUAPP. Therefore, the samples are valid.

So it's really just a quality assurance/quality control program so that everybody knows you're collecting good quality data that you can make decisions with.

Q. Is that the kind of information -- or the QUAPP, is that the kind of quality assurance that is done that would allow you to have, for instance, a peer-reviewed study?

A. It is. Yes.

Q. What kind of investigation did you do with respect to animal pens?

A. We -- we put the drill rig in the animal pens and collected multiple soil samples. I think there's four pen locations that we poked. We did the same as with the fields.

We collected data down to 10 feet, and separated those soil samples into one-foot intervals, and then analyzed them for a list of different parameters and contaminants.

Q. For compost areas, what kind of investigation did you do?

A. During the first go-round, I believe we only did one sampling of the compost areas to about 20 feet. We did the exact same program. Collected soil samples down to 20 feet, separated them into one-foot intervals, and then did the specific analysis of each one-foot interval.

Later we came back and did additional compost areas on -- on the other dairies to collect more data.

Q. Sir, I'm going to ask you to look at Exhibit A-67 in your binder. It's also up on the screen.

Do you recognize this document, sir?

A. I do.

Q. What is this document?

A. So through the EPA, this dairy cluster has to do an annual report that provides EPA with all of the groundwater data, field monitoring data, application data for all five of the dairies.

So this is the 2017 annual report for that group of dairies.

Q. And that one came just a few weeks ago?

A. Correct. March 1st.
Q. Is that the same kind of report that has been done for previous years?
A. It is. I believe they've been doing it since either '13 or '14.
Q. So this is just the most updated version; correct?
A. Correct. So all they've done is take the 2016 report, add one more year's worth of data to it, and presented it.
Q. So that has all the groundwater monitoring information in it?
A. It does.
Q. And it has the soil testing information in it?
MS. HOWARD: We're going to object on the grounds of foundation. This is a draft report. We haven't established that this gentleman is actually an author of this report.
So again, this line of questioning doesn't appear that we've laid a foundation for any of the questions that are being asked at this point. And again, a relevance objection, as well, with regards to this data and how it relates to the permit. Sorry. I'm getting a little more tired.
JUDGE FRANCKS: Do you want to lay some more foundation?
MR TEBBUTT: That's what I'm doing, Your Honor.

BY MR. TEBBUTT:

Q. So this report is drafted by the dairies; correct?

A. By their consultant, yes.

Q. By their consultant, yes.

Who is their consultant?

A. A company called "Anchor QEA."

Q. And that's changed over the years; is that right?

A. It has, yes.

Q. Who is the prior report done by?

A. There's been several. One was a company called "Inland Earth." Before that it was Arcadis.

Q. And that was -- the principal who was there was a gentleman by the name of...?

A. Kevin Freeman.

Q. Right.

Mr. Freeman was an expert for the dairies in the litigation; correct?

A. That's correct.

Q. Is this the type of report that you would normally rely upon for coming to conclusions about the impacts of facilities on the local environment?

A. It is, yes.

Q. Do you get copies of these documents as they are submitted to the EPA?

A. I do.

MR TEBBUTT: Your Honor, we would move A-67.

MS. HOWARD: Same objections, Your Honor. Again, I just want to point out, this is a draft report. It's not a final report. And we haven't established that he's the author.

So to the extent that he's going to be talking about this, I don't understand how he's laid the foundation to be able to talk about the contents of this particular document.

MR TEBBUTT: I can spend another five or ten minutes laying foundation, but we don't have forever.

MS. BARNEY: Ecology has an additional objection. This is a March 2018 report. Mr. Erickson's report was submitted in 2017. This document -- to the extent it contains old data, perhaps, but certainly more recent data -- could not be -- form the basis for his conclusions that are in his expert report submitted in this case.

MR TEBBUTT: It has all the cumulative information, as well, from the groundwater monitoring. Again, I could spend 10 more minutes asking foundational questions. It has the whole history of all the groundwater monitoring information in it. It's submitted to EPA in draft form.

EPA has a certain amount of time -- I think I asked Mr. Erickson this -- to review it and say, "Okay, we've got this problem with it, this problem, you need to add this,

that, or the other thing to it." But it's basically the information. Nothing major changes in it every year.

We could have used the 2016 report. But then we would have got an objection that it was old data. So we have given them the most recent data so we can get this in front of the board and use real fresh data.

JUDGE FRANCKS: So this is not a report that he's authored?

MR TEBBUTT: That is correct.

JUDGE FRANCKS: But it's data that he's relying on in his expert report?

MR TEBBUTT: That's correct.

JUDGE FRANCKS: But not the newer data?

MR TEBBUTT: Well, not for the old report. But I mean, I could ask him the same questions. Has the data changed significantly? I could spend, you know, 10, 15, 20 minutes asking those questions. But this is relevant information.

It's -- you know, it's directly at issue. It's some of the most comprehensive information in the State of Washington, in the history of the United States, on CAFO contamination.

JUDGE FRANCKS: I'm going to allow it, but I think we need to focus.

MR TEBBUTT: I'm trying to. But I have to lay a

foundation because I'm getting objections about it. So I'm trying to get there.

(Exhibit A-67 admitted.)

BY MR. TEBBUTT:

Q. Mr. Erickson, I would like you to take a look at page 186. Sorry. 183, Figure 1.

Do you have Figure 1 in front of you, sir?

A. I do.

Q. What is Figure 1?

A. So Figure 1 is the -- the conceptual model of the different sources of contamination at a dairy operation. It's a figure, that while I'm not the author of this report, it's something that we worked on with EPA and Anchor to incorporate in the report.

Q. So you've had input into a number of pieces of the report itself?

A. Correct.

Q. I forgot to ask you. Are you working for any of the dairies now?

A. We are currently working for all three dairies.

Q. In what capacity? Let's start with Cow Palace.

A. At Cow Palace, we are working on the lagoon project, as far as lining their storage lagoons with -- we've completed two of them to date. Another one this year.

We're also working on their compost issue in their

compost area. Working to decrease the permeability of the soil and increase the sloped or runoff from that area so it's not seeping into the ground.

The Bosma and DeRuyter facilities --

Q. Let's just go with Bosma. What are you doing for Bosma now?

A. Currently working on the compost issues, also.

Q. What about DeRuyter?

A. Similarly. Compost area. We've closed one area and moved into a better-suited area for compost.

Q. In some circumstances, you're actually hired and paid directly by dairies; correct?

A. That's correct.

Q. And in other circumstances, you are still working for Care, the plaintiffs in the case, as well; correct?

A. Yes.

Q. So you have a very unique role of being both an expert for Care and technical consultant for the dairies; correct?

A. It's challenging.

Q. I can only imagine. Actually, I don't have to imagine because I hear about it a lot.

So everything that happens at the dairies, essentially, is open to me and it's open to the dairies, correct --

A. Correct.

Q. -- because of that agreement?
A. Yes.
Q. So that's with Cow Palace.
So any work that you're doing for Bosma is also shared with Care; correct?
A. Yes.
Q. And you're actually not being paid by DeRuyter to do anything right now, are you?
A. We are still working on a few compost issues that he is paying us on.
Q. He is? All right. I guess we need to talk more often.
So you have input into the information that comes in these annual reports, too; correct?
A. Correct. Occasionally, we're involved with the sampling -- soil sample collection or groundwater sample collection, and we do get a chance to review the reports along with the EPA.
Q. Let's look a little bit and talk about A-67, page 183, the conceptual model. Let's talk about animal pens.
How does animal pens affect, if at all, the issues in this case?
A. What -- what Ms. Redding had stated earlier is true. There does appear to be a -- a black layer that is -- that the cows trample on and push into the ground, and it creates a black, almost asphalt-looking material. But it is not

impermeable.

So if you actually go look at the pens, a lot of the pens have areas that water collects and stands and seeps into the ground. There's always manure present in the ground. So it is a potential source of seepage.

There are water troughs. We all know it rains, it snows. So I disagree that the pens are -- shouldn't be addressed, as far as some type of contamination, and we have multiple data from multiple borings that show a lot of variability within each pen, as far as what may be moving towards groundwater.

The other thing that we see that's very apparent -- the next time you go to a dairy, if you ever get to one, a lot of times the fences look like they're coming up out of the ground. The concrete seals around -- or footings around the metal fences. And after several years, the concrete is sticking out of the ground this high, (Indicating), and that's because every time they come in and grade the pen, they take that top layer off. So that opens up a new area for infiltration.

The other thing that we see happen in a lot of pens, instead of going to a compost area, they actually stockpile the wet manure in the pen and let it dry out enough or drain enough so that they can take it to the compost area. So --

Q. Let me stop you there.

What's the water content of raw manure?

A. So raw manure in the pens is about 45 percent water. So it's literally saturated -- fully saturated.

Q. Then it's mounded sometimes in the pens; right?

A. Correct. They usually -- they usually push it into a mound in a collection area, and then haul it to the compost area.

Q. When it goes to the compost area, what's the approximate water content of that material?

A. It's highly variable. It depends on the weather. A lot of times when they're trying to move that, they've got snow and early season rain. So it really is still at that 45 percent moisture.

Q. How would you describe its looks?

A. Slop, would be the best way to describe it. It doesn't -- I had some pictures of compost areas where you see these nice, tilled rows. When it first goes out there, it's not a nice, tilled row. It's wet cow manure that just spreads out, with no structure to it whatsoever.

Q. So have you sampled -- I believe you said -- you started to talk about this.

You sampled below this black layer that you were talking about?

A. We have. On multiple occasions.

Q. Have you found constituent -- let's start with nitrate and ammonia.

Have you found nitrate and ammonia below that black zone that you're talking about?

A. We have.

Q. At what depths?

A. I have to look at the data, specifically, but I believe 10 feet, to as deep as we sampled.

Q. And so obviously, there are no crops growing there?

A. Correct.

Q. So the nitrate and ammonia that's there, and the nitrate that gets below that black level, where does it go?

A. It drains downward.

Q. To where?

A. To groundwater.

Q. Is there anything that's going to stop it?

A. So there's some things that can go on in the subsurface, and you -- I think this question has been tough for everybody to answer. But you need a -- you need head or you need water entering the ground to push that nitrate down.

So there are times when -- like in Western Washington, when you have significant rains and snows, where you've got liquid leaching through the ground, picking up the nitrates and carrying it down. As it goes down, it

spreads out.

So it can hit a level that we call "field capacity," which is about 15 percent moisture, where it quits migrating and it sits there.

Then when the next wet season comes or the next rainfall comes, you get another wetting front that comes down and pushes it further down. So it's always migrating in that vadose. But the speed is variable, depending on the head.

So it's headed to groundwater. There's not much that could stop it unless you intercept it and pull it out. But it takes time to get there, and it doesn't move necessarily uniformly, in, like, the pens where you have a -- variable saturated conditions.

Now, underneath the lagoons is a different story.

Q. Yeah. We'll get to that in a little bit. Let's just stick with the pens for now.

You've heard discussion -- you sat in the courtroom yesterday and today, correct --

A. Correct.

Q. -- and you've heard some discussion about driving forces. Water being a driving force. And you just talked about that.

Water is a driving force that will move the constituent down to groundwater; correct?

A. Correct.
Q. In animal pens, what are the sources of water that will drive the manure and nitrates down to the groundwater?
A. There's several sources. One is precipitation. Number two is flushing. Quite often they are flushing the runways or the alleyways, and the water spills out of the alleyway onto the ground.

Three is the cattle troughs. You go look at a facility, there's always a large, wet area around the troughs where the cows go to water. And the fourth one is urine. Part of the waste is urine, and that's a liquid that's on the ground all the time.

Q. The manure itself, is there water in the manure?
A. And then the saturation of the manure, yes.
Q. Let's -- again, we're just going to try to give some background today. We'll get into the details tomorrow. But I just want to give a background for the board on all these different concepts here for today while we have a little time.

Let's look at the compost areas. How do compost areas fit into this conceptual model that we're looking at?
A. So the -- the compost area is usually a separate area away from the dairy. They haul the wet manure to this location. They have specialized equipment that -- well, to haul it, there's no specialized equipment. It's just trucks

and front end loaders.

Once it gets there, they have compost turners. It's a tall piece of equipment with large rubber fingers that turn around and mix this compost, stack it in nice windrows and allow the manure to compost, and we should talk a little bit about what that is.

Through natural degradation, manure actually heats up to about 140 degrees and cooks over the summer. Those temperatures kill the pathogens within the manure. And then the -- the action of turning it and composting it breaks it down into finer products or finer pieces.

While that's going on, the compost changes from about 45 percent liquid to about 10 or 15 percent liquid. And that's not magic. That happens through two different mechanisms.

One is the actual composting action, where it heats up and dries off the moisture and evaporates. The other is through drainage. So whatever is driven off and evaporates, there's more that goes into the ground because of that heating operation and gravity drainage.

Q. You mentioned "gravity." Is that a scientific principle that applies to water and the way it moves?

A. It is.

Q. Explain the process of gravity and how gravity moves water downward.

A. Very similar to the apple falling out of the tree. Gravity just is a force that pulls anything with mass towards the center of the earth. It's just like watering your garden or dumping a glass of water where it seeps into the ground. It's --

Q. I think we get that concept. I don't know that we need to spend too much time on it.

So what else -- is there -- let me ask you this. How many acres of compost area is there at the Cow Palace facility?

A. I believe it's about 90 acres, total.

Q. What about the Bosma facility? Do you know?

A. There's two different compost areas. I think they total about 60 acres, combined.

Q. And you've tested the bottoms of some of these areas?

A. Correct. We've -- we've sampled, according to what I previously described, soil samples down to about 10 feet. One, I think we went to 20.

Q. What did those samples show?

A. The --

Q. Just in general.

A. The first compost area we sampled showed some of the highest nitrates in soil that we'd seen, and it showed a zone at about -- going off memory -- about 15 feet. I think it was 14 feet -- that was very high and wet, that contained

a lot of nitrogen. So it was a direct indication that nitrogen was moving down through the soil.

Q. So did you see nitrate and ammonia at depth?

A. We did. Yes.

Q. We'll get into some more of that in the details tomorrow. Let's talk about lagoons.

How do lagoons fit into this conceptual model?

A. Lagoons are a significant source of contamination, because, one, we're -- on the lagoons we're working on, we haven't seen the actual liner that everybody's talked about for the last couple of days.

One of the points that I really want to make is that we keep talking about clay liners. But these aren't -- these are not clay liners. In order to meet this --

Q. What are they, then?

A. Ten to the minus six standard -- what most of the dairies are doing is just compacting the natural ground. It can be a silt. Silty sand. It can have gravel in it. And it can still meet that ten to the minus six permeability standard.

I would like to talk a little bit about scale. Really, the permeability standard ranges from one to ten to the minus twelve. Ten to the minus twelve being the synthetic liner.

So we're -- we're really about only halfway into the permeability scale. Actual materials -- like a good clay -- will be ten to the minus nine, ten to the minus ten permeability. So we've heard a lot of talk about clay liners.

What we've seen in the field is more like a silt liner or a sandy silt liner. That standard is really just not sufficient for lagoons, where you have anywhere from nine feet of water, which is the NRCS standard, to over 30 feet of water in the lagoon.

So I think Ms. Redding talked about the head pressure. For every two and a half feet of water, you get one PSI of pressure at the bottom of the lagoon. So with 30 feet of water, you're looking at over 15 PSI of pressure on that liner.

Q. What's "PSI"?

A. Pounds per square inch.

Q. Explain what that means in hydrologic terms.

A. It -- it's the driving force that pushes that liquid into the ground. If the -- if you're looking at the pens, where you have a puddle that is only a few inches deep, at that point you're really looking at just gravity drainage. You don't have any extra pressure going into the ground.

Lagoons, where you've got 30 feet of water on top of that liner, you have a lot of extra pressure driving

liquid through that liner.
Q. What's the deepest lagoon you've seen in your experience?
A. It's 30 feet deep.
Q. Which one is that?
A. It's one of the lagoons at Cow Palace.
Q. Is that one of the new ones that's -- is that one of the new ones at Cow Palace?
A. No. That's just an existing lagoon.
Q. So that's just an earthen lagoon?
A. Correct.
Q. Were you in charge of designing a lagoon or lagoons for Cow Palace?
A. We are. We're on our third lagoon there.
Q. What's the largest volume capacity of a lagoon that you've built for Cow Palace?
A. The one we completed last year was 25 million gallons.
Q. So what's the top recommended depth of water in that lagoon?
A. That lagoon will be 24 feet deep at its max.
Q. When it's full?
A. When it's full.
Q. But it's actually deeper than that; right?
A. Correct.
Q. Because you're supposed to leave some amount of

freeboard between the top and the top of the lagoon?
A. Yeah. So part of the design is that you leave enough space in the lagoon to handle a big storm event, so that that storm water can be routed to the lagoon without over-topping, and you leave at least a foot of freeboard for -- if a wind storm comes in and you have wind blowing, the wave action doesn't force the waves -- the water over the top of the lagoon.
Q. Let's look at the conceptual model with regard to fields. Crop fields.
Can you explain how that conceptual model is relevant to the issues in this permit, please?
A. So the -- the liquid waste is stored in the lagoons and then applied to crop fields over the course of the year. There's multiple ways this is applied.
We saw some pictures this morning of a big gun. Most of the time it's a pivot on the bigger ones. On the bigger CAFOs.
So the -- the lagoon water is mixed with irrigation water and applied to the field. You can see by the conceptual model that there's two different things that happen there as the water enters the ground. It either leaches down below the root zone or the roots uptake that water and nutrients and result in plant growth.
Q. If the water -- whether it's irrigation water or manure

water -- gets below the root zone, where is it going?
A. It's also going down to groundwater.
Q. Because of gravity?
A. Correct.
Q. You heard Ms. Redding testify earlier today about different aspects of potential contamination from CAPOs and the likelihood -- or the loading, I guess, if you will, from each of the sources.

Do you remember that testimony?

A. I do.
Q. In your opinion, what's the highest likely loading source of nitrate to groundwater?
A. That's a difficult question, in general, because it depends on the dairy and how it's operated. In situations where you have earthen lagoons in coarse, grain soil, I would -- I would guess that the lagoons are much more significant, as far as the source.

In areas where you have over application to the fields and not enough field to handle the load from the dairy, then I would guess that the application fields are probably the predominant source.

One of the other things that we looked at in this conceptual model that's shown here is you can see some piping running from the pens to the lagoons, in between the lagoons.

One of the things that we did in the dairy cluster is we inspected that piping. It's -- it's the conveyance system for the waste into the lagoons, and what we learned was there was a lot of problems with that piping.

So I believe that was a significant source there, because the piping's actually pressurized. If it's leaking underground, nobody knows it's leaking underground. So that's another item shown in that conceptual model.

If I had to rank -- rank the -- the potential sources, I would say that the -- in most cases, the application fields are the biggest source, followed by the lagoons.

I believe the compost areas are -- are -- would be number three, but they're a bigger source than we think. Followed by the pens being last.

Q. But they are all contributing sources to groundwater contamination?

A. Correct.

Q. Is there any question in your mind that they are?

A. All the data that we've collected to date indicates that they're all sources.

Q. Let me ask you, just while we're on the piping issue.

Do you see anywhere in -- you've read the general permit in this case; correct?

A. Correct.

Q. Do you see anywhere in the permit that deals at all with the -- the leakage from piping, the infrastructure, at all?
A. I do not. No.
Q. Do you see anywhere that deals with compost infiltration into groundwater?
A. No.
Q. Do you see anywhere that deals with the infiltration from animal pens into groundwater?
A. I do not.
JUDGE FRANCKS: Mr. Tebbutt, might this be a good time to wrap it up?
MR TEBBUTT: It would be a good time to call it a day.
JUDGE FRANCKS: That's what I was looking at.
MR TEBBUTT: With your permission, I think what we would like to do is try to figure out if we can get Dr. Keeney on tomorrow morning.
JUDGE FRANCKS: Okay.
MR TEBBUTT: Displace Mr. Erickson for a little while, and then bring him back. We'll do our best. And if it doesn't work again, we'll keep going with Mr. Erickson, until we figure it out.
JUDGE FRANCKS: That's fine. All right. We are adjourned until tomorrow at 9:00.

(Proceedings adjourned at 4:45 P.M.)

C E R T I F I C A T E

I, LAURA L. STEWART, Certified Court Reporter in and for the State of Washington, residing at Graham, do hereby certify;

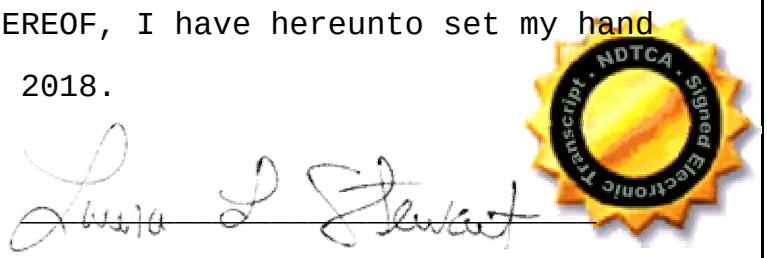
That the foregoing proceedings were taken before me and thereafter reduced to a typed format under my direction; that the transcript is a full, true and complete transcript of said proceedings consisting of pages 410 through 661;

That as a CCR in this state, I am bound by the Rules of Conduct as Codified in WAC 308-14-130; that court reporting arrangements and fees in this case are offered to all parties on equal terms.

That I am not a relative, employee, attorney or counsel of any party to this action, or relative or employee of any such attorney or counsel, and I am not financially interested in the said action or the outcome thereof;

That upon completion of signature, if required, the original transcript will be securely sealed and the same served upon the appropriate party.

IN WITNESS WHEREOF, I have hereunto set my hand this 19th day of June, 2018.



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