BEFORE THE POLLUTION CONTROL HEARINGS BOARD

STATE OF WASHINGTON

AIRPORT COMMUNITIES COALITION, Appellant, CITIZENS AGAINST SEA-TAC EXPANSION, Intervenor/Appellant, vs. STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY, and PORT OF SEATTLE, Respondents.	PCHB No. 01-160

TRANSCRIPT OF PROCEEDINGS

DAY NINE

March 28, 2002
Lacey, Washington

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BE IT REMEMBERED that the above-entitled matter came on for hearing before the Pollution Control Hearings Board, Day Nine commencing on the 28th day of March, 2002, and continuing through Day Ten, the 29th day of March, 2002. The hearing was conducted at the Environmental Hearings Office, 4224 6th Avenue SE, Rowe Six, Building, Lacey, Washington.

Sitting as the Washington State Pollution Control Hearings Board were KALEEN COTTINGHAM, presiding; ROBERT JENSEN, Board Chair, and BILL LYNCH, Member.

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I N D E X

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E X H I B I T S

NUMBER	DESCRIPTION	IDENTIFIED	ADMITTED
1023	Resume and Curriculum Vita for expert witnesses	9-0024	
0045	Letter from Northwest Hydraulics Consultants to Corps of Engineers 11-26-01	9-0025	
0804	Amendment to Interlocal Agreement between City of SeaTac and Port of Seattle	9-0026	
1178	Pacific Groundwater Group Hydrologic Studies Report 6-19-00	9-0033	
1305	Pacific Groundwater Group SeatTac Third Runway Embankment Fill Modeling in Support of Low Streamflow Analysis 11-27-01	9-0034	
1118	Parametrix Water Effect Ratio Screening Study at STIA	9-0057	
0649	Memorandum from Todd Pollard to Keith Smith 2/29/00	9-0062	
0686	2001 City of Des Moines Water Quality Monitoring Program	9-0071	
0005	WAC 173-201A	9-0121	
0285	1998 Soil Fill Acceptance Criteria	9-0131	
0286	1999 Soil Fill Acceptance Criteria	9-0131	
0294	Third Runway Project Off Site Borrow Source Baseline Chemical Characterization Black River Quarry	9-0133	

E X H I B I T S

NUMBER	DESCRIPTION	IDENTIFIED	ADMITTED
0287	Memo from Beth Doan to Paul	9-0140	
1320	S.S. Papadopulos & Assoc. STIA Third Runway Embankment Fill Water Quality and Transport Analysis	9-0150	
0076	Analysis of Preferential Ground Water Flow Paths	9-0176	
2014	Natural Resource Mitigation Plan	9-0207	

MS. COTTINGHAM: I just jotted down some things I wanted to take care of this morning on our little agenda, and we can add some stuff to it. In fact, I've already added a couple of things. I've have added number 5 at the end, time budget for today and tomorrow morning from each of the parties, and I've also added number 4(a) where it says, "Keeping the record open for depositions and for the final exhibit list."

Why don't we just kick through these things. The first one is the concern raised by Mr. Poulin on the access to the materials after hours.

MR. PEARCE: Thank you, Your Honor. I did talk to Mr. Tobiason. He said he was in here actually having a conversation with Mr. Fish, who is the president of CASE, who was here the whole time. And Scott was looking at some boards, he didn't know whose boards were whose, but he was looking for some figures off the stormwater master program, didn't look through any of the board's materials, didn't look through any of ACC's, didn't even look through any of our materials, but that's what Mr. Tobiason said he was doing.

MS. COTTINGHAM: Okay.

MR. POULIN: That he was just looking through the large-scale --

MR. PEARCE: That's what he said, yeah, he was just looking through the large-scale exhibits.

MR. EGLICK: Mr. Fish is here, maybe we should --

MR. POULIN: Does that comport with what you saw?

MR. FISH: No, it's not. I came in early from lunch and saw Mr. Tobiason going through the ACC documents and writing a bunch of stuff down. Physically he went through two books. We were standing about this far apart and he was doing something with these books right here, and he spent a lot of time doing it. He went over to those files, to these files, back here, back here, spent most of his time here, had a large knapsack that looked like it had binders in it. That's about all I can add to it.

MS. COTTINGHAM: Just so you know, we are missing some binders up here. We're missing one at least that we know of.

MR. PEARCE: I don't think he has any binders. I certainly can ask him. He said he was interested in some numbers from the stormwater master program, the stormwater management program.

MS. COTTINGHAM: That may be the one binder that we're missing up here. Board Member Lynch is

missing one binder.

MR. PEARCE: I believe that's the one that we have one copy of.

MS. COTTINGHAM: No, he is missing a binder that I have and that Board Member Jensen has, so -- I mean, this is not a trial to determine what's missing, I just want to make sure that we are not missing evidence and that we don't have people going through our notes and stuff up here.

MR. PEARCE: I certainly don't think he has any of the evidence, but I can check with him again, but I don't believe he took anything. He didn't tell me he took anything out of the room at all. He was looking for some figures.

MS. COTTINGHAM: Okay.

MR. PEARCE: I apologize for any confusion.

MS. COTTINGHAM: Why don't we make sure that at lunch breaks and at the end of the day that the last people who leave the room are the attorneys to make sure that we're not setting up a situation again.

The second one is to get an assessment from Mr. Kray where we are on the depositions to be published.

MR. KRAY: Ecology and the port have completed their review and have prepared their counter excerpts and their objections to the designations of ACC and CASE for

seven of the eight. Ms. Marchioro is back at the office finalizing Mr. Hellwig, which is the longest of them, and we anticipate that we'll have that by lunchtime.

I have the seven, I can provide them to ACC and CASE. I was running a little bit late and kind of dashed in, and you were here, so we started. But at any point this morning I can provide that to them. Then the question is how much time do they need to respond to our objections.

MR. EGLICK: It would help to see it first.

MR. POULIN: It's kind of hard to guess.

MR. KRAY: I understand.

MS. COTTINGHAM: Why don't we again tomorrow morning -- I would appreciate if you could share as soon as possible the entire package.

MR. KRAY: I'll do that right now.

MS. COTTINGHAM: And I would like a sense either at the end of today or first thing in the morning. This may be one of those issues that we carry over past the close of the record, actually, not the close of the record, but past the end of tomorrow, that we then finalize through a written order.

MR. KRAY: That's fine. The one comment I would make on that is we worked diligently to get these responses quickly. I'd prefer that we give a

commensurate amount of time for their response as well.

MS. COTTINGHAM: Okay. So is tomorrow morning --

MR. KRAY: No, they can let you know once they have looked at how long they need, but my question goes to let's not leave it open for a couple weeks.

MS. COTTINGHAM: I wasn't planning on it.

Okay, the third thing on my agenda is we've been hearing from public members that there are a lot of people planning to come for the closing arguments, so it would be nice if at the end of today we could get this room at least organized enough that we can have space for -- one, we are going to need space for the cameras, because TVW is going to set up tonight or tomorrow morning, and I want to make sure that we have at least the last two rows for the public and, if it's at all possible, not to have every person in the room. So I am assuming that we're not going to have witnesses lined up, that we can use the majority of the room for counsel, a few paralegals and the rest for the public.

Is that okay?

MR. KRAY: No objection from Ecology.

MR. PEARCE: No objection.

MS. COTTINGHAM: So at the end of today, it would be nice if you could all help by moving some of the

charts and all that stuff so that we can be prepared for tomorrow.

MR. POULIN: And will the podium be brought back for the afternoon?

MS. COTTINGHAM: Yes. We'll have it right outside the door and we'll break at lunch and make sure that there's enough room there between the two tables.

MR. KRAY: What time are you planning to begin, Ms. Cottingham, for closing?

MS. COTTINGHAM: What we plan to do is hopefully finish in the morning - the sooner you finish, the longer you get to prepare - and then come back either at 1:00 or 1:30, depending on what the parties would prefer.

The next thing is some post hearing activities. As we were just talking about keeping the record open for the deposition publication, so we'll get a little bit better sense of that on Friday. I also want to go through the list and identify those previously objected-to exhibits that have come in without further elaboration on the exhibits. I'm sure that there will be exhibits that haven't been talked about over the last two weeks and we'll need to have some sort of resolution on whether they're admitted or not. And my preliminary indication would be that if none of the parties used a witness to

introduce them, to allow them to come in for background only. And that would then be consistent with the hearsay objections that have been raised.

So what I plan to do is hopefully in the next day to go through my list and the exhibit list to see where -- and there have only been about three or four where the objection was reiterated and argued and I made some sort of ruling. The rest have either not been introduced or have been introduced without further objection.

And what I plan to do then is to take the exhibit matrix, to finalize that, and to issue it with an order as the final exhibit list for purposes of this hearing, if that's acceptable. And I would like to get that done sometime next week.

Is mid-week acceptable time period for all of you?

MR. KRAY: Yes.

MR. EGLICK: Yes.

MS. COTTINGHAM: And I think that's really what I'd like to do for both the publication of the depositions and the final evidence list, is to set it Thursday next week. Anybody know what the date is, is that like the 3rd or 4th?

MR. EGLICK: Monday is the 1st, isn't it?

MR. POULIN: Thursday should be the 4th.

MS. COTTINGHAM: And I will try and memorialize

all this in an order, but I just wanted to let you know what my thoughts were on that.

We still have outstanding -- Ms. Osborn and Mr. Young, I believe, were working on some further redaction materials.

MS. OSBORN: I have just reviewed the redacted version of Mr. Garland's prefiled testimony and it's fine.

MS. COTTINGHAM: As submitted by Mr. Young. I haven't seen that yet.

MR. YOUNG: I have copies and all that here, so I can provide those. I can provide them now or --

MS. COTTINGHAM: Is it just as a page or has it been written in some sort of --

MR. YOUNG: We have two things, we have his revised testimony, which has been signed by him, and then we have an offer of proof which contains the things that were excised, which I signed, and so it's two documents, and I've got about a zillion copies here, which probably won't be enough.

MS. OSBORN: One of the --

MS. COTTINGHAM: Let's try not to talk over each other because we have a record being preserved here.

MR. YOUNG: So should I file these with you or with Tracey or how do you want me to do that?

MS. COTTINGHAM: I don't know. Why don't you give it to me and I will convert it into some sort of an order, acknowledging the redacted, much like I did with the earlier ones. I will view it as a motion in limine of some sort.

MR. YOUNG: Here is the revised testimony, an original and four copies, and here is the offer of proof, original and four copies.

MS. COTTINGHAM: Okay. The next one is the preparation of draft findings of facts and conclusions of law. You have in front of you my attempt to put together an outline for the opinion, and since I did this late at night last night, I may have accidentally, in my inability to use word processing, I may have renumbered them accidentally, so if you could look at the issues to make sure I have the same number.

And what I'd really like from you is whether this is an outline that you believe captures the framework of this entire appeal. I would like to know whether there are things missing, I would like to know whether you would structure it differently, because what I would like to suggest is that we reach agreement on a common outline so that when each side submits draft findings of fact and conclusions of law, that we are all working from the same general approach. So what I'm going to suggest is that I

hear back from you by next Thursday on this outline.

And then the next thing I'd like to know is I would like to set a time line for filing draft documents. I'm going to suggest one per side. Would that be acceptable for Ecology and the port to jointly submit one draft?

MR. PEARCE: I think we can work that out.

MS. COTTINGHAM: And the same with ACC and CASE.

MR. EGLICK: I think we can do it jointly, yes.

MS. COTTINGHAM: Is one month enough time for the parties to do that?

MR. PEARCE: More than enough.

MR. EGLICK: Yes.

MR. POULIN: Yes.

MS. COTTINGHAM: So if we set a deadline of April 26th to have that filed and shared with the parties as well.

Then I have a question about transcription. Do any of the parties plan to have the hearing transcribed? I guess this is one of those strategy things that nobody tips their hand because they don't want to pay for it, I suppose.

MR. KRAY: I guess, Ms. Cottingham, I suspect, and I can't necessarily speak for everybody, I suspect that at some point this record will be transcribed and

moved on to some other venue one way or another, and so perhaps the parties should discuss a way to handle that. I don't think we've had an opportunity to discuss it at all, I don't know, am I speaking out of school? Has anybody talked about this issue?

MR. EGLICK: Not with the other parties. Frankly, you know, there is the ex-checker issue.

MS. COTTINGHAM: The --

MR. EGLICK: Money.

MR. POULIN: Who pays.

MR. EGLICK: And I don't know, you know, that that's something that we know without going back to our clients, asking for an appropriation, so to speak, or some sort of indication that we can afford the whole transcript.

MS. COTTINGHAM: Well, I raise this because if it would be helpful in drafting either the opinion by the board or the draft findings, that the parties might be well served in having this discussion early so that it could be of use to you. So I don't have an opinion one way or the other, but I'm going to raise it and ask that you talk among yourselves and then perhaps talk with each other.

MR. KRAY: Is there some way that we can get an estimate of the total cost once we have a sense of how

much time was used for --

MS. COTTINGHAM: I can have Tracey ask Gene Barker & Associates to give us a rough estimate, and, hopefully, she could get a rough estimate in the next day or so.

MR. KRAY: I think that would be a useful piece of information.

MS. COTTINGHAM: Okay. I'll do that. I'm not asking you to make any decisions on the spot. I raise it just because it often happens after you need it, you know, so anyway --

Those are the only things that I wanted to raise with you this morning. Is there anything that you would like to raise in a procedural manner?

MR. KRAY: I believe you indicated something about a time budget is also on your --

MS. COTTINGHAM: Oh, yes, time budget for today and tomorrow. We don't have much time left. We have eight hours and ten minutes, five minutes.

MR. PEARCE: We are hoping to at least get through -- of course, it depends on, you know, I understand parties have to make objections for the record, but if we could keep our colloquy short. And depends on the amount of cross, of course, but we're confident, we're hopeful, let's say, that we can get at

least to Miss Cassin today and finish with Mr. Kelley and Mr. Bailey first thing Friday morning.

MS. COTTINGHAM: Well, I'm going to impose a change in the way we've done the clock in order to keep us on the straight and narrow. We're not going to stop the clock for back-and-forth discussions and changing, so we're going to keep the clock running all day today because we don't have much more than eight hours between now and noon tomorrow for testimony. So that should keep you a little more on your toes, and I'm sorry to have to do that, but you've been very good on the clock, I've been amazed it's been working as well as it has for this.

MR. POULIN: And if you would like, Your Honor, I can eliminate that one-minute delay or shorten it if you think that would be helpful.

MS. COTTINGHAM: No. I think that's fine.

With that, we'll take about a 10-minute break and everybody can get organized and we'll start up with the next witness.

MR. PEARCE: Mr. Cheyne, beginning the direct testimony of Michael Cheyne.

MS. COTTINGHAM: I'm going to go back on the record for just one thing. When you file the draft findings of fact and conclusions of law, and I won't memorialize this, but I would like to get them

electronically, too.

(Whereupon, a recess was taken.)

MS. COTTINGHAM: Be seated. We'll go back on the record. Mr. Pearce, if you would call your next.

MR. PEARCE: The port calls Michael Cheyne.

MR. STOCK: Ms. Cottingham, at this point, I am going to move to strike Mr. Cheyne's prefiled testimony from the record. And I would refer the board to his prefiled testimony and the table of contents, which is the first two pages of his prefiled testimony.

Mr. Cheyne's prefiled testimony has nothing to do with the issues that are before this board with respect to whether there's reasonable assurance that this project will not result in a violation of state water quality standards.

The board has now granted the summary judgment motion on the SEPA issues, and while some of these statements in Mr. Cheyne's testimony, prefiled testimony, may have been relevant to the SEPA issue, that is no longer before the board, given that summary judgment has been granted on that issue.

None of the items specified here in Mr. Cheyne's prefiled testimony are relevant except for the last item on page 8, "No current plans for redevelopment of borrow sources." Mr. Cheyne is contending that there isn't any

current plan for redevelopment of the borrow areas, a point that Mr. Rozeboom spoke about in his testimony.

So ACC requests that the prefiled testimony of Mr. Cheyne be stricken and that Mr. Cheyne be precluded from testifying with respect to any of these items except the item on page 8.

MS. COTTINGHAM: Mr. Pearce.

MR. PEARCE: Thank you, Ms. Cottingham. Many of the documents attached to Mr. Cheyne's, well, referred to in Mr. Cheyne's testimony, are background. The board can read that. They're clearly relevant to the project and how the project has undergone environmental review. We're really here on environmental issues.

In particular, the documents such as the EISes talk about - which have already been litigated and found legally adequate - talk about activity levels at the airport, expected activity levels. That is directly relevant to whether there will be any violations of water quality, because, as we heard from Mr. Smith yesterday, it is the activity levels at the airport that create metals on impervious surfaces, not the impervious surfaces themselves, so the activity levels are important, and it's important for the board to have that information in front of it.

The records of decision by the FAA are also

important, because not only do they talk about expected activity levels, but they talk about how the FAA has implemented its wildlife hazard policy with respect to this particular project.

And I would urge the board to accept Mr. Cheyne's testimony, give it the weight the board believes -- accord it the weight that the board think it deserves.

MR. STOCK: Mr. Pearce just said that this is relevant to the issue of the environmental review that this project has gone through. Given SEPA is no longer an issue before the board, there is no relevance to the issues specified here. It's not relevant to the issue of whether this project is going to result in a violation of water quality standards.

In terms of justifying dumping into the record all of these previous environmental reviews on the basis that it relates to the activity level at the airport, broad general statements about activity levels on impervious surfaces is not competent evidence as to the level of pollution that's going to be generated by adding a third runway. There hasn't been any testimony in that regard. And the broad general hearsay statements in these documents, if there are any relating to the activity level, simply is not competent evidence.

And so on that basis, on relevancy, the lack of

competency of the evidence presented, ACC requests that the prefiled testimony be stricken and Mr. Cheyne be precluded from testifying on those issues.

MS. COTTINGHAM: Let me ask a question as it relates to the exhibits. Are any of the environmental documents, the SEPA documents, stipulated as exhibits down in the --

MR. PEARCE: They are exhibits. We would ask the board to take into the record volume 1 of the FEIS and volume 1 of the supplemental EIS for the discussion of the background, for the discussion of what the activity is expected to be at the airport.

MS. COTTINGHAM: Are they a numbered exhibit or is the only place --

MR. PEARCE: They are a numbered exhibit and there is only a hearsay objection to them, after the meeting with the ALJ, there is no relevancy objection to them.

MR. STOCK: And ACC will maintain that hearsay objection. What Mr. Pearce just said is the port wants the board to consider the FEIS and the supplemental EIS for the truth of the matter asserted with respect to activity levels, and that is not competent evidence for that purpose. He also said that he wanted the board to consider it for background information. Again, that is

not relevant to the issue that is before the board. And so we will maintain our hearsay objection on the FEIS and the SEIS and ask that the board not consider it for the truth of the matter asserted.

MR. PEARCE: I can certainly lay a foundation for hearsay.

MS. COTTINGHAM: The board is going to take about a 2-minute recess. We'll be back in a minute.

(Whereupon, a recess was taken.)

MS. COTTINGHAM: We'll go back on the record. The board is going to strike the prefiled testimony of Mr. Cheyne. The board will allow Mr. Cheyne to verbally testify on the issue of the borrow pits. And the board will overrule the objection, the hearsay objection, on the environmental documents, the FEIS and the supplemental EIS. The board has already ruled on issue number 14, already found that those documents are adequate and they're the type of information that the board generally relies on and, under the board's rule, will be admitted.

MR. PEARCE: Can I ask Your Honor about the record of decision from the FAA, because they are very important in determining, in showing how the FAA has implemented the wildlife hazard policy.

MR. STOCK: Well, we can reargue what we just

argued and I'll make the exact same arguments.

MS. COTTINGHAM: And it is a numbered exhibit?

MR. PEARCE: It is a numbered exhibit.

MS. COTTINGHAM: And it has a hearsay objection?

MR. STOCK: I understand that the wildlife hazard plan is part of the NRMP and so, to that extent, that's already before the board, and so if that's the basis for bringing in the record of decision, there's no basis for bringing in the record of decision.

MR. PEARCE: Actually, the basis for bringing it into the record is it shows what the FAA has required with respect to that advisory circular. There is a hearsay and relevance objection about the FAA's record of decision. The FAA's amended record of decision, which incorporates the earlier record of decision, there is only a hearsay objection. Those are both clearly public records and admissible pursuant to Evidence Rule 803.

MR. STOCK: We will maintain our hearsay objection and, again, a relevancy objection. What is now before the board just doesn't have any relevance, the record of decision.

MS. COTTINGHAM: I'm going to recognize the hearsay objection on the FAA record of decision, but I am going to allow it in for background purposes, not for the

truth of the matter asserted. And I would like from you, Mr. Pearce, the exhibit numbers for the environmental documents and the FAA documents, the record of decision.

MR. PEARCE: I can give you those right now if you'd like.

The final environmental impact statement is Exhibit 1069.

MS. COTTINGHAM: Okay.

MR. PEARCE: The supplemental environmental impact statement is Exhibit 1081.

MR. STOCK: And you're just asking for volume 1?

MR. PEARCE: She just asked for the exhibit number.

MR. STOCK: But in terms of what's being admitted, it's just volume 1?

MR. PEARCE: Volume 1 is really what's necessary. All the appendices are background for the discussion in volume 1.

The July 3rd, 1997 record of decision from the FAA, which talks about the advisory circular and how they're going to administer that, is Exhibit 1081.

MS. COTTINGHAM: 1081?

MR. PEARCE: Yes -- I'm sorry, it's 1086. 1081 is the SEIS.

MS. COTTINGHAM: Let me ask a question, the appendices of volume 1 of the SEIS are also part of Exhibit 1081 or are they separate exhibit numbers?

MR. PEARCE: They're also part of that, but the only thing we're really interested in the board taking a look at is volume 1.

MR. STOCK: And ACC would like the opportunity then to counter designate in that exhibit those portions of the FEIS that have public comments and agency comments.

MS. COTTINGHAM: Are they appendices?

MR. STOCK: Yes, they are.

MS. COTTINGHAM: So we'll allow the entire Exhibit 1081. I will overrule the hearsay exemption for all of it.

MR. PEARCE: The August 9, 2001 FAA record of decision, the amended record of decision, is Exhibit 1270.

MS. COTTINGHAM: Okay.

And with that, the court reporter will swear in the witness.

MR. STOCK: I'm sorry, but this amended record of decision, August 9, 2001, as I recall it, it didn't have anything to do with the hazard wildlife management plan.

MR. PEARCE: It has to do with activity levels at the airport.

MR. STOCK: But that is not the basis upon which the board ruled. That's not my understanding the basis upon which the board ruled, so the amended record of decision, Exhibit 1270, has no relevancy.

MR. PEARCE: There's no relevancy objection to 1270. They have never made a relevancy objection to 1270 until we were bushwhacked this morning, Your Honor.

MS. COTTINGHAM: It was a hearsay objection earlier.

MR. PEARCE: That's correct.

MR. STOCK: And we will continue to assert the hearsay objection.

MS. COTTINGHAM: Right. And I am recognizing that and allowing these two documents in only for background. Is that okay?

With that, we'll have the court reporter swear in the witness for the limited testimony on the borrow sites.

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MICHAEL CHEYNE, having been first duly sworn on oath or affirmed to tell the truth, the whole truth and nothing but the truth, testified as follows:

EXAMINATION

BY MR. PEARCE:

Q. Good morning, Mr. Cheyne. Could you give your name for the record and spell your last name.

A. Michael Cheyne, C-H-E-Y-N-E.

Q. What is your current employment, Mr. Cheyne?

A. I work for the Port of Seattle, SeaTac International Airport, I'm the director of planning.

Q. Could you give us a brief description of your work experience in project management and planning.

A. I am a certified project manager through the Project Management Institute. I have been doing project management, I guess, for 20-some years. I've been involved with the project at the airport, the master plan projects, particularly the third runway project, as the program lead, since 1997 and have been working as program lead for the third runway project since that time until November of last year.

Q. Could you look at Exhibit 1023, the first page. I believe it's right here.

A. Yes.

Q. Is that a copy of your professional resume'?
A. It is.
MR. STOCK: Exhibit 1023? I have that as Mike Bailey's.
MR. PEARCE: There are a number of resume's behind that exhibit. They are all stipulated, Your Honor.
Q. Mr. Cheyne, could you explain to us whether the port has any current plans for redevelopment of any of the on-site borrow source areas?
A. No, not at this point. The issue of borrow sources at the airport is similar to issues related to development of any vacant properties at the airport. At this point, there are no specific plans for redevelopment of those properties.
MR. PEARCE: Those are all the questions I have for Mr. Cheyne.
MS. COTTINGHAM: Mr. Young.
MR. YOUNG: I have no questions.
MR. STOCK: I have a few questions.

EXAMINATION

BY MR. STOCK:
Q. Mr. Cheyne, if you'll turn to Exhibit 45, and the notebook is right down there beside you, and it's flagged

for you, Exhibit 45. And if you'll turn over to the last four pages of Exhibit 45. The first few pages is a letter from Northwest Hydraulic Consultants, and attached to that letter is a Port of Seattle Commission agenda; is that correct?

A. It is.

Q. And that agenda is dated October 16, 2001?

A. Yes.

Q. And you received a copy of this agenda, did you not?

A. Yes.

Q. And you also attend on a regular basis the Port of Seattle Commission meetings; is that right?

A. Yes, regularly.

Q. And with respect to the agenda for the November 13 meeting, under the subject, isn't it true that the agenda proposed that the commission execute an amendment to the September 4, 1997 interlocal agreement between the Port of Seattle and City of SeaTac regarding allowed uses within the aviation commercial and aviation operation zone?

A. Yes.

Q. And if you'll turn over to the third page of the agenda, isn't there two-thirds of the way down more detail with respect to what that agenda item is?

A. It appears to do so, yes.

Q. And part of that agenda item, the amendment, calls for amending the interlocal agreement and stipulating with the City of SeaTac that, the first bullet item, "The port shall appropriately mitigate borrow areas and reclaim and consider economic development of the areas"; is that right?

A. That's what it says.

Q. All right. Let me show you -- I'd like to go ahead and have this marked as an exhibit for identification purposes as 804.

MR. PEARCE: We'd object to this exhibit, Your Honor. It's not on the exhibit list, it's not disclosed.

MR. STOCK: No, it's not on the exhibit list. It hasn't been disclosed. I'm using it for impeachment purposes and I am entitled to do it for impeachment purposes.

MS. COTTINGHAM: I'm going to allow it.

Q. (Continuing By Mr. Stock): Can you identify Exhibit 804, please?

A. It's agreement between the Port of Seattle and City of SeaTac for the development of certain port-owned properties.

Q. And, in fact, this was the amendment to the interlocal agreement between the City of SeaTac and the Port of Seattle that was referred to in the October 16 port

commission agenda; isn't that right?
A. I'm sorry, say that again.
Q. This is the amendment to the interlocal agreement between City of SeaTac and the Port of Seattle that was referred to in the October agenda item; isn't that right?
A. I believe so, yes.
Q. And, in fact, this amendment has now been signed by both the Port of Seattle and the City of SeaTac?
A. It looks like that way. I didn't --
Q. In fact, that's Gina Marie Lindsey's signature on page 8, is it not?
A. It looks like it is, yes.
Q. You recognize her signature?
A. I do.
Q. So there is no question that the Port of Seattle and the City of SeaTac have entered into this agreement?
A. I wasn't aware this had been signed, but, yes.
Q. Were you aware that it was proposed at the time that you filed your prefiled testimony?
A. That we would be doing an interlocal, yes.
Q. Turn over to page 6 of this agreement between the City of SeaTac and the port. And under the paragraph entitled "Marketing," isn't it true that the port has agreed within six months of the effective date of this agreement to prepare redevelopment and marketing plans at its own

expense and promote redevelopment of the site by actively making the site available for lease or purchase?

A. Are you reading from this section?

Q. Yes, I am.

A. Yes.

Q. And that's what the port's agreed to do with respect to borrow sites 3 and 4; isn't that right?

A. Mm-hmm (witness nods head affirmatively), portions of borrow site 3, yes.

MR. STOCK: I don't have any further questions. Well, actually, let me back up. I just saw something that is also interesting.

Q. Under paragraph H, "Future Redevelopment."

A. Mm-hmm (witness nods head affirmatively).

Q. Has the port agreed in this agreement, the last sentence of that provision, "The port shall in good faith pursue having the redevelopment of the property completed within five years of the date of this agreement"?

A. That would be contingent on the outcome of the marketing study.

Q. And the port agreed to that with the City of SeaTac; is that right?

A. That contingent upon whether there is a market for redevelopment, would we pursue that, hopefully, in the future, we will.

MR. STOCK: I don't have any further questions.

MR. POULIN: No questions from CASE.

MS. COTTINGHAM: Mr. Pearce.

EXAMINATION

BY MR. PEARCE:

Q. Could you explain to the board the contingency on the marketing study.

A. Well, at this point, there isn't an understanding of what type of activity could be developed there. The port has many, many acres of property that are vacant now. Vacant property does not mean that property will be developed; it means it's available and we want to try to market it as we do any of our properties.

Q. Are there any actual plans for development on any of these properties?

A. No. We couldn't do any planning until we figure out if there is a market. It's going to be demand driven. At this point, we don't know if there's a market and we don't have any specific plans for development.

Q. What's your understanding about the environmental review for any future projects for these properties?

A. Any project or any development that we do would have to go through subsequent environmental review and meet the mitigation requirements of that development.

Q. Okay. Thank you. Nothing further on redirect.

MS. COTTINGHAM: Any questions from the board?

MR. JENSEN: No.

MR. LYNCH: No questions.

MS. COTTINGHAM: Thank you. You're excused.

MR. PEARCE: The port's next witness will be Mr. Charles Ellingson.

CHARLES "PONY" ELLINGSON, having been first duly sworn on oath or affirmed to tell the truth, the whole truth and nothing but the truth, testified as follows:

MR. REAVIS: I have a handout here which is two or three pages from one of Mr. Ellingson's reports that is marked as an exhibit that I'll be referring to.

EXAMINATION

BY MR. REAVIS:

Q. Would you please state and spell your name for the record.

A. My name is Charles Ellingson, E-L-L-I-N-G-S-O-N.

Q. Now, you are referred to in some documents, probably most documents, as Pony Ellingson; is that right?

A. That's correct. Pony is a nickname.

Q. What is your current employment, Mr. Ellingson?

A. I am a principal hydrogeologist at Pacific Groundwater Group.
Q. How long have you been with Pacific Groundwater Group?
A. Since its founding in 1987.
Q. Is a copy of your CV attached to your prefiled testimony?
A. Yes, that would be attachment A.
Q. Can you give us a brief summary of your professional experience with regard particularly to hydrology and groundwater modelling.
A. I think pertinent to this project with my undergraduate training and experience in unsaturated soil, hydrology and soil physics, measuring many of the parameters that have been discussed, permeabilities and unsaturated flow characteristics. Then in graduate school I spent more time with the theory and the equations describing that kind of flow, including programming and writing equations for computers to simulate the flow of water both in saturated and unsaturated conditions.

I have continued to practice in those areas in my professional career.

Q. Can you give us a brief run-down of your educational background.
A. I have a bachelor of science in geology and geophysics from University of Hawaii and a master of science in hydrology from the University of Arizona.

Q. And do you have any particular professional certifications?
A. I am certified in the states of Idaho and Oregon and have applied in Washington, that is pending. I also have a national certification as a groundwater professional.
Q. Could you describe for us generally, briefly, your experience with computer models as applied to your profession.
A. I have used a wide variety of computer models to simulate groundwater flow. Sometimes it's just an equation that you can do with a calculator and sometimes it's very involved. I have used them for a variety of purposes over many years.
Q. When were you first retained to work on anything having to do with the third runway project?
A. In 1999 I was our project manager under Ecology's, what I call, the Ecology project or the hydrologic studies project. I was project manager of a team to study selected hydrologic effects of the third runway construction for Ecology.
Q. So were you retained by Ecology then at that time?
A. Yes. There was a stakeholder committee that included the port and ACC, but Ecology was the state's project manager for that effort.
Q. Now, did your scope of work change over time with regard

to the third runway project?

A. I ended the Ecology project and was then hired by Earth Tech, who was hired by the port to do low-flow studies. And after getting involved in that, I was subsequently directly retained by the port to continue the low-flow studies.

Q. Now, did you produce a report as a result of your work on behalf of Ecology?

A. Yes, I believe that's a June 2000 report called "Hydrologic Studies Report," something like that.

Q. That's Exhibit 1178. Can you tell us if that appears to be a copy of the report that you just described?

A. Yes, called "SeaTac Runway Fill Hydrologic Studies Report," 1178.

Q. And are your conclusions set forth in that report relative to the work that you performed for Ecology?

A. Yes, they are.

Q. Now, then you described a second phase of your work, I believe, that was done for Earth Tech on behalf of the port. Did you produce a report summarizing your conclusions in that particular topic?

A. I believe our input was maybe an appendix or a memo to Earth Tech's low-flow report, which I believe was summer of 2001, and was the first specific report dealing with low flow.

Q. Let me ask you about what I think is a later report produced in November of 2001.
A. Yes.
Q. Can you tell us what that was and what particular project that was produced as a result of?
A. We were hired to simulate flows through the new embankment fill as a part of the low-flow analysis performed by the port.
Q. I believe that is Exhibit 1305.

MS. OSBORN: 1308, I think.

MR. REAVIS: 1308. Thank you.

Q. Does that appear to be a copy of your November 2001 report?
A. This appears to be the low stream flow analysis large report. Our report was appendix B to this low-flow report.
Q. I think there is another exhibit, and that's what I'd like to refer you to, which is 1305.
A. Yes, 1305 is our input into the December low-flow report produced by the port.
Q. So 1305 is your report and that was incorporated in the later low-flow report; is that right?
A. Yes.
Q. Now, what I'd like to do then is have you discuss the modelling work that you did, briefly, on the embankment.

And if you would, refer to this handout, which is a page from the low-flow report itself, which is 1308. And there's a chart there that is the portion that I'd like for you to refer to. This is part of the handout.

A. The drawing on the last page of the handout here is a graphic demonstrating how our work was coordinated with other modelling efforts in the low-flow project. The part inside the hatched area is hours and the entire process is all the boxes. The entire process began with an HSPF model run that provided us - meaning Pacific Groundwater Group - two time series. We got runoff from impervious surfaces and we got infiltration into pervious surfaces. Then that was handed to us as a series of hourly values for 11 model years.

The first box in our scope of work was then to pass that runoff and infiltration through an additional filter wherein we used the permeability that we calculated for the fill to figure out how much of it was actually going to sink in the ground. And that was a lower permeability, therefore, we calculated more runoff in this step than was handed to us.

We took the amount that we thought was going to infiltrate and we modeled it, we predicted the way, the timing of its movement through the new fill.

Then we come down to the third box inside our area,

and that is the description of the Slice modelling, which accumulated those vertical flows along the bottom of the embankment, and ultimately to the fourth box, where we multiplied those two-dimensional flows that we accumulated over the breadth of the embankment to come up with the total contribution from the embankment to the low flows.

And we handed that back to the HSPF modelers and they plugged it into their models to simulate the low-flow condition, the future condition.

Q. Okay. Thank you. Can you describe for us, briefly, the specific areas at the airport that you modeled? And I think there's a demonstrative exhibit here, which again is a page from your report, is it not?

A. This is figure 2-1 from our report. It's also attached to my direct testimony, I believe.

The red line on this figure is the new fill. We are looking down on a map, and the existing airport is to the right here. The red line outlines the new fill. So we clipped it out and we managed all the rainfall within the red line.

The other colors on here are the runways in gray, so those are the impervious areas, and the blues and the yellows reflect the different thicknesses of fill that we calculated because that's an important parameter in the

model.

Q. So you used how many models in your work?

A. We used two formal models and complementary calculations.

Q. Now, there's been some criticism raised in prefiled testimony here about the use of two models as opposed to one. Can you explain for us why you decided to use the two models?

A. It was recognized quite early that the HSPF model was not capable of lagging flows that occur as infiltration moves vertically down through tens of feet of unsaturated material. HSPF can delay flows, but it can't truly lag them; it doesn't have the equations in there to deal with that.

In the Ecology study we demonstrated that we think that effect was going to occur, the port recognized that HSPF couldn't simulate it, so we were requested to use those tools, because it was a better tool for the fill condition after the fill was in place to simulate the water flow.

Q. Is it unusual in your field to use more than one model for a particular project?

A. No, it's not unusual.

Q. Let me ask you a couple of questions about infiltration rates, because there's been some testimony about that. And were you here during Dr. Leytham's testimony?

A. No, I was not.
Q. There were some photos presented - have you seen those - of ponding on top of the embankment?
A. I did see those during Dr. Lucia's testimony.
Q. Do you have any opinion about whether or not those photos demonstrate conditions that would be inconsistent with your infiltration parameters?
A. There's no reason I would expect them to demonstrate that it's inconsistent.
Q. Can you explain that for us, please.
A. The permeability parameter that we used for the new fill results in our prediction of about 20 percent runoff, so over the four years of test period, about 20 percent of the precipitation we would predict to run off, so runoff is something that we would expect.
Q. Now, you were here during Dr. Lucia's testimony; is that what you said?
A. Yes.
Q. What I'd like to do is ask you to refer to one of the demonstrative exhibits that Dr. Lucia used, and I think it's behind that one there, figure 6 to Dr. Lucia's report, which is cross-sections of the embankment.
A. Yes.
Q. And I have just a couple questions about that. One is regarding the issue of horizontal versus vertical flows,

Hydrus 1D versus 2D. Can you just explain for us what, if anything, those show to you about that particular issue?

A. Yes. Dr. Lucia testified that the model should have been run in a two-dimensional mode, and, yet, this figure clearly shows to me that a one-dimensional approximation is a very good approximation. We modeled it in a 1D sense. The fact that these lines are vertical, that the margins between wetter and dryer areas are vertical, indicates that we can model it in a one-dimensional sense and be quite accurate.

This type of simplification is a foundation of hydrogeologic modelling and is well accepted, and I think these results really support our one-dimensional simplification.

Q. Now, with regard to discussion in Dr. Lucia's testimony about lag time and moisture content of the soil, can you tell us what this figure here in front of you tells you about that particular issue?

A. Yes. I believe it was Dr. Lucia's, as he said, his biggest criticism was the prediction of a lag time after construction before discharge would occur. That prediction is largely based on the fact that they began with a model condition that is virtually bone dry. That is so far outside the realm of reality, that his

modelling -- that leading to that conclusion begins with a flawed concept, it ends up with wrong answers, and his biggest criticism is, therefore, really quite misplaced, it's not a concern at all. His conditions are very inaccurate.

Q. There's another criticism in Dr. Lucia's prefiled testimony relating to what he calls, I believe, ignoring the gravel content of the fill. Now, did you hear his testimony on that and can you explain for us what you see as the difference between your view on that and his view on that?

A. Well, I don't think our views on it are very different now, because in his oral testimony, he testified that, in fact, his approach and our approach result in rather similar characterizations for the fill even though he was unaware of our approach prior to his work on this project. So we took different approaches, had the same concern, the same concepts, but took different approaches to correct for the gravel content, resulted in similar characterizations, so doesn't seem like an issue to me.

Q. Now, were you asked in the course of your work to draw any conclusions about the effect on wetland hydrology of this whole embankment modelling?

A. We made some conclusions regarding that in the Ecology report, and then very late in the low-flow, after the

low-flow work, I was questioned by some of the wetland people about wetland conditions.

Q. Is there a demonstrative exhibit there that you can illustrate that point with?

A. I hope so, yes.

MS. OSBORN: I would object to this line of questioning as -- what we're not sure about is when Mr. Ellingson is talking about the work that he did.

MR. REAVIS: I think he said it was part of his original report.

MS. COTTINGHAM: Why don't you bring that out to clarify.

Q. (Continuing By Mr. Reavis): This work that you actually did relative to wetlands hydrology, when did you perform that work?

A. That would have been as part of the Ecology project in '99 and 2000.

Q. And did you develop your opinions at that time or sometime later?

A. My opinions began to be developed at that time and, you know, I have continued to study it since then.

Q. Can you tell us --

MS. OSBORN: So when did he continue -- what we are trying to determine is at what point in time were his continuing opinions developing? I understand that

this began in 2000 with the Ecology report, but I don't understand what the end point is.

Q. (Continuing By Mr. Reavis): Maybe what I can ask you to do is explain for us your opinions about wetlands hydrology as you expressed them or formulated them at the time of your work for Ecology. Can you do that, separate out the two?

A. They're not separate, so I'll just explain. The wetlands on this drawing occur down here. This soil type down here with this wetland symbol, this is a cross section through the ground, showing the fill, the till, and the wetland soils and Miller Creek there.

This line here, this dark line is a conceptualized version of the water table in the Qva aquifer, so it's the aquifer below this shallow stuff we've been talking about. Note that it's virtually at the ground surface down in these wetland soils. And that's quite a common occurrence.

What that means is that not only is there groundwater coming down off the hillside in a shallow sense, but all of the ground down here is saturated, and there's some, maybe not a lot, but there is some potential for groundwater movement to occur upwards towards the creek here. So these wetlands down here are supported by flows coming off the hillside as well as

deeper groundwater sources.

And my prediction would be that the role of the deeper groundwater source is really to protect them against hydrologic effects that are only subject to local changes, such as the construction of the embankment. I think the embankment will also have some effects, but we're not going to see a lot of change in the wetlands because there are other water sources that stabilize the situation.

Q. Have you done any calculations to determine how much of the water that infiltrates through the embankment passes through the drainage layer and how much goes below the drainage area to the lower aquifers?

A. Yes. I'll use this drawing to describe that. By the way, Hydrus was applied, I hope you realize now, to this portion of the flow field, and Slice was then used to calculate how much moves downward versus how much moves sideways. I don't remember the numbers off the top of my head. I think the downward flow is generally greater but they're on the same order of magnitude. And that, in fact, is the two different time series that we gave back to the HSPF modelers. Part of it was horizontal movement versus the movement that we expect to occur down into the regional watershed.

Q. So what does that allow you then to conclude about the

effect of the embankment on the wetland hydrology?
A. The surface flows I think will extend further into the dry season than they do currently because of the delayed flow in the embankment, but overall, I don't think there will be any measurable effects on the regional water table which also support the wetland functions.
Q. Okay. That's all I have. Thank you.

MR. YOUNG: No questions.

MS. COTTINGHAM: Cross examination.

MS. OSBORN: Thank you.

EXAMINATION

BY MS. OSBORN:

Q. Mr. Ellingson, in discussing permeability parameters, you indicated that you thought in your modelling you indicated there would be about 20 percent runoff; is that right?
A. Yes.
Q. And isn't the amount of runoff an important factor in determining how much water is actually going to infiltrate into the embankment and flow through in the Hydrus model?
A. They're both part of a water balance.
Q. So the amount that you assign to that permeability or the infiltration from permeability is a part of the water

balance consideration, right?
A. They're related, if that's what you mean, yes.
Q. In modelling infiltration of the embankment, did you use a number derived from calibration with data from the existing embankment?
A. No, we did not. Well, we used soil type data from the existing embankment and calculated permeabilities from that data.
Q. You didn't calculate from permeability measured from the embankment itself; is that right?
A. There were no permeabilities measured in the embankment.
Q. Now, in the PGG 2000 model that you did for Ecology, you modeled both existing and future conditions; is that right?
A. Yes.
Q. And in modelling existing conditions, you used a recharge model and then the Slice model, right?
A. Yes.
Q. And the Slice model, as you indicated there, modeled what was infiltrating or seeping down into the deeper groundwater; is that right?
A. Correct.
Q. And the model showed that whatever went into the deeper groundwater was actually lost in the system, it didn't reemerge in the streams; is that right?

A. We made generalizations based on stream flow gain, and in the reach that we measured those in, it appeared that much or most of the water could be accounted for by shallow groundwater movement.

Q. But what I am asking you is, the water that you modeled as seeping down into the lower aquifer, I believe, the till and below, was lost to the system, it was no longer accounted for in the model; is that correct?

A. Well, all of our modelling stops there, frankly. Any subsequent calculations are at this time based on --

Q. I just need a yes or no. It no longer returned into the model; is that right? You identified it as water that was gone.

MR. REAVIS: I think the question is vague as to which model it disappeared from.

Q. You know which model I'm talking about, the existing condition Slice model for the PGG 2000 report?

A. My answer is that in all of PGG's calculations, flow downward through the till is no longer managed by PGG.

Q. Okay. And then in doing the future conditions model for the Ecology report, you used the recharge model, the Slice model and you also used Hydrus 2D; is that right?

A. Correct.

Q. And you used Hydrus 2D because then the future conditions you have to pile the embankment up on top of the slope

and you needed Hydrus to model the vertical flow; is that right?

A. With one clarification. Even in the Ecology project we used Hydrus 2D in a one-dimensional sense so, fundamentally, there was no difference between the approaches.

Q. And then when you went to work for the port and you began to do the modelling that is described here, existing conditions were modeled that didn't use Slice to model existing conditions; is that right?

A. That's correct.

Q. But in the future conditions as described here, you used HSPF, Hydrus and Slice to model future conditions; is that right?

A. Correct.

Q. Thank you. Are you familiar with the port's decision to excavate soils beneath the embankment to increase seismic stability of the embankment?

A. I have read, I believe, a Hart Crowser report on that and a subsequent HNTB Hart Crowser memo.

Q. So you are familiar with that?

A. If that's what you mean.

Q. Was that included in your modelling of the embankment, that excavation of soils?

A. No.

Q. Could you take down the story board that you have right there to look at the -- this is an exhibit submitted with Dr. Lucia's prefiled testimony that you just testified about.

Now, you say that this exhibit indicates that there is vertical flow in the embankment, but don't we actually see lateral flow occurring as water moves -- in the changes of the colors of the line?

A. Minimal.

Q. And you mention that you disagree with the assumption that the embankment will be dry at the time that construction is completed. Did you make an assumption about the conditions, the unsaturated conditions of the embankment in your modelling?

A. We were very careful to --

Q. Actually, Mr. Ellingson, I need a yes or no answer from you.

A. Would you rephrase the question.

Q. Sure. In your modelling of the embankment, you made assumptions about what the saturated or unsaturated conditions were of the embankment; is that right?

A. All models require initial conditions, so you have to tell it how to start.

Q. And that start was the condition that held from that point forward, right?

A. No.

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

MS. COTTINGHAM: Mr. Poulin, do you have any questions?

MR. POULIN: No questions from CASE.

MS. COTTINGHAM: Any redirect?

EXAMINATION

BY MR. REAVIS:

Q. You said that the flow downward through the till is no longer managed by PGG. Can you explain for us what you mean by that?

A. The calculated time series -- this arrow right here represents that downward flow to the till and its daily flow rates for 11 years, okay, so each day has a rate. We handed that back to the HSPF modelers, so I stopped worrying about it at that point is what I meant.

Q. With regard to this assumption of initial moisture conditions, I think you said that did not continue throughout. Can you elaborate on that for us?

A. Well, Dr. Lucia's example of that is that his initial moisture condition is very dry and, as you can see, over time, these modeled changes did occur in moisture over time. We started with a much wetter condition and we made sure to not base our conclusions on a modelling

period that were so influenced by the initial conditions. And that was a big mistake here.

Q. Okay. Thank you.

MR. YOUNG: Could I ask one question.

MS. COTTINGHAM: You may.

EXAMINATION

BY MR. YOUNG:

Q. Can you say where this figure 6, the one with the cross-section, what is that from?

A. That is figure 5-1 of our November report with appendix B to the December low-flow report.

MR. YOUNG: Thank you. That's all that I had.

MS. COTTINGHAM: December 2000 or December 2001?

THE WITNESS: December 2001 low-flow report.

MS. COTTINGHAM: Do you have an exhibit number for that?

MR. REAVIS: I got confused earlier. I think the 2001 low-flow report is 1308 and his separate report is 1305.

MS. COTTINGHAM: No further questions from the board members? I have one question.

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EXAMINATION

BY MS. COTTINGHAM:

Q. I think you just answered it. You used the term lag flow and delay, implying that they were different, and I assumed that the difference has to do with the assumptions that start on the dryness, whatever, the nature of the fill in your model. Do you mean different words when you say lag and delay?

A. Are you referring to my description of how Hydrus and HSPF can simulate these things differently or --

Q. You said because HSPF was inadequate to deal with lag flow, it can delay it but not lag.

A. Can I draw a picture to describe that.

MR. REAVIS: Sure. There's I believe a chart behind all of that. There should be some markers there.

A. Time is across the bottom here and the amount of flow is across the top. HSPF takes a stored amount of water and it can calculate a decrease in that flow over time. What our concept was for the embankment and, in fact, modelling has verified, is that it's not just a delay, but the onset of flow is lagged. So the maximum flow occurs at a time not zero time but some later time. That's what I meant by lagged.

HSPF is limited to this kind of simulation. Hydrus allowed us to simulate that kind of flow.

MS. COTTINGHAM: Thank you. Any other questions?

MR. JENSEN: No.

MR. LYNCH: No.

MS. COTTINGHAM: Any questions as a result of the board questions?

MS. OSBORN: None.

MS. COTTINGHAM: Any questions as a result of the board questions?

MR. REAVIS: No.

MS. COTTINGHAM: Thank you. You're excused.

MR. STOCK: During the transition, I just wanted to clarify that Exhibit 804 was admitted. I had forgotten to formally move after Mr. Pearce's objection had been overruled and I just assumed that it had gone into the record.

MS. COTTINGHAM: It is in the record.

MR. REAVIS: The port calls Linn Gould. I'm sorry, I'm out of order. We're going to Mr. Stubblefield first.

WILLIAM STUBBLEFIELD, Ph.D., having been first duly sworn on oath or affirmed to tell the truth, the whole truth and nothing but the truth, testified as follows:

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EXAMINATION

BY MR. PEARCE:

Q. Good morning. Could you state your name and spell your last name for the record.

A. Yes. My name is William Stubblefield, S-T-U-B-B-L-E-F-I-E-L-D.

Q. You have submitted direct testimony in this matter?

A. I have.

Q. Is your professional resume' attached as tab A to that testimony?

A. It is.

MR. PEARCE: And I would note for the board that it's the stipulated exhibit, it's in 1023.

Q. Could you briefly describe your educational experience for us.

A. Yes. I have a bachelor's degree in biology and chemistry and that I received from Eastern Kentucky University. I have a master's degree in toxicology and toxicodynamics that I received from the University of Kentucky, and I have a Ph.D. in environmental toxicology that I received from the University of Wyoming.

Q. Could you briefly describe your professional work experience.

A. Certainly. I worked for approximately five years between my master's and my doctorate degree for Exxon

Corporation. I worked, subsequent to completing my doctorate degree, for Mobay Chemical Company and then I've been at ENSR Consulting for 16 years, and also have an adjunct faculty position at Colorado State University.

Q. Could you explain to us in layman's terms if possible how ambient water quality standards are developed?

A. Sure. Ambient water quality criteria are established on the basis of a procedure that was developed in 1985 by the U.S. EPA. Briefly, it involves the development of laboratory toxicity data, laboratory toxicity tests that are conducted. The data are arrayed and a criterion is developed from the statistical procedure from that data set, so basically it's based on laboratory data.

Q. What type of water is used to develop those ambient water quality criteria?

A. The water that is used in those tests is almost always a very clean, very pristine water that is a laboratory water. It's very low in organic carbon content, it's very low in dissolved solids, and the reason for that is we want to minimize things that can affect the results of the toxicity tests.

Q. Could you contrast that for us to the development of a water effects ratio?

A. Certainly. Water effects ratios is a procedure for

modification, if you will, of a national criterion, and it is done by comparing toxicity test results that have been generated using the laboratory water, the clean pristine laboratory water to a site water, which would be water literally taken from the site of concern. And that water would reflect whatever the constituents are in that water, including organic carbon, including suspended solid loads and all of the associated parameters that exist in that site water.

Q. Why are organic carbon and suspended solids important?

A. Well, those are two, among others, of the parameters that can in fact affect toxicity test results. They can modify the toxicity or the bioavailability, if you will, of the material to the organisms, and it results in a difference in the data from what you would get in a standard laboratory test, the likes of which are used in deriving the criterion.

Q. Are these site-specific studies recommended by EPA?

A. Absolutely. Since the beginning of the development or since EPA first put out the guidelines for deriving criteria, it was noted in there that there are cases by which it may be necessary or desirable to develop site-specific criteria as opposed to relying on the more general national criteria.

Q. In your opinion, are they less protective than the

published ambient water quality standards?

A. They're exactly the same because they are a modification of the existing criteria.

Q. What do you get at the end of the study? You said you get a ratio; how is that applied?

A. As I said, in developing a water effect ratio, what you do is you run side-by-side tests, tests between a laboratory water, which is identical to that used in deriving the criteria originally, and you're comparing that to a test that's run in site water, which is water that is literally taken from the site, brought into the laboratory and tested. The end points of the test are what, at least in this case, are called acute end points are LC_{50}s. It's the concentration that is lethal to 50 percent of the organisms contained in those tests.

You ratio the results of those two tests. In other words, you look at the results you got from the site water and you compare that to the results you got from the laboratory water, and then that ratio is used to modify the national criterion. So you basically just multiply it times that value, what the original standard value was.

Q. And how are they applied in a regulatory setting; how are these ratios applied in a regulatory setting?

A. They are used for deriving site-specific criterion.

Q. Could you give us an example of, say, if the ambient water quality criteria is 2 and if the water effects ratio was 3, what would your standard be that you would have to meet?

A. In that particular case, the national standard or the, excuse me, the national criteria or the state standard would be 2. If you had a water effect ratio that was derived from the lab data of 3, then the 2 would actually just be multiplied together, and so you would modify the state standard to be 6 in this particular case. So it's merely an arithmetic movement of the value.

Q. Have there been any range finding or WER studies done at the airport?

A. Yes, there have, there was a series of studies that were run by Parametrix a few years ago, looking at potential water effect ratios in Walker, Des Moines and Miller Creeks.

Q. Are those the types of studies that you routinely rely on in your professional work?

A. Those are certainly the range-finding studies that we would do at any site.

Q. Could you look at Exhibit 1118.

MR. STOCK: We have an objection on hearsay grounds to Exhibit 1118. This is a Parametrix document and Mr. Stubblefield is not with Parametrix.

MS. COTTINGHAM: The burden shifts to you.

Q. (Continuing By Mr. Pearce): Is this the type of document that a reasonable scientist would rely on in studying water quality?

A. Certainly. This is a laboratory data report from the laboratory that conducted the studies.

MR. PEARCE: I believe that meets the board's hearsay rule.

MR. STOCK: Well, actually, simply because an expert can rely upon incompetent evidence to form opinions doesn't mean that that evidence gets admitted for all purposes. The fact that he as an expert can rely upon hearsay evidence doesn't overcome the admissibility issue of the hearsay, so the hearsay objection still is appropriate. Right now it can be used for context and background, but it cannot be used for the truth of the matter asserted simply because he, as an expert, relied upon the hearsay.

MR. PEARCE: I don't think that's what he said. I think the board's rule is whether a reasonably prudent person would rely on this type of document in the conduct of their affairs. And I think that's exactly what the testimony shows. Scientists rely on this, I mean, they're the only people that really read them.

MR. STOCK: It's still hearsay and it is being

offered for the truth of the matter asserted, so I would continue to assert the hearsay objection.

MR. PEARCE: That's correct, it is certainly hearsay, and under Evidence Rule 703, our expert witness can clearly rely on it, whether it's admissible or not, but it's also, I believe, admissible under the board's rule of evidence 371-08-500, so evidence including hearsay evidence is admissible to the board if, in the judgment of the presiding officer, it's the kind of evidence in which reasonably prudent persons are accustomed to rely in the conduct of their affairs.

MS. COTTINGHAM: I'm going to allow the evidence in and the board will give it the weight that it deems is appropriate.

Q. (Continuing By Mr. Pearce): Is this one of the water effect ratio -- well, could you identify this for us, please, Dr. Stubblefield?

A. This is a report generated, as I said, by Parametrix entitled "Water Effect Ratio Screening Study at Seattle Tacoma International Airport, Toxicity Evaluation of Site Water" dated February of '99.

Q. And could I also ask you to look at Exhibit 1120. I apologize, it's not in the same volume, it's in the next volume.

MR. STOCK: Ms. Cottingham, ACC asserts a

hearsay objection to this. This is even more egregious. This is a port-generated document. And this is not the witness to bring this in for the truth of the matter asserted.

MR. PEARCE: I can lay a foundation. But it's the same type of document as 1118.

MS. COTTINGHAM: This is a draft memorandum, so do you want to make your arguments?

Q. (Continuing By Mr. Pearce): Are you familiar with this document, Dr. Stubblefield?

A. Yes, I have seen this document, that's correct.

Q. Is this the same type of document as in 1118?

MR. STOCK: Object, vague.

Q. Is this a range-finding WERS study?

A. This document presents the results of some range-finding toxicity tests that were conducted, that's correct.

Q. Is this the data draft or --

A. No, the data are actually laboratory bench data sheets, which is the kind of things that, frankly, I would want to see, as opposed to a summary report. It is the true basis of what was generated as opposed to a report that may or may not adequately reflect all of the data that were gathered during the studies.

MR. STOCK: Based upon that testimony, Your Honor, it's just getting more attenuated. It's actually

now double hearsay, where attached to this port memorandum is lab results. No one is hear from the lab to cross examine. Dr. Stubblefield can't be cross examined on the lab results. He can't be cross examined on the port memorandum. It is classic hearsay. And in terms of the indicia of trustworthiness, it hasn't been established. I don't see how the board can rely --

MS. COTTINGHAM: I am going to allow this in for background only because of the draft nature. If it were a more formal report that somebody might rely on, I might let it in, but --

MR. PEARCE: Can I ask him whether he would rely on the data?

MR. STOCK: On draft reports.

MR. POULIN: Your Honor, I would further note that there still has been no foundation laid as to this witness's familiarity with this document.

MR. PEARCE: I would be happy to lay that foundation. I think he testified he was familiar with the document, that it's a range-finding WERS study, and that this is the kind of laboratory data that he typically relies on in his professional work.

MS. COTTINGHAM: Why don't you lay the foundation better.

Q. (Continuing By Mr. Pearce): Are you familiar with this

report?
A. I have seen and read this report, yes.
Q. Is this the type of laboratory data that you typically rely on in forming your professional opinions?
A. Yes, it is.
(Board conferring)
MR. STOCK: ACC will continue to assert the hearsay objection. It's double, triple hearsay and their is an indicia of trustworthiness required by the board's own rules.
MS. COTTINGHAM: I am going to grant the motion to exclude this for hearsay purposes. It can be only for background, which is what the matrix shows it for, but not for the truth of the matter asserted.
MR. PEARCE: Thank you, Your Honor.
Exhibit 649. I would note that this memorandum is an ACC exhibit that's been stipulated to by ACC.
Q. Have you reviewed this memorandum from Parametrix, Dr. Stubblefield?
A. I have seen this document, yes.
Q. Does it report the findings of the whole effluent -- of the WER ratio range-finding study?
A. It does, or at least it presents the range of data that was obtained, correct.
Q. What is your opinion about the results or indications

from the WERS screening study at the port?

A. My opinion is that the water effect ratios that had been generated here and are presented in this memo are slightly higher than but are not surprising in terms of what I've seen previously at other sites and other waters with regard to the types of water effect ratios you would expect to see for copper.

Q. And what is the range that's indicated for a water effects ratio?

A. This memo reports that it's 7 to 16.

Q. Is that consistent with water effect ratios for copper reported in scientific literature?

A. I have seen water effect ratios typically more in the range of 2 and half to 10, somewhere in that, although, I, myself, have generated data in other streams associated with storm events that have shown water effect ratios upwards of 40.

Q. Could you explain to the board mechanistically what's happening in the site-specific water, why a water effects ratio would be 6 instead of the ambient water quality standard developed in lab water?

A. Sure. Remembering that an ambient water quality criteria is derived off of straight laboratory dilution water, and that the water effect ratio is testing in a natural water, anything that comes into that natural water that

has an effect on the bioavailability of the metal, in other words, the availability of that metal to be taken up by the organism, will change that, will reduce the toxicity, if you will.

In the case of a storm event or something of that nature, if you think of the types of materials that can affect that bioavailability, chiefly, in the case of copper, being dissolved organic carbon, dissolved organic carbon is basically the brown material, if you will, that runs into the stream, and it has the ability to bind up metals and make them such that they are not available to the organism and, thus, reduces the toxicity to the organism.

Q. Have you reviewed any recent base flow instream monitoring at the Port of Seattle?

A. I have.

Q. And what constituents does it focus on?

A. Chiefly copper and zinc.

Q. Do you know why it focuses on copper and zinc?

A. Previous studies that have been done at the port that looked at a number of additional metals have indicated that the concentrations of those metals are either below detection or are below levels that have been shown to be of concern, i.e., are below state standards or federal standards.

Q. And was this monitoring done instream?
A. My understanding is, yes, that's correct.
Q. What does that data show in your opinion for copper in Miller and Walker Creeks?
A. From the most recent study, the studies that I have reviewed, what it showed is that copper concentrations in Miller and Walker Creeks are below the acute and the chronic standards that have been laid out by the State of Washington.
Q. And do you have an opinion what the data shows with respect to zinc in Miller and Walker Creek?
A. It is also below applicable state and state standards for acute and chronic exposure.
Q. Could you discuss what the data shows for copper and zinc in Des Moines Creek?
A. There are exceedances that have been observed in Des Moines Creek and the tributaries to Des Moines Creek.
Q. How would you characterize those exceedances?
A. They are transient and associated with the storm flow event, so when you have the storm flow event, you get the runoff; as that dissipates, then the concentrations drop back down to what would be more consistent with base flow.
Q. With respect to copper in Des Moines Creek, do you have an opinion about whether a site-specific WER could be

developed for Des Moines Creek and what effect that will have?

MR. POULIN: Objection, compound.

MS. COTTINGHAM: You can ask it as two questions.

Q. (Continuing By Mr. Pearce): Do you have an opinion with respect to copper in Des Moines Creek whether a site-specific water effect ratio can be developed?

A. Certainly one can be developed.

Q. And do you have an opinion about the range of the site-specific ratio that's likely to occur?

MR. POULIN: Objection. There's inadequate foundation.

MR. PEARCE: He has already testified about the range-finding studies, Your Honor.

MS. COTTINGHAM: I am going to overrule the objection.

A. I answer?

Q. Yes.

A. I would expect water effect ratios to certainly be present in the stream, and I would expect they would range somewhere in the range of what I've seen both in the literature and from what was previously reported by Parametrix to be in the range of, you know, 5, 10, something of that nature.

Q. What would the effect of a water ratio of even 3 be with respect to the exceedances of copper you have seen in Des Moines Creek?
A. It would make it so that there were no longer an exceedance; in other words, the standard would be higher and the exceedance wouldn't exist.
Q. What is your opinion about what the instream monitoring shows with respect to zinc in Des Moines Creek?
A. It is basically the same situation. There are exceedances of the zinc standard, but that it is likely that a water effect ratio associated with zinc would increase the state standard and there would be no exceedances, or if there were exceedances, that appropriate measures can be taken to reduce the concentrations of zinc to below whatever the appropriate standard would be.
Q. And do you have an opinion about whether the ambient water quality standards for copper and zinc can be met at the airport?
A. I believe with the inclusion of site-specific modification, that there should be no reason that you cannot meet and protect the system, so meet the appropriate standard and provide the desired level of protection.
Q. And I asked you about a WER for copper in the range of 3.

I just want to make sure that we're clear. Your testimony is that the range would likely be --

MR. STOCK: This is leading, Your Honor. Could he ask a direct question, please.

Q. I asked you about a WER as an example, a hypothetical about a WER for copper in the range of 3. What is your opinion about what the likely WER for copper would be?

A. Based on the extent of empirical data, it is likely that that value will be higher than 3. The data generated by Parametrix suggests that it is in the range of 7 to 16.

Q. And what would that mean in your opinion for exceedances of copper in Des Moines Creek?

A. It would certainly mean there wouldn't be any exceedances.

Q. Thank you, Dr. Stubblefield. I have no further questions.

MS. COTTINGHAM: Do you have any questions?

MR. YOUNG: No questions.

MR. STOCK: I don't have any questions.

MS. COTTINGHAM: Did you say you do not have any?

MR. STOCK: I do not have any for this witness.

MR. POULIN: Yes.

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EXAMINATION

BY MR. POULIN:

Q. Dr. Stubblefield, I'm Rick Poulin for CASE. You're a relative newcomer to these proceedings?

A. I am.

Q. And you did not submit a declaration earlier in this appeal, did you?

A. I'm not sure what you mean.

Q. I guess you did not. When did you first become involved in the third runway master plan update projects at issue here?

A. About a year ago I was asked to start looking at the issue of water effect ratios in the streams associated with the port, with the airport.

Q. I'm sorry, I missed your initial response. When did your involvement begin?

A. About a year ago.

Q. About a year ago.

A. Maybe a little more. I don't know. I can't remember specifically.

Q. You were not personally involved in the range-finding studies?

A. That's correct.

Q. And you did not assist in the 1999 sampling effort?

A. Not personally.

Q. Or the analysis of the data?
A. I have seen that data and we are in the process of doing the analysis of that data.
Q. And, likewise, with the excluded draft 2000 material, you weren't involved in preparing that?
A. What do you mean by the excluded? Can you specifically tell me, I'm sorry.
Q. The April 2000 memorandum that you were asked about.
A. I did not prepare that memorandum, that's correct.
Q. There's not a section in your prefiled testimony discussing your familiarity with the voluminous documents we've all been talking about for the past ten days. Have you reviewed any of the annual stormwater monitoring reports?
A. I have seen some of the earlier stormwater reports, yes.
Q. You have seen them. Have you reviewed them in any detail?
A. I'm familiar with the data and I have read them. I can't repeat them to you verbatim.
Q. Have you reviewed the 1997 stormwater receiving environment monitoring report?
A. I think I have focused more on some of the more recent data, I think there's like a 2000 report and '99 report, perhaps.
Q. Okay. Now, you cite in your testimony on page 8 a report

that you refer to as Herrera 2001?
A. That's correct.
Q. And that is better known to us as Exhibit 686. Would you agree that's the 2001 City of Des Moines water quality monitoring program?
A. Yes.
MR. PEARCE: Can the witness see it?
MR. POULIN: Certainly.
A. That is the report that I am familiar with.
Q. So you have reviewed this 5-year project report?
A. I have.
Q. And would you agree that this report was undertaken by the City of Des Moines and it involved - well, I'll leave it at that - that the City of Des Moines contracted with Herrera consultants to perform this study?
A. I honestly don't know how this report came about. It says that it is the City of Des Moines report. I assume that that's what it is.
Q. And it involved a 5-year monitoring program that looked at receiving water in three streams including Des Moines Creek?
A. That is what the data suggests, yes.
Q. And you cite this report with reference to the typical range of dissolved copper and zinc in Des Moines Creek?
A. That's correct.

Q. Do you know where the instream samples for this report were taken?
A. Not specifically, because the report is inadequate in telling specifically where all of the samples were taken. However, there is one location that was identified; it's downstream of the airport, I believe it's substantially downstream of the airport, that is referred to in, I can't remember, it's like table 2. There's a series of large tables.
Q. I was going to offer figure 1, which follows page 3.
A. Actually, what I had looked at was table B1 and B2, which are the actual data as opposed to a figure.
Q. But you agree that the monitoring on Des Moines Creek is substantially downstream from the Port of Seattle stormwater discharges?
A. It is substantially downstream, is my understanding, yes.
Q. Are you aware that this Herrera study concluded that dissolved copper concentrations in Des Moines Creek significantly decreased downstream during storm flow?
A. No, quite honestly, because I focused primarily on the data only in this report. I did not look at the conclusions of the report.
Q. You're not suggesting that the report does not include data substantiating that conclusion, are you?
A. I don't know whether the report includes that or not. As

I said, I used the report merely to look at the base flow data that is reported in tables B1 and B2 and, frankly, I was trying to reach my own conclusions, excluding -- I wasn't interested in what their conclusions were.

Q. Okay. So you didn't look at the analysis of water quality?

MR. PEARCE: Objection, asked and answered.

MR. POULIN: That's a brand-new question, Your Honor.

MR. PEARCE: He said he only looked at the tables.

MR. POULIN: I'm confirming my understanding of the witness's testimony.

A. Could you restate.

MS. COTTINGHAM: I'll allow the question.

Q. (Continuing By Mr. Poulin): You did not look at the sections addressing water quality?

A. To the extent that the data that are contained in tables B1 and B2 have metals concentration data, I looked at that. I did not look at a comparison in this report between those values and what standards, the appropriate standards would be. So I did not look at any comparison thereof.

Q. Okay. And by tables B1 and B2, you're referring to appendix B, the water quality data base?

A. It is my understanding it is the raw data upon which the report was based.
Q. So that's just the numbers?
A. That is just the numbers, that's correct.
Q. It's not the report's discussion of the significance of those numbers?
A. That's correct.
Q. Are you aware that Washington State class AA water quality criteria apply to Des Moines Creek?
A. I have read that.
Q. Are you aware that this study compared the stormwater sampling results to the class AA water quality criteria in Des Moines Creek?
A. No, because I have not read the detailed portion. As I said, I didn't read the discussion portion of this report; I relied on only the data reported in tables B1 and B2.
Q. So then you're not aware that this study concluded that over the 5-year monitoring period --

MR. PEARCE: Objection. Counsel is just testifying. The witness has said over and over and over that he used tables B1 and B2 and has no opinion about the conclusion of the --

MR. POULIN: This individual has been offered as an expert with an opinion relevant to copper in Des

Moines Creek and I'm exploring the adequacy of his factual familiarity with the issues that we've been discussing here.

MS. COTTINGHAM: But you keep referring to a part of the report that he says he hasn't read, so you can explore his general understanding, but he's already answered that he only looked at the data in this report, so narrow your questions.

Q. (Continuing By Mr. Poulin): You haven't compared that data to water quality criteria?

A. Actually, I did do a brief comparison of the data to the appropriate standards.

Q. And did you see any data that would cause you to disagree with the study's conclusion that 40 percent of the stormwater samples taken at the upper Des Moines Creek sampling station violate --

MR. YOUNG: Objection. He is just testifying.

MS. COTTINGHAM: Sustained.

A. I don't know what the study concluded, Counselor, I'm sorry.

Q. Okay. So you didn't use information about dissolved copper that's available from further upstream at Des Moines Creek; you chose to use the Herrera study instead?

A. I looked at the Herrera study with one intent and that was to see if I could get some idea of what the

relationship between total recoverable and dissolved copper values were instream. It was one of the few studies that actually had both dissolved and total recoverable values. That is the reason that I used the data in B1 and B2.

Q. Haven't you seen information produced by the Port of Seattle that reflects dissolved and total copper?

A. I said in addition to the studies that I have been involved with recently, that is the only study that has actual instream data that has both total recoverable and dissolved values.

Q. So, again, I ask, you're not familiar with the 1997 stormwater receiving environment monitoring report?

A. I have seen the report; I have not reviewed the report in depth.

Q. So you're not familiar with its discussion of dissolved and total copper instream?

A. I have not read the report.

Q. Now, with respect to this 1999 range-finding study that you've attached as exhibit C to your prefiled testimony, and has also been introduced today and admitted for background purpose.

MR. PEARCE: I'm not sure if that's how it's been admitted.

MS. COTTINGHAM: Give me the number.

MR. POULIN: 1118.

MS. COTTINGHAM: That was admitted. I overruled the hearsay objection.

MR. POULIN: Okay.

Q. Now, this is a preliminary aspect of generating a WER?

A. That's correct.

Q. Is this effort directed to a total recoverable WER or a dissolved WER?

A. Actually, it would be applicable to either one of them, quite frankly, because this was a range-finding study and in so doing the range-finding study, the reason it is a range-finding study is they relied on nominal concentrations of metals, i.e., they were not measured concentrations. And because of that, it gives you an indication of what either a total recoverable or a dissolved WER would be.

Q. But nominal means --

A. Unmeasured.

Q. -- being such in name only, so-called or punitive?

A. I'm sorry, could you rephrase that.

Q. Nominal means being such in name only, so-called or punitive?

A. Nominal in the parlance of toxicology for what we are talking about right now means an unmeasured concentration. It means, for example, if you're baking a

cake, I think I added a cup of flour, but unless I actually measured the cup of flour, then I can't say for certain that it was a cup.

Q. So they are purporting to measure the effect of copper, but they didn't measure the copper?

A. That's correct.

Q. Now, I'm somewhat confused by this report. It does not appear to report any LC 50 statistics. It appears, if you look at page 4 of this 1999 study, that every sample resulted in 100 percent survival; isn't that right?

A. Give me a moment to find that to refamiliarize myself.

MR. YOUNG: Which number exhibit are we on?

MR. POULIN: It's Exhibit 1118, page 4.

A. Table 3 on page 4 indicates that there was 100 percent survival in all of the site waters. So in answer to your question, an LC 50 could not be calculated or, more correctly, an LC 50 would be reported as greater than 100 percent.

Q. So it's not possible to generate a WER without determining what the LC 50 is, is it?

A. Actually, it is possible to generate a WER without generating an LC 50. This portion of the report is really not WER, per se. This portion of the report was some screening-level studies that were done where water was taken and brought in and organisms were tested in the

water, but it was not the kind of side-by-side test that is done generally for the water effect ratio.

Q. Well, there's nothing in this report that indicates how the WER ratio was arrived at, is there?

A. In this particular portion of the report -- I'm familiar with the other reports, frankly, for purposes of the WER, the generation of the WER.

Q. But this report, which you use in your prefiled testimony to support a WER in the range of 6.7 to 16, provides no basis for how those numbers were arrived at, does it?

A. This portion of the report does not, you are correct.

Q. So you have not provided either with your testimony or in this exhibit supporting data to back up the table in your prefiled testimony?

A. I believe that that information is contained in the other exhibit that was pulled previously. I don't remember the number specifically, I'm sorry.

Q. That's the exhibit that was described as double or triple hearsay. Well --

A. This report contains --

MR. STOCK: There is no question outstanding, Ms. Cottingham.

Q. (Continuing By Mr. Poulin): Is the fathead minnow a fresh-water species?

A. Is the fathead minnow a fresh-water species? Yes, it is.

Q. Back to your prefiled on page 12. I'm somewhat curious, do I understand you correctly you're stating that the water quality criteria that we start with is overly conservative because it's based on laboratory water?
A. I'm sorry, where are you in the text?
Q. I'm not referring specifically to the text, I'm just asking about --
A. I'm sorry, you said page 12. I was confused for a moment.
Q. We'll get to there. Is it your testimony that the water quality criteria are overly conservative because they're based on laboratory water?
A. No, it is not. What I've said is that a water quality criteria can be both overly or under protective, in some cases, but the preponderance of the data that I'm familiar with has shown that water quality criteria on a site-specific basis do in fact tend to over protect and are overly protective in that respect.
Q. You state on page 6 that the acute water quality criteria for copper at 50 milligrams of hardness --
A. Yes.
Q. -- is 8.86?
A. That's correct.
Q. And, yet, on table 2 on page 12, the column referring to hardness normalized, the copper, indicates that the LC 50

is -- I'm sorry, I'm looking at the wrong --

In the second column, this table indicates that the LC_{50} for copper is 9.2 with laboratory water, and the second column indicates that when hardness is normalized, it's 4.9, so I'm curious to see those samples substantially less than the water quality criteria reported on page 6.

MR. PEARCE: Counsel is providing testimony, not asking a question.

Q. I didn't phrase that question properly. I'll withdraw it given the lack of time.

Now, in your testimony, you state that you are familiar with more recent data that was not provided with your testimony, but in paragraph 27 of your statement on page 16, you state that the instream monitoring results have shown limited exceedances at some locations for storm events in Des Moines Creek?

A. That's correct.

Q. So do I understand you to be stating that the data you have seen indicate that the current water quality criteria are being violated?

A. No, actually, what I'm saying there is that we have seen limited exceedances in some locations, and by some locations, I mean predominantly the samples that were taken in the west branch of Des Moines Creek, the east

branch of Des Moines Creek and Des Moines Creek below the weir.

Q. Thank you. You've answered my question. And the --

A. I'm sorry, I'd like to expand on that if you don't mind.

MS. COTTINGHAM: The attorney on the other side will be able to bring that out on cross examination.

MR. PEARCE: I would object to counsel cutting the witness off mid answer when he is trying --

MR. STOCK: He didn't cut him off, Ms. Cottingham. I think you properly instructed the witness.

MR. PEARCE: Who gets to instruct the witness.

MS. COTTINGHAM: Let's maintain the high level of civility we've had so far to date and proceed. We haven't had a break this morning, which might be the reason that we are getting this way. Why don't you continue, Mr. Poulin, and we will finish this witness and I think what we'll do is take an early lunch break.

Q. (Continuing By Mr. Poulin): Dr. Stubblefield, after looking at the water quality criteria and the range-finding study, you did not calculate the water quality criteria that you believe is likely to result from the port process?

A. I did not.

Q. And you did not compare the resulting site-specific water quality to current discharge levels?

A. In so much as I looked at the values and said that a factor of 2, factor of 3 would probably be higher, would indicate that the standard, the applicable standard would be higher, that is the extent to which I did that. I don't have the data upon which to say quantitatively what the water effect ratio is likely to be, and so until those data are actually available and those studies have been conducted in a definitive fashion, I can't tell you specifically what the appropriate standard would be.

Q. But you did state that for a range of 3, there would no longer be any exceedance in Des Moines Creek; wasn't that your testimony?

A. With respect to copper?

Q. Yes.

A. I said that a factor of 3 would probably be sufficient. That's based on a qualitative evaluation of the data rather than a quantitative evaluation.

Q. Now, the lower end of the range that you reported in your prefiled testimony is 6.7; isn't that right?

A. That is what the Parametrix report says, you're right.

Q. And if we round that up to 7 and multiply it times a range of 3, a resulting acute water quality criteria would be 27, isn't that right?

A. I don't know because the water quality criteria is hardness dependent. If you take the hardness with which

that is appropriate, yeah, we can make those sorts of assumptions.

Q. And are you aware that over half of the stormwater discharges from SDS 3 exceed 0.29 copper?

MR. YOUNG: Objection, lack of foundation.

MS. COTTINGHAM: Sustained.

Q. (Continuing By Mr. Poulin): Please turn to the 2001 stormwater monitoring report, that's Exhibit 6, page 106.

A. Which page?

Q. It's page 106. It's a handwritten number on the right margin or, rather, the left margin, three quarters of the way back in the exhibit.

MS. COTTINGHAM: We don't have any handwritten on ours.

A. I don't have any handwritten notes.

MR. POULIN: I think we've been down this path before, and I would like to stop the clock if it's necessary to reorient you.

MS. COTTINGHAM: We are on page 106, but we have no handwritten. I think you're looking at a wrong version.

MR. POULIN: Well, I'm looking at Exhibit 6 as it was introduced in the John Drabek deposition. And does your page 106 say page 2 of 6?

MS. COTTINGHAM: Yes.

MR. POULIN: And NPDES composite statistic.

MS. COTTINGHAM: Yes.

Q. (Continuing By Mr. Poulin): Right in the center column, SDS 3 results are reported and the column shows that the 25th percentile, sorry, the median percentile for copper is 0.29. Do you see that?

A. Okay. Yes, it does say 0.29.

Q. That indicates that fully half of the samples were greater than 0.29; isn't that right?

A. Frankly, sorry, I don't know specifically what all of this data is based on. The value says 0.29. It says that it is the NPDES composite statistics.

Q. And the median value is the one that's right in the middle?

A. That's more or less correct. It's not an arithmetic mean, there's a difference between mean and median.

Q. Indeed. So half the samples are below and half above?

A. Above the 0.29 number.

Q. And we just discussed that the WER would be 0.27 with a range of 3?

A. The WER would be 0.27, I'm sorry?

Q. The water quality criteria resulting from a WER of 3 would be 27, which translates to 0.27?

A. I am sorry, Counselor, I'm not sure where you're getting the 27. I need to know what the hardness is. The

hardness will fluctuate, excuse me, the standard will fluctuate with whatever the hardness is at the time the sample was taken. You can take a mean hardness if you want and try to evaluate what the appropriate standard would be, but the standard will, in fact, fluctuate with the hardness of that water.

Q. And are you familiar with the receiving water data that indicates that the hardness in Des Moines Creek drops during storm events?

MR. YOUNG: Object. Lack of foundation.

MS. COTTINGHAM: I am going to allow the question. You may answer his question.

A. Would you please restate it for me.

Q. Are you familiar with receiving water data that indicates that the hardness in Des Moines Creek drops during storm events?

A. I am familiar with data that shows that the hardness in Des Moines Creek does in fact drop associated with a stormwater event.

Q. Thank you. No further questions.

MS. COTTINGHAM: Any redirect?

MR. PEARCE: Very briefly, Your Honor.

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EXAMINATION

BY PEARCE:

Q. I believe Mr. Poulin asked you whether you used dissolved copper data in addition to Herrera, and maybe I am mistaken, but just to clarify, did the more recent sampling from the Port of Seattle have dissolved copper data?

A. It did.

Q. And was that instream data?

A. That is.

MR. POULIN: I object to this testimony in that this information has not been provided, it's not been made an exhibit, it's not been discussed in any detail in the prefiled testimony, and to admit this information in this form I think is improper. It's not being used to support the expert's opinion, it's simply being offered through direct testimony when it's not previously been made available.

MS. COTTINGHAM: Can I ask a clarifying question. By this, you mean what?

MR. POULIN: I mean the results of the instream monitoring data that Port of Seattle ostensibly has done recently.

MR. PEARCE: I can clarify that if you would like.

Q. Could you take a look at Exhibit 1319.

MR. POULIN: I'm told there's an outstanding objection to this, not only hearsay but also untimely provided. I'd also note that it's a preliminary draft subject to quality assurance review.

MR. PEARCE: Is there an objection to that or does he want to see it? He said he wanted to see it.

MR. STOCK: That's the objection.

MR. POULIN: The objection is this is not properly in evidence and you're asking a witness about it and I think that's improper.

MR. PEARCE: It doesn't have to be properly in evidence in order for me to ask an expert witness about data that he has reviewed. I have not offered it as an exhibit in evidence. We're happy to offer it if counsel would like.

MR. STOCK: It goes to the foundation and there is no foundation. It's an improper exhibit and there is an exhibit on the matrix on untimely and hearsay, and Mr. Poulin's pointed out that it's a preliminary draft.

MR. PEARCE: The witness has testified and he is allowed to testify to data that he has reviewed, under Evidence Rule 703. This data is marked as an exhibit. We don't need it in evidence in order for Dr. Stubblefield to rely on that data and rely on what he

knows and what he has reviewed.

I would note that this data was supplied to ACC prior to the end of discovery, prior to the end of when they could have taken depositions regarding it. It's not necessary for us to enter it into evidence for the truth of the matter asserted. It's the type of evidence that Dr. Stubblefield can rely on.

MR. POULIN: There's a major difference between allowing an expert to base his opinion on inadmissible hearsay evidence and using expert testimony to introduce that evidence to the proceeding.

MR. STOCK: Right.

MR. POULIN: There was no question about the witness's opinion or the basis for it, it was a question about inadmissible hearsay that --

MR. PEARCE: That's what the testimony is, it's his opinion regarding whether water quality standards are exceeded in these creeks.

MR. STOCK: But Mr. Pearce --

MS. COTTINGHAM: I'm going to sustain the hearsay objection, I'm going to allow the witness to testify as an expert, so long as this evidence doesn't come in to show the truth of the matter asserted.

MR. PEARCE: We're not offering it as an exhibit. Our expert is relying --

MR. STOCK: But he is, and Mr. Pearce is being very selective in how he is responding to you, he is offering it through this witness for the truth of the matter asserted and that is hearsay. So your ruling is it can't be used for the truth of the matter asserted.

MR. PEARCE: Your Honor, if you look at Evidence Rule 703.

MR. STOCK: Mr. Pearce is making the same flawed point. It doesn't get over the competency of the evidence. He is trying to use this evidence in an improper way. He's trying to bring it in through this witness for the truth of the matter asserted.

MS. COTTINGHAM: And I'm going to sustain the objection on hearsay. Not only is it a preliminary draft, but there is no one here to cross examine on the data.

Q. (Continuing By Mr. Pearce): Could you look at the exhibit Mr. Poulin showed you, that's Exhibit Number 6, page 106. Do you know whether any of this data shown that Mr. Poulin referred you to, any of the sampling from this table was taken instream?

A. Given the fact that it's the NPDES monitoring data, my understanding is that none of this data is taken from instream. According to this table, it shows that it is taken from SDS 3, which is an outfall at the facility.

Q. Okay. Thank you. No further redirect.

MS. COTTINGHAM: Any questions from the board?

MR. JENSEN: No.

MR. LYNCH: I have a couple quick questions.

EXAMINATION

BY MR. LYNCH:

Q. Thank you for your testimony today. I'm just trying to understand WERS a little bit better, just some general questions about them. When a WER is done and it's completed, is it for a certain segment of a stream from point to point that you do samplings from one end to another end and then the WER that's derived is effective for between those two points; is that how it works?

A. It actually can be both. If you look at the EPA's guidance document, there is what's referred to as a type 1 or a type 2 water effect ratio. Type 1 water effect ratios are generally done at a point source discharge, so in that case, you're looking at immediately below a discharge point and looking at what the appropriate criteria is at that point.

A type 2 WER is more of a more general water body sort of WER and it's basically, for point of clarification, is probably segment by segment would be a way to look at it.

By and large, what the scientific definition is for a type 2 is it is applicable to a range in the stream or the lake which is consistent in terms of its water quality type, its environmental habitat, the type of organisms that live there, et cetera. So, for example, if you're talking about a stream that's, say, a high rocky mountain stream and then falls out on to the plains, your range for applicability might be over the range of the mountainous segment, if you will, but as it drops out on to the plains, you see a change in water because the water will generally slow down, you might drop down your suspended solid load, water might actually warm up in temperature, the types of organisms that reside there might change. So you would draw a definition instead of a statutorial type definition, say, segment by segment, you might draw a definition based on the type of habitat that's there.

Q. Thank you. And my last question is, in order to do a WER, is it outlined that you have to do a standard number of samples or tests in a particular way or is it just a best professional judgment?

A. No, there is definitely a guidance document that EPA has, and I think if you look in my testimony, I have referenced all of the appropriate documents, but there's approximately four documents that have been developed

since roughly 1985 that outline exactly how the EPA recommends that a water effect ratio be derived, and it is very specific in terms of the numbers of samples to be taken and it is very specific in terms of the type of organisms to be tested and how those tests are to be conducted.

MR. LYNCH: Thank you. No further questions.

MS. COTTINGHAM: Are there any questions as a result of the board's questions?

MS. COTTINGHAM: Mr. Pearce, do you have any questions?

MR. PEARCE: No questions.

MS. COTTINGHAM: Mr. Poulin?

MR. POULIN: No questions.

MS. COTTINGHAM: Thank you. You're excused. With that, I suggest that we take a lunch break and come back at 1 o'clock.

I'm going to ask for the accounting on the time just to make sure we're tracking. How much have appellants used?

MR. POULIN: Appellants have used 36 minutes, 40 seconds.

MS. COTTINGHAM: And how much have the respondents used?

MR. POULIN: One hour, 14 minutes, 24 seconds.

MS. COTTINGHAM: I'm going to recalculate and I'm going to show this afternoon, so if you want, you can start the clock over this afternoon. Thank you. And with that, we'll back at 1 o'clock.

(Whereupon, a recess was taken.)

MS. COTTINGHAM: On the record now. And I do have one other preliminary matter I'd like to ask. We have a list up here of the remaining witnesses. I would like to know just for purposes of timekeeping and keeping us on track if there will be any rebuttal witnesses that we should add to the list.

MR. STOCK: Yes, there will be. It will be Dyanne Sheldon, Bill Rozeboom and Patrick Lucia.

MR. POULIN: And possibly Greg Wingard as well.

MR. STOCK: And we will be able to tell you by the end of the day the order.

MS. COTTINGHAM: And are you all allocating your time so that you will have enough time to --

MR. STOCK: We're trying to budget our time. It may not appear that way, but we are trying to budget our time accordingly. But if the port would be willing to relinquish some of its time, we would be happy to accept it.

MS. COTTINGHAM: I won't even ask that

question.

Again, our goal is to finish up with all of these witnesses before noon tomorrow so that we can start closing arguments shortly after noon.

So, with that, the port can call its next witness.

MR. REAVIS: The port calls Linn Gould.

LINN GOULD, having been first duly sworn on oath or affirmed to tell the truth, the whole truth and nothing but the truth, testified as follows:

EXAMINATION

BY MR. REAVIS:

Q. Please state your name for the record and spell your first and last names.

A. It's Linn, L-I-N-N, Gould, G-O-U-L-D.

Q. And, Ms. Gould, what is your current occupation?

A. I am the owner of an independent environmental consulting firm called Erda Environmental Services.

Q. Is a copy of your CV attached to your prefiled testimony?

A. Yes, it is.

Q. Can you describe for the board, just give us a brief summary of your educational background.

A. Yes. I have an undergraduate degree in geology from Smith College. I also have post-graduate experience in

toxicology and risk assessment from the University of Washington. I did my master's in soil science at the University of Wisconsin at Madison.

Q. Can you describe for us what you do as a risk assessor?

A. Sure. Basically, as a risk assessor, I examine the adverse effects of potential contaminants on sites. I have been working as a risk assessor for the past 15 years. I've been working with MTCA since its inception on risk assessment issues.

Q. And that's the Model Toxics Control Act?

A. That's true.

Q. How does that differ from being a soil scientist?

A. Well, the work that I've done is basically combining the concept of soil science and fate and transport of contaminants through soils with risk assessment, so I look at contaminants in soils and I evaluate whether the contaminants in soils can be a risk on human health and the environment.

Q. Could you give us a little background then on the work that you have done specifically with regard to MTCA and regulations promulgated under MTCA?

A. Yes. For the past, let's see, starting in about 1995 or 1996, MTCA was going to be revised and the policy advisory committee got together and I was a person working on the policy advisory committee to work on risk

assessment issues in order to revise MTCA. And then the other thing was that in 1996, I was hired as the TPH project manager for a project oversight group that was -- basically, we were assigned the 3-year project to revise the TPH regulations for Washington State and for MTCA. And it was an interagency agreement where I was hired by the Department of Ecology, EPA, City of Seattle, King County, Port of Seattle, and several other agencies, and it was an interagency agreement for me to help rewrite the MTCA regulations for TPH.

Q. How much of your work concerns petroleum hydrocarbon contamination?

A. I would say I do a lot of work with TPH because that is the main contamination issue in Washington State.

MS. COTTINGHAM: Can you define for the board TPH.

THE WITNESS: Yeah. TPH stands for total petroleum hydrocarbons.

Q. (Continuing By Mr. Reavis): Now, when were you first retained to work on the third runway project?

A. I think probably August of 2000.

Q. And since that time, what work have you performed?

A. I first started working on looking at borrow areas 3 and 4 as potential sources for the third runway embankment, and then around January of 2001, the Port of Seattle

brought me into evaluate, to look at the fill criteria and insure that it would be protective of all receptors that might be exposed.

Q. Could you just give us a brief rundown of the elements of the embankment and where some of these things are located that we have reference to such as the drainage layer cover and so forth.

A. This is what we call, or at least risk assessors call, a conceptual site model of the embankment, so it's very important that I understand how the embankment from a soil science perspective and risk assessment perspective is going to be designed.

And there's some important components. First of all, there's this drainage layer area here. And this drainage layer area was designed to when the groundwater rises up too high during the rainy season, it's meant to basically not rise into the embankment so the embankment won't become saturated and collapse.

This is a drainage layer area, and this is an area of clean, very ultra clean soil per an agreement that we arranged with Fish & Wildlife Service. And it's also called the wedge, so if you ever hear "the wedge," we're talking about it looks like a wedge drainage layer cover. And then we have the general embankment fill.

Q. You can have a seat again. Now, did you conduct a risk

assessment, a risk analysis for the fill to be used in the embankment?

A. Yes, I did.

Q. Can you tell us, just generally speaking, how the water moves through the embankment?

A. Well, basically the point of the risk analysis of the embankment was I did what was called an exposure pathway analysis, so I evaluated what potential receptors might be exposed to potential contamination in the fill. And so we looked at water and how it goes through the fill and then how it might enter the groundwater and wetlands and go towards Miller Creek.

And based on the exposure pathway analysis, we decided that the most sensitive receptors that we should be protecting are receptors that reside in the creeks.

Q. Can you tell us what happens just from a physical standpoint with these various constituents as water passes through the embankment?

A. Okay. So assuming that a potential contaminant gets into the embankment. This embankment really behaves like this huge filter, sand filter, and it can filter out contaminants. And the way it filters out potential contaminants is it goes through all these natural processes that happen every single day. They're chemical processes where there's chemical transformations of

constituents, there's physical processes such as adsorption, which change the constituents that move through the embankment. There's natural biodegradation processes that occur inside the embankment. And then there's also dilution of constituents as rain flows through the embankment.

Q. You mentioned adsorption?

A. Right. Adsorption.

Q. I can't pronounce it, but can you describe that for us?

A. Basically, adsorption, it's a physical term where a constituent literally -- I mean, I guess you could compare it to absorb, but it's not absorbing into a rock particle because rock particles are solid, so it's adsorbing via chemical/physical process on to each particle, the edge of each particle.

Q. So does it sort of glob on to --

A. It globs on to it.

Q. Okay.

MR. STOCK: That was leading, but --

MS. COTTINGHAM: But it was helpful.

[Laughter]

Q. (Continuing By Mr. Reavis): Are you familiar with the biological opinion that the Fish & Wildlife Service issued for this project?

A. Yes, I am.

Q. How did you become familiar with that?
A. Before the biological opinion was released, the Fish & Wildlife Service came to us and they had questions about the embankment fill and they wanted to make sure that the previous criteria that the Port of Seattle had arranged with Ecology were indeed protective of aquatic receptors.
Q. And so did you work towards developing some criteria?
A. That's exactly right. I developed soil fill criteria that would be protective of aquatic receptors.
Q. And how did you go about developing these?
A. The Fish & Wildlife Service don't have soil criteria that they can prove are protective of aquatic receptors or of ambient water quality criteria, but MTCA has some models in it that you can adapt to surface water quality criteria to basically develop a soil criteria that's protective of ambient water quality criteria.
Q. And what's that process called?
A. There's a model in MTCA that's called the 3-phase partitioning approach, or the easiest way to say it is there's a back calculation model.
Q. And why is it called back calculation?
A. The reason why it's called a back calculation model is because we start with ambient water quality criteria that we want to protect for a particular constituent and then we take the equation and we back calculate to a soil

concentration that is protective of the water quality.
Q. Are you familiar with the biological opinions requirement for constituents in soil in the upper, the top most three feet of the embankment?
A. Yes. When we talked to Fish & Wildlife Service, they were not only worried about ambient water quality, but they were also worried -- they expressed concern that they wanted to protect terrestrial ecological receptors in the top three feet of the runway. That's where the grass strips are and the paved area.
Q. And what are terrestrial ecological receptors, generally?
A. Well, basically, they are receptors that are not aquatic receptors, they are organisms like earthworms and birds and animals that live in the top three feet of the soils.
Q. Now, in the course of doing these back calculations, we've had some testimony about adjustments based upon what's called a PQL. Can you just tell us what a PQL is?
A. A PQL is a practical quantitation limit. It's a limit where when you go to the laboratory and you measure a constituent, the instrument that's measuring the constituent can only reliably measure at that specific limit called the PQL.
Q. Now, I believe in your prefiled testimony you talk about, in paragraph 22, adjustment of some of these back-calculated numbers relative to Puget Sound background

values. Do you remember that discussion?

A. That's correct.

Q. Can you explain for us what background is, as it's been applied in this case, background concentrations? If you have demonstrative exhibits --

A. I do. This is called a probability density function for Puget Sound copper background. And I'm just going to explain X and Y axes because I think it will help you understand the graph.

On the Y axis, Puget Sound background concentrations, there was about 50 samples that were collected, and these samples were collected by the USGS and Department of Ecology together over a six-year period, and collected samples from all over Washington State. And we have about 50 samples that were collected specifically in Puget Sound background. Now, when someone asks you -- oh, actually, let me finish. So we have the X axis and this is the concentration of copper that they found in background. So in the 50 samples they found, these are pristine samples that have never been affected by anthropogenic chemicals of any type. They're dug down deep where there's been no exposure to human activities. Concentrations ranged from 0 to 250.

Now, when you hear someone say Puget Sound background, Department of Ecology calls Puget Sound

background the 90th percentile, which means, in effect, that when you go out and sample background, 90 percent of the samples are below 36 milligrams per kilogram, but 10 percent are above.

And so the point here is that you can have samples that range from 36 to 250 that are perfectly clean, have never been affected by human activities, but they are perfectly clean and they would not exceed water quality, and, yet, this 36 milligrams per kilogram is our 401 criteria.

Q. Now, so that's a statistical analysis, is that right? Why don't you stay up there for the next question, which is, what happens if you're sampling not just for copper but if you're sampling for multiple constituents, does that change the statistics?

A. Yes, it does. The important point here is that if we just sample for one constituent, we are going to exceed it, when we are sampling out at the site, we are going to exceed it 10 percent of the time just for copper. But let's say for one sample I'm also sampling -- okay, this is copper, right, this is one sample. So this is a probability of failure to meet multiple criteria.

And on the Y axis, this is a probability of failing at least one background criteria. For one sample, let's say copper, I'm going to exceed 10 percent of the time.

However, let's say I also have copper and nickel at the background concentration in the same sample. I exceed the criteria 18 percent of the time. If all of a sudden to the same sample I add the background concentration of copper, nickel and zinc, I all of a sudden am exceeding the criteria 28 percent of the time.

The point that I want to make is that if we have 14 samples that we have to put at natural background criteria, we are going to exceed the criteria 78 percent of the time. And it's just because Department of Ecology has called 36 milligrams per kilogram the 90th percentile. But they say in their very own rules and guidance that this is incredibly conservative criteria. Many states including Canada use the 99 percent. So they just use it as just a screening criteria, but they have no problems at all with criteria being higher than the 90th percentile.

Q. Thank you. Now, there's been some discussion in the September 401 certification of the SPLP, or synthetic precipitation leaching procedure. Can you tell us how that relates to this background discussion you just gave us?

A. Yes. The reason why the SPLP is really important is that the Department of Ecology calls this 90th percentile -- they basically say we're going to start with this as a

screening criteria, but we recognize that you have a false positive or you're going to fail 10 percent of the time. And, you know, if you have more constituents, you can fail up to 80 percent of the time. So basically there's an alternative that's written into statistical guidance for Ecology project site managers, just in regular guidance, that basically says that you can develop an alternative when you exceed this criteria of 36. And so what the SPLP test does is it helps you evaluate -- basically if you exceed this criteria, then you have the right to go ahead and use an SPLP test to show that it's not really causing ambient water quality problems.

Q. And how does the SPLP test then demonstrate that it's not really causing ambient water quality problems?

A. The SPLP test is what's basically considered kind of a gold standard, it's equivalent to the WET testing that Dr. Wisdom talked about yesterday. It's basically like the equivalent of a blood test in medical technology. And basically it's this test where you put the soils into this little column, just like a little plastic column, and you put synthetic acid rain into the column, and you agitate it for 24 hours, and then you evaluate what comes out of the soil column after 24 hours, and you compare it to water quality criteria.

Q. And the purpose for that comparison is what?
A. The purpose of that --
Q. The purpose for doing the SPLP test and then getting results from that is what?
A. The purpose of the SPLP test is to prove that any criteria that happens above the 90th percentile is not going to leach to groundwater or surface, to surface water.
Q. Okay. Now, are you familiar then with the fill criteria that are contained in the September 401 certification?
A. Yes.
Q. Can you tell us how those differ, if they do, from the fill criteria that were set forth in the biological opinion?
A. The difference between the two -- the FWS had this drainage layer cover, or the wedge that I was showing to you before.

MS. COTTINGHAM: FWS stand for Fish & Wildlife Service.

A. Fish & Wildlife Service.
Q. Let me stop you there if I could. I'm just talking first the numbers, the numeric criteria.
A. We develop numeric criteria.
Q. But can you tell us how the numeric criteria differ between the biological opinion and the 401 certification?

Are there things added or removed and so forth?

A. Okay. The Department of Ecology, when they came in after the biological opinion and wrote the 401, they added seven new constituents and including TPH.

Q. Do you know what the TPH values that appear in this 401 certification, and, again, total petroleum hydrocarbon values in the 401 certification are based on?

A. Can you repeat that.

Q. Do you know what the TPH values that appear in the 401 certification are based on?

A. Yes. The TPH in the 401 criteria are based on modelling results that we developed over the past three years when I was working for the project oversight group. We also hired Washington State University and a couple other agencies to help us develop the model that is now the TPH criteria in the 401.

Q. Do you have an opinion as to whether or not the numeric criteria for TPH in the 401 certification are protective of water quality?

A. They're absolutely protective.

Q. Have you done any calculations to demonstrate that?

A. Well, there's a model that exists and that I've used the model that's in MTCA to show that they're protective.

Q. Now, we've heard some discussion about petroleum and TPH in the course of this hearing. Are there tests to detect

whether or not there's petroleum in soil?
A. Yes.
Q. What tests are those just generically?
A. They're just standard laboratory tests to test whether TPH exists in soils.
Q. Can you tell us what is petroleum?
A. This is probably really obvious, but petroleum is decayed plant matter that has been compressed at great pressures, and I think everyone knows you can drill for it and pump it out and use it for many, many purposes.
Q. Now, are there things that exist in the natural environment in this area that can actually show up on one of these analytical tests that you have described as petroleum hydrocarbons?
A. Definitely. Because TPH or petroleum is decayed plant matter that's been highly condensed, it's absolutely normal to see TPH when you go out into the environment and test for it naturally. You might see it in wetlands, you could probably, if you went and sent your garden soils to test for TPH, you would probably see TPH signature because it's plant decayed matter, and we often see it in glacial soils.
Q. Now, were you here for Dr. Lucia's testimony?
A. Yes, I was.
Q. He testified about a concern he had relating to whether

this wedge concept that you've described was as protective as the 6-foot layer on the bottom that was in the August 401. Do you remember that testimony?

A. Yes, I do.

Q. Do you have an opinion as to whether or not the wedge is protective of water quality?

A. Oh, absolutely, I think it's more than protective, it's very protective.

Q. What does the wedge do in the design of this in order to add protection for water quality?

A. Well, I think the reason why the wedge is more protective is because Fish & Wildlife stipulated that they would be interested in having soils in the front of the embankment - in other words, the soils that are closest to aquatic receptors - to be at Puget Sound background so they would be extra careful that they would be protective of water quality.

Q. Now, have you read Mr. Pete Kmet's deposition transcript?

A. Yes, I have.

Q. Are you familiar with the testimony in there regarding sampling protocols?

A. Yes, I am.

MR. WITEK: Ms. Cottingham, we're going to object. First, this is an improper use of a deposition and, second, this is beyond the scope of the prefiled

testimony. And with this witness in particular, we're greatly prejudiced because we submitted interrogatory responses, asking the port to identify their expert witnesses and to explain the facts and opinions that their experts would testify to, and the port has never answered that interrogatory with respect to this witness. So we would ask that this witness' testimony be limited to things within the scope of her prefiled testimony.

MR. REAVIS: I don't know if we ever answered that interrogatory. I thought we answered the interrogatory for all of them. I think there's some burden on them if they believe we haven't provided adequate response to move to compel. None of that was done. If it had been done, we could have corrected it.

Let me respond also with regard to Mr. Kmet. We didn't realize that his entire deposition was going to be offered in this proceeding, and so what we're trying to do with this witness is respond to some of that deposition testimony, and this is really our only opportunity to do that. We are not going to have the opportunity to question Mr. Kmet himself.

MR. WITEK: If I could respond to that briefly. The port's interrogatory responses are actually in the record and they're Exhibit 295 if you want to look and see what they've provided with respect to Ms. Gould.

Also, I would like to note with respect to this suggestion that, you know, we were required to ask them for it, if you look at Rule 26(e), it talks about the circumstances under which a party has a duty to supplement. And clearly if you look at Rule 26(e)(1), it states that, "The party is under a duty to supplement their interrogatory or discovery responses regarding the identity of each person expected to be called as an expert witness at trial, the subject matter on which he or she is expected to testify and the substance of his or her testimony." And that's precisely the interrogatory that we submitted to the port.

MS. COTTINGHAM: Can you show me where in the interrogatory?

MR. WITEK: Sure. If you look at Interrogatory Number 3.

MS. COTTINGHAM: Page.

MR. WITEK: On page 10. It says, "For each person identified in the preceding interrogatory, state with particularity." And actually if you back up, you can go to Interrogatory Number 2, it says, "Identify each person you intend to call as an expert witness." I think you'll see that Ms. Gould's name is not listed there.

And then number 3, Interrogatory Number 3 starting on page 10 says, "For each person identified in the

preceding interrogatory, state with particularity the subject matter on which the expert is expected to testify, the substance of the facts and opinions to which the expert it expected to testify and a summary..." And it's not a mistake that the language in our Interrogatory Number 3 exactly parallels the language that I quoted earlier in CR 26(e) regarding the duty to supplement.

MR. REAVIS: I'm not sure that really the interrogatory answers is the relevant portion. They took Ms. Gould's deposition, and if she wasn't asked questions about this, I think that's because what she is doing here is providing rebuttal testimony to what we anticipate or what we know to be in Mr. Kmet's deposition. So to say we should have supplemented an interrogatory answer, when the rebuttal testimony is just now being offered, I think is getting the order reversed. So all I wanted to do is ask her a couple questions in order to deal with the testimony that we just learned at the beginning of this hearing would be provided by deposition.

MR. WITEK: Well, Ms. Cottingham, on this issue of, you know, that we had a chance to depose her, I would like to point out that Ms. Gould appeared on the port's October 10 witness list and submitted a declaration in support of the stay, but then her name was withdrawn from the port's November 15 witness list. We went ahead and

deposed her anyway and the port made her available because she had offered a declaration in support of the stay. But we conducted a very limited deposition, and the questions that I asked included, "Have you been asked to provide or prepare testimony" - and this is on December 6th - "for the hearing?" And the answer I got was, "No." Then we wanted to find out who would be providing testimony for the port, so we asked, "Do you know who the port intends to call as a witness about the fill criteria?" Answer: "Not specifically about the fill criteria." Question: "Or about the SPLP testing procedure." Answer: "I don't know."

Now, the point really is that we are particularly prejudiced here to the extent that Ms. Gould is going to testify beyond the things that are in her prefiled testimony because we haven't had -- our experts haven't had an opportunity to review that testimony and those opinions haven't been identified for us in advance. So, in this situation, we think it's particularly appropriate to limit the testimony to the scope of the prefiled.

MS. COTTINGHAM: I think the board will take about a 1-minute recess and be back in a second.

(Whereupon, a recess was taken.)

MS. COTTINGHAM: The board is going to grant the motion to limit the testimony of Ms. Gould to the

scope of what she put in her prefiled, and our basis is that she was not identified in the interrogatory and, thus, the other side did not have the opportunity to fully depose her.

MR. REAVIS: I don't have any more questions for her then.

MS. COTTINGHAM: Mr. Kray.

EXAMINATION

BY MR. KRAY:

Q. Ms. Gould, in response to one of Mr. Reavis' questions, you said that you had done some calculations and used a model in MTCA. What model were you referring to?

A. Are you specifically referring to TPH or the metals?

Q. It was in between your discussion of SPLP and your discussion of TPH, but I can't tell you exactly which of those you were referencing.

A. We used two different models. We used a 3-phase partitioning approach or the back calculation model for metals. And then for TPH we used what is called a 4-phase partitioning approach.

Q. How do those two differ?

A. Actually, the 3-phase partitioning approach is really, really easy, a really, really conservative basic model that you can really plug in with a calculator. Anyone

can do it.

The 4-phase partitioning model is very, very complex. It took us several months to write and you plug it into a spread sheet on Excel and it does just -- it's just basically a more complex model.

Q. And what did you apply the 4-phase model to?

A. We applied it for TPH constituents in order to calculate the criteria for the 401.

MR. KRAY: No further questions.

MS. COTTINGHAM: Cross examination.

EXAMINATION

BY MR. WITEK:

Q. Ms. Gould, I am Mike Witek.

MR. KRAY: Excuse me. Ms. Cottingham, I just want to point out one thing. It is getting late in the process, but if Mr. Witek is conducting cross examination, then Mr. Stock had no business giving objections to any of the questions.

MR. WITEK: I think the only objection he gave was one in jest about Mr. Reavis' leading question, so I think we can probably move on.

MS. COTTINGHAM: Point made.

MR. KRAY: Never mind.

Q. (Continuing By Mr. Witek): Ms. Gould, I want to ask you

about the SPLP work plan, and that's attachment E to the September 401 certification.

You reviewed and edited this attachment for the port; is that correct?

A. That's correct.

Q. Is it your understanding that under the SPLP work plan, the port is not required to do SPLP testing unless the numeric screening criteria are exceeded; is that right?

A. Right.

MS. COTTINGHAM: Can you refer us to whatever exhibit you were --

MR. WITEK: Sure. It's Exhibit 1, the September 401 certification, and the SPLP work plan is attachment E, which I think is the very last attachment.

Q. Do you have it there?

A. I'm ready.

Q. So is it also your understanding that under the SPLP work plan, only one SPLP sample is required for each original screening sample that exceeds the criteria?

A. That's right.

Q. So if one original screening sample for a site over 100,000 cubic yards exceeds the screening criteria, the site can be approved based upon a single SPLP test; is that right?

A. I don't know what you're talking about with 100,000 cubic

yards.

Q. Well, you're aware of the sampling requirements for the screening criteria under the 401 certification?

A. Yes. Could you point them out, please?

Q. Sure. I think we've referred to these before, and I think it's on page 16 of Exhibit 1.

A. Page 17?

Q. Seventeen I have is the actual fill criteria, and then on page 16 on Exhibit 1 there's a box down at the bottom of the page.

A. I gotcha.

Q. Okay. So this is the sampling that's required under the 401; is that right?

A. It appears to be, yes.

Q. And so the way I understand it, if you have a site that's over 100,000 cubic yards, a minimum of six samples are required, and then if one of those fails the numeric screening criteria, the port's only required to do one SPLP test, and based upon the results of that test, the entire site can be approved for use; isn't that right?

MR. KRAY: Objection. Calls for a legal conclusion.

MR. WITEK: I am asking for her understanding.

MS. COTTINGHAM: Can you repeat the question.

Q. (Continuing By Mr. Witek): My question is, under the 401

certification, six screening samples are taken for a site over 100,000 yards under the chart on page 16.

MR. KRAY: Mr. Witek, you're asking for impression, correct?

MR. WITEK: That's right.

Q. And under the SPLP work plan, and I think you have already said that only one SPLP test is required for each failed sample. So my question is, is it your understanding that for a site over 100,000 yards, that you could have one SPLP test used to approve the entire site?

A. Can I tell you how I interpret it because I don't interpret it that way. Let's say you have greater than 100,000 cubic yards and you tested a minimum of six samples but probably many, many more. So let's say you have tested six and five have passed for the criteria, but then one, one constituent of one sample doesn't pass, you run the SPLP, sure, you know, then you've got -- yeah, that works.

Q. So when the SPLP testing is performed, it's only conducted for the chemical constituent that exceeds the criteria; is that right?

A. That's correct, because all the other criteria have passed.

Q. You talked about the biological opinion; is that right?

A. That's correct.
Q. Is there a difference between the types of metals addressed in the BO and the metals addressed in the 401 certification?
A. Can you specify what you mean by types?
Q. Well, are there fill criteria in the 401 certification for metals for which there aren't limitations in the biological opinion?
A. The biological opinion specified a set of metals, and then when the 401 was issued, there's more metals that Ecology decided that they wanted sampled.
Q. I want to go back to attachment E, then, on page 3. Looking where it describes the screening procedure, and it says, "Results from the SPLP will be compared to fresh water ambient water quality criteria according to the guidelines outlined in WAC 173-201A-040." Do you see that?
A. No, could you please tell me what page you're on.
Q. I'm on page 3 of attachment E and there's Roman Numeral 3 "Screening Procedure" and that's the first sentence after the Roman Numeral 3.
A. Okay. I'm ready. Could you repeat your question.
Q. Sure. Why don't we take a look at WAC 173-201A-040. I think that is Exhibit --
MR. REAVIS: Did you say 9?

MR. WITEK: I think it's 5.

Q. Do you have Exhibit 5?

A. I do.

Q. Do you see where all the tables start on Exhibit 040? I have a page 481 in the bottom right-hand corner on my copy.

A. Got it.

Q. So are these the criteria referenced in the SPLP work plan?

A. Yes.

Q. So would you agree that antimony, beryllium and thallium are all constituents for which sampling are required under the 401 certification?

A. Yeah, and we developed criteria for them that weren't here, we developed alternative criteria.

Q. All right. I'm going to ask that you answer my question, okay. So my question is, are there standards for those constituents on this table?

A. No.

Q. So there's no water quality standard in 040 for antimony, is there?

A. No.

Q. And there isn't one for beryllium or thallium?

A. No.

MR. JENSEN: What was the last one?

MR. WITEK: Thallium, T-H-A-L-L-I-U-M.

MR. JENSEN: Thank you.

Q. (Continuing By Mr. Witek): I think in your testimony earlier, and also in your prefiled, you talk about ultra clean fill?

A. That's true.

Q. Is that a term of art in risk assessment?

A. No, it's a term that the Fish & Wildlife Service developed.

Q. So that ultra clean fill that's -- can we put figure 2 back up?

A. Sure.

Q. I can get it for you. So where is the ultra clean fill on that figure 2?

A. It's what we call the drainage layer or the wedge.

Q. And is it your understanding that under the 401 certification that the ultra clean fill can contain gasoline, diesel and heavy oil?

A. The way that we wrote the -- the way that the Fish & Wildlife Service wrote for the drainage layer cover, it was a narrative standard for TPH, and the reason why is because when the BO was released, that was in May, and we knew that MTCA was about to come out with a new regulation in August, so we created a narrative standard for TPH in the drainage layer cover awaiting the new

regulations which were about to be published a few months later.

Q. So my question is, can that ultra clean fill include gasoline, diesel and heavy oil?

A. The ultra clean layer can contain TPH that is protective of water quality receptors. They could be naturally occurring.

Q. Ms. Gould, can I ask that you just answer my question, and if there's something additional that you have to say, your counsel can bring it up on redirect.

You testified earlier about testing for TPHs and picking up sort of, I guess, natural stuff, is that right.

A. (Nods head affirmatively).

Q. Now, are gasoline, diesel and heavy oil naturally-occurring substances?

A. Yeah, that's why you can dig them out of the earth, pump them up, and that's why we use them.

Q. In refined form?

A. Some are refined, some are not.

Q. Gasoline?

A. Gasoline is refined. Gasoline has a criteria of 30 milligrams per kilogram.

Q. So is gasoline a naturally-occurring constituent?

A. Once it's refined, but it's still natural.

MR. WITEK: That's all I have for now.

MS. COTTINGHAM: Mr. Poulin.

MR. POULIN: No questions from CASE.

MS. COTTINGHAM: Any redirect?

MR. REAVIS: Just a couple of questions.

EXAMINATION

BY MR. REAVIS:

Q. When Mr. Witek was asking you about the antimony, beryllium and thallium and whether those were in the table, and then you started to answer something about deriving those. Can you tell us what you actually did?

A. Yeah, I can. Let's see, Fish & Wildlife Service have there are own criteria which are developed for other criteria besides what's in 201A, and so it made a whole lot of sense for me -- and their criteria comes from the EPA, so I basically adopted those EPA criteria when I was back calculating these concentrations. And then Dr. Wisdom from Parametrix also calculated numbers for us which we used and which we would use to analyze for the SPLP test.

MR. REAVIS: Ms. Cottingham, I'd like to get back to these questions that Mr. Witek objected to earlier, because the questions I was going to ask relative to Mr. Kmet dealt with sampling. Mr. Witek has

asked this witness about sampling. I think that whatever objection to sampling testimony that ACC has has been waived because they brought the subject up and I'd like to ask her some questions about sampling protocols.

MR. WITEK: Ms. Cottingham, I think the board has already ruled on this issue.

MS. COTTINGHAM: I'm going to allow the redirect within the scope, the narrow scope of his cross examination on sampling.

Q. (Continuing By Mr. Reavis): I'm trying to remember the scope of his question. But are there recommendations in MTCA for sampling protocol?

MR. WITEK: Objection, outside the scope. All I did was talk about the table that's on page 16 of the 401 certification.

MR. REAVIS: I guess I think it's hard to separate out. We have been talking about, you know, MTCA regulations, sampling, it's kind of hard to just take a narrow slice of that and ask this witness questions and not allow her to explain her position on sampling. We're trying to stay within the scope of direct, but, unfortunately, I think it's leaving a misimpression of what this witness's testimony is about sampling protocol.

MR. WITEK: Ms. Cottingham, if the argument here is that I opened the door, I would like to point out

that the door I have opened is very narrow.

MS. COTTINGHAM: I agree that the questioning is very narrow. He asked about the sampling table, he asked about antimony, beryllium, thallium, so if you can keep it narrow within those, and her responses to those questions.

MR. REAVIS: I think my questions go beyond that, so that's all the questions I have.

MS. COTTINGHAM: Mr. Kray.

MR. KRAY: No questions.

MS. COTTINGHAM: I have one question.

EXAMINATION

BY MS. COTTINGHAM:

Q. I want to make sure I captured this right, I didn't catch it the first time, but I filled in a blank here. You said the port is not required to do the SPLP unless one sample fails the numeric fill criteria, is that how you --

A. Maybe I should rephrase it because I'm not sure I said it right. If you're sampling a whole bunch of samples and they all pass, but one sample fails because it fails one of these criteria, we then run an SPLP on that criteria. If that SPLP fails, we submit it to Department of Ecology and a decision is made by Department of Ecology whether

that fill is rejected. Did I answer your question?

Q. I'm not sure I asked that question, but you answered a related question.

Any other questions?

MR. LYNCH: No questions.

MR. JENSEN: No.

MS. COTTINGHAM: Any questions as a result of board's questions?

MR. REAVIS: I don't have any.

MS. COTTINGHAM: Thank you. You're excused.

MR. REAVIS: The port's next witness is Beth Clark.

ELIZABETH CLARK, having been first duly sworn on oath or affirmed to tell the truth, the whole truth and nothing but the truth, testified as follows:

EXAMINATION

BY MR. REAVIS:

Q. Could you please state your name for the record.

A. Elizabeth Clark.

Q. Miss Clark, how are you currently employed?

A. I am a consultant to the Port of Seattle.

Q. Are you a port employee?

A. No, I am not.

Q. What exactly do you do for the port currently?
A. I oversee phase I and phase II environmental site assessment for the new property acquisitions for the Port of Seattle. I oversee the coordination of the environmental suitability review of incoming fill in accordance with condition E of the 401 certification. I am also involved in various site investigations and oversight of various site cleanup actions at the airport.
Q. And a copy of your CV was attached to your prefiled testimony; is that correct?
A. That's correct.
Q. Can you just give us a brief summary of your educational background.
A. I have a bachelor's and a master's degree in geological engineering, and I am a licensed civil engineer in the state of Washington.
Q. And did you used to work as an employee for the port?
A. Yes, I did.
Q. What did you do before working for the Port of Seattle, just briefly, your employment background?
A. I was employed for eight years in a consulting firm, and I was responsible for overseeing and managing environmental site investigation and cleanup activities at sites throughout the Puget Sound. Subsequent to that, I was environmental manager with the Port of Tacoma.

Q. Now, let me ask you, do you have a role with regard to implementation of the fill criteria set forth in the 401 certification?
A. I am responsible for coordinating the environmental suitability reviews that are in condition E(1) of the 401 certification.
Q. Where does the port get the fill that's coming from off site off of the port's property?
A. From contractors.
Q. Are you involved in the process of hiring those contractors?
A. No, I'm not.
Q. Are you involved in developing specifications for the bids for that work?
A. Yes, I am.
Q. Can you tell us whether you have prepared bid specifications in the course of that work?
A. Yes, I have.
Q. Can you tell us what's in those bid specifications in terms of the limit for TPH contamination?
A. In the specifications I have put a limit of 460 ppm for total petroleum hydrocarbons.
Q. Is there some sort of, not magic, but where does the 460 number come from?
A. The 460 number is the more conservative criteria that are

present in the 401 certification, and my understanding is that is based on ecological criteria.

Q. Now, how many sites have you accepted fill from since the September 401 certification was issued?

A. Seven.

Q. And have you listed each of those sites in your prefiled testimony?

A. Yes, I have.

Q. Can you tell us how many of those sites met the requirements contained in the 401 certification?

A. All of those sites.

Q. Now, before the 401 --

MR. STOCK: I'm sorry, I did not hear her answer.

THE WITNESS: All of those sites.

MR. STOCK: Thank you.

Q. (Continuing By Mr. Reavis): Before the 401 certification was issued, were you responsible for environmental review of the proposed third runway fill?

A. Since 1999, yes.

Q. Now, were there standards in place governing that fill that was imported prior to the 401?

A. Yes, there was a 1998 and a 1999 fill acceptance agreement.

MR. REAVIS: And those I believe we have marked

as Exhibit 1003 - I think we have multiple numbers - 285 and what's the other number?

MR. JENSEN: 285?

MR. REAVIS: It's 285 and 286.

MS. COTTINGHAM: And 286?

MR. REAVIS: Correct.

Q. Could you just take a look while everybody is getting their copies out of Exhibits 285 and 286 and familiarize yourself with those. Do those appear to be the agreements that you referred to that govern imported fill prior to issuance of the 401?

A. Yes.

Q. Now, in the course of your work, then, regarding suitability of fill before the 401 was issued, did you rely on these agreements?

A. Yes, I did. I relied on the 1999 agreement and I had reviewed material developed prior to that time, and my understanding is the port was implementing the 1998 agreements for that material.

Q. Now, do you know who was involved in agreeing to these particular numbers, the port and --

A. And Ecology.

Q. Without going into a lot of detail about this, can you give us just the highlights of what the primary restrictions on imported fill were under these two

agreements?

A. Similar to the 401 certification, the process included a review of current and past site history as appropriate, it required site sampling, and then a comparison of those sampling values to numerical criteria, but, in this case, it was the method A values.

Q. Now, to your knowledge, was all of the fill from sources imported prior to the 401 certification consistent with the requirements of these two agreements?

A. Yes, with one exception.

Q. And what is that exception?

A. The Black River Quarry.

Q. And have you described the Black River Quarry in your prefiled testimony?

A. Yes, I have.

MR. REAVIS: That's all I have. Thank you.

MS. COTTINGHAM: Mr. Kray.

MR. KRAY: Nothing for Ecology, Your Honor.

MS. COTTINGHAM: Cross examination?

MR. STOCK: Yes.

EXAMINATION

BY MR. STOCK:

Q. Miss Clark, Kevin Stock for ACC. I want to go back to the answer that you gave that I didn't hear, and that

was, did you say all of the sites, the seven sites from which the port is currently importing fill, you reviewed and those sites have met the 401 criteria?

A. In my opinion, yes.

Q. I want to refer you to Exhibit 294. Can you tell us what Exhibit 294 is, please?

A. Exhibit 294 is a report prepared by Hart Crowser, the third runway project off site borrow source baseline chemical characterization for the Black River Quarry.

Q. And you used this report to make your recommendation to the port that fill from the Black River Quarry be accepted for importation to the third runway site; is that correct?

A. This was one of the reports that I used.

Q. Turn to page 2 of the report, under "Chemical Analysis Results and Conclusions," do you see that?

A. Yes.

Q. And it's true, isn't it, that with respect to samples taken from the Black River Quarry, that chromium concentrations from two samples exceeded the chromium fill criteria set out on page 17 of the 401 certification?

A. That chromium exceeded for two?

Q. Yes.

A. I would have to --

Q. If you want, it might be easier to read table 1 of Exhibit 294, which is right after page 6. And at the top of that table, the first column --

A. Yes.

Q. -- sets out the screening levels contained in the 401 criteria; is that right?

A. Right. And so for chromium there were two values that exceeded the criteria for the wedge or the drainage layer cover.

Q. And with respect to copper, all six samples from the Black River Quarry exceeded the numeric criteria set out in the 401 certification; isn't that right?

A. For total metals, correct.

Q. And the only reason that you went ahead and accepted the material from the Black River Quarry was because the port then used an SPLP test procedure; is that right?

A. That's correct.

Q. And, in fact, that happened with the Kent Kangley site also?

A. That's correct.

Q. There were samples from the Kent Kangley site where the samples exceeded the numeric criteria on page 17 of the 401 certification and the port used the SPLP procedure to overcome the numeric criteria in the 401 certification; isn't that right?

A. There were values for the Kent Kangley site that were above the numeric criteria for total metals.
Q. And the port used the SPLP procedure to go ahead and say, yes, we're going to accept fill from the Kent Kangley site even though that fill sample exceeded the numeric criteria on page 17?
A. The port utilized the SPLP testing in accordance with attachment E of the 401 certification.
Q. And, in fact, the next site, Marine View pit, the same thing happened?
A. That's correct.
Q. There were samples from the Marine View pit that exceeded the numeric criteria in the 401 certification and, again, the port used the SPLP procedure to overcome the numeric criteria in the certification, correct?
A. I'm not sure I would characterize it that way, but we did utilize the SPLP procedures.
Q. And then the port accepted that fill from the Marine View pit?
A. Yes, and we submitted that information to the Department of Ecology.
Q. And there was yet another site, wasn't there, where that happened and that was CIT pit number 3 where there were samples that exceeded the numeric criteria in the 401 certification, and the port used the SPLP procedure yet

again to accept the fill even though the samples exceeded the numeric criteria in the 401 certification?

A. So there was --

Q. Is that right?

A. That's correct.

Q. All right. So four out of the seven sites that are currently being used, samples exceeded the numeric criteria and were subsequently accepted with SPLP; correct?

A. That's correct, the four out of seven exceeded the criteria which were developed based on background.

Q. Let's talk about TPH. Gasoline. There's no naturally-occurring background levels for gasoline, is there?

A. I am not prepared to talk about the naturally-occurring background values.

Q. Well, based upon your professional experience as an environmental site investigator, and given all of your experience with respect to cleaning up sites, you agree, don't you, that there's no naturally-occurring background levels for gasoline?

A. Again, I believe what Linn Gould was saying is that --

Q. Well, I want your opinion, Ms. Clark. Based upon your experience as an environmental site investigator, and based upon all of your clean-up experience, you agree, don't you, in your professional opinion, that there is no

naturally-occurring background level for gasoline?
A. The test that is used to --
Q. Please answer my question, Ms. Clark.
MR. REAVIS: I think she is trying to answer the question.
A. Because the test that is used to evaluate gasoline will pick up, in addition to gasoline, naturally-occurring constituents that will be quantified as gasoline.
Q. Please listen to my question and answer my question. I will make it a very simple question.
You agree, based upon your experience in cleaning up sites, that there is no naturally-occurring background level for gasoline?
A. If you're saying like there is a number that is calculated for the metals, no, there is not.
Q. And, in fact, diesel oil doesn't naturally occur in the environment, does it?
A. Well, again, I believe Ms. Gould was saying --
Q. I want your professional opinion, not what Ms. Gould was saying, I want your professional opinion.
A. My understanding is that naturally-occurring compounds can be quantified as diesel.
Q. Isn't diesel a refined petroleum?
A. Right, but naturally-occurring compounds -- diesel is a hydrocarbon, a multi-chained hydrocarbon. There are

naturally-occurring compounds, I understand, that will occur in the same range as the diesel will occur, and so it's very common at site investigations to get natural interferences with your gas, diesel or your heavy oil, and based on my experience, I have seen that at sites before.

Q. Well, I don't want to perpetuate this much further because of the clock, but let me see if I can get this agreement out of you. You agree, don't you, that gasoline doesn't naturally occur in the environment?

MR. REAVIS: Objection. I think that's been answered.

MR. STOCK: I asked a different question.

A. Gasoline is a refined product.

Q. And it does not naturally occur in the environment, does it?

A. No.

Q. Let's move on and talk about the sites from which TPH has been present and the port has imported from those sites.

The port's imported material from the Black River Quarry site, correct?

A. Correct.

Q. And the material that was imported contained TPH at some level, isn't that true?

A. There were some samples that did detect TPH.

Q. And that's also the case with the Summit Ridge site, the port imported material from the Summit Ridge site and the material from the Summit Ridge site contained TPH at some level, correct?
A. The material that contained TPH from the Summit Ridge site was removed from the third runway.
Q. That was 1500 tons, correct?
A. I don't recall the numbers.
Q. There was also material imported from the First Avenue Bridge site that contained TPH, correct?
A. Correct.
Q. And there was also material imported from lagoon number 3 that contained TPH, correct?
A. That's correct.
Q. And the port also imported to the third runway site material from air field panel replacements concourse B material that contained TPH and put it at the third runway site; isn't that true?
A. Yes, and in all cases below the method A levels.
Q. And with respect to the south satellite terminal expansion project, the port again imported material from that project, put it on the third runway site, and that material contained TPH at some level, did it not?
A. Restate the project again.
Q. SSTEP, south satellite, that's how you put it in your

deposition.
A. That's correct.
Q. Turn to Exhibit 287, please. Now, you were formerly going by the name of Beth Doan, were you not?
A. That's correct.
Q. And this Exhibit 287 is a memo that you wrote to Paul Agid; is that correct?
A. That's correct.
Q. And Paul Agid works for the port?
A. That's correct.
Q. And the subject of this memorandum to Mr. Agid was the material that was ultimately imported to the third runway site from the Hamm Creek site?
A. That's correct.
Q. Go down to the second to the last paragraph on the first page under "Discussion."
A. Yes.
Q. You wrote, "Since the samples were composited over large areas and depths, there is a potential for hot spots to go undetected." Do you see that?
A. Yes, I do.
Q. And you wrote that, didn't you, because there's always the potential when you use composite samples, that hot spots in the fill will go undetected, isn't that true?
A. As I discussed, there's times when you would use

composite samples.

Q. And my question, Ms. Clark, is the reason you wrote that is when you use composite samples, there's always the potential for hot spots to go undetected; isn't that right?

A. And that's why I --

MR. REAVIS: Before she answered, I think she got out one word or two words before Mr. Stock interrupted her last time. I think we're having a little bit too much of cutting the witness off before she's even had a chance to determine whether or not she is responding to the question.

MS. COTTINGHAM: Be careful on talking over the witness.

MR. STOCK: As always.

MS. COTTINGHAM: And you're going to need to speak up. The microphone does not broadcast.

Q. (Continuing By Mr. Stock): You wrote that because you know that when you use composite samples, there's a potential for hot spots to go undetected; isn't that right?

A. I wrote that along with the clarification in the next sentence which discusses the Boeing study which specifically did look for hot spots.

Q. But the reason you wrote the hot spots sentence is

because composite samples leave the potential for hot spots to go undetected; isn't that right?

A. And I was clarifying for the port that --

Q. Well, I need an answer to my question. That's why you wrote that sentence; isn't that right"?

Q. And, again, the reason why I wrote this sentence following it was to explain that at this site there was a combination of sampling approaches that were used.

MR. STOCK: I don't have any further questions.

MS. COTTINGHAM: Mr. Poulin.

MR. POULIN: No questions from CASE.

MS. COTTINGHAM: Any redirect?

MR. REAVIS: I have a couple.

EXAMINATION

BY MR. REAVIS:

Q. Let me ask you about Black River Quarry, since it was raised, containing some TPH. Were you able in the course of your investigation of that site to determine where that TPH was coming from?

A. Yes, I was.

Q. And where was it coming from?

A. The Black River Quarry site is a commercial site that essentially takes native bedrock, crushes that bedrock and it's used for construction sites throughout the Puget

Sound. This Black River Quarry site is also the site of an asphalt-recycling operation. Now, that operation is separate from the rock-crushing operation, but it does use some common equipment. And as we began accepting material from the Black River Quarry, we were doing on-going TPH testing, and two out of the 14 samples we found had exceedances of the method A level for TPH. The value, the maximum value was 270 ppm which compares to a method A level of 200 ppm or the current method A level of 2,000 ppm.

We looked back and determined when those samples, what time those samples, material that represented, and what we found what was happening is if the quarry was blasting rock, then they switched to their asphalt-recycling operations and then went back to blasting rock, that the initial soil coming off the equipment was -- it was that soil that was containing these residual levels of heavy oil. And we determined that that was attributed, therefore, to essentially not completely cleaning out their equipment.

When we found this out, we stopped, discontinued haul from the Black River Quarry and went to the operator and had them evaluate their operations. And what they did specific just for the Port of Seattle was to make a modification in their operation such that whenever there

was a switch in equipment, that they would more thoroughly clean the equipment and that the first 100 tons of soil would be discarded and not brought into the third runway. They then did testing to see if that was going to be sufficient and in all cases, then, the levels of TPH were reduced, and that seemed to be an effective way to address this incidental asphalt that seemed to be mixing in with the rock material.

Q. Now, this rock material that's being blasted out, is that naturally-occurring uncontaminated soil?

A. Naturally-occurring rock, yes.

Q. Now, how does the rock get from the pit to the third runway site?

A. It is loaded into trucks.

Q. What do those trucks run on?

A. Run on diesel.

Q. Okay. Let me ask you about Summit Ridge. Mr. Stock asked you a question about material being brought in to the embankment from Summit Ridge, and I think you answered, I'm not sure if you completed your answer, but what happened to that material?

A. Essentially, while they were excavating at the Summit Ridge site, the contractor noticed that there was a petroleum odor. They called their environmental consultant who came on board and said it looks like we

have encountered a home eating oil tank. They notified the Port of Seattle and we immediately stopped accepting material from that site. They had been hauling for about one day from that site. So the question then arose was there a potential that some of the material that already came in was impacted by that petroleum. And we evaluated the situation to determine whether we should go back in and test the material that was already placed, and the port made the decision in cooperation with the contractor that it was just as simple to remove all material from that full day's worth of haul rather than to go back and do extensive sampling of that.

Q. Let me ask you about Hamm Creek then and this issue of hot spots. I think you were describing the sentence after the one that Mr. Stock was reading to you about the Boeing study. Can you elaborate on that a little bit and tell us what the Boeing study added to your evaluation of that site?

A. The Boeing Company did a phase I/phase II site assessment on this property. So they looked very carefully to determine where there were areas of potential environmental concerns. And they tested in areas very specific, very specific areas to address and to look and see if there was any soil that would be impacted.

Q. Now, with regard to these questions about whether

gasoline or diesel is naturally occurring, I think you were starting to describe --

MR. STOCK: This is leading.

MR. REAVIS: I'm trying to shortcut and get her into the topic.

MR. STOCK: I would ask that Mr. Reavis just ask direct questions instead of setting the question up.

MS. COTTINGHAM: Ask it carefully.

Q. (Continuing By Mr. Reavis): Do you remember the questions you were asked about whether gasoline is naturally occurring?

A. Yes.

Q. What sort of analytical procedures were used typically to sample for the presence of gasoline and other petroleum hydrocarbons?

A. What the laboratory does is a method that will look at the -- TPH isn't a single compound, TPH is a combination of many different compounds. And so they will do a scan that will evaluate the presence of all, you know, within that range of compounds that gasoline would occur. And so my point is that gasoline will occur between a particular hydrocarbon range, but naturally-occurring substances will also occur within that hydrocarbon range. And so very often you will see that you will get, you know, these false indications of gasoline or something

being quantified as gasoline because naturally-occurring compounds are kind of overlapping what a gasoline scan would look like.

MR. REAVIS: That's all I have. Thanks.

MS. COTTINGHAM: Mr. Kray.

MR. KRAY: Nothing

EXAMINATION

BY MS. COTTINGHAM:

Q. I have one question, and I didn't catch it because your voice dropped off. You were talking about the off-site fill from contractors. You said there were limits on, and I think you said P-P-L. I probably missed that.

MR. STOCK: I think -- I don't mean to testify, but I think she said TPH.

MR. REAVIS: I'm not sure --

A. Are you talking about the specifications that we developed?

Q. You said limits on, and then the next sentence was for 460.

A. Yes. So in the specifications we have included the Fish & Wildlife Service criteria in the 401 certification criteria. As you are aware, in the 401, the criteria is 2,000 ppm for --

Q. That's it, ppm.

A. Parts per million for TPH. What we use was 460 instead of the 2,000 number.

MS. COTTINGHAM: Thank you. Any other questions?

MR. LYNCH: No questions.

MR. JENSEN: No questions.

MS. COTTINGHAM: Any questions as a result of the minor board question?

EXAMINATION

BY MR. STOCK:

Q. Just for clarification, ppm, or parts per million, is the same as milligrams per kilogram?

A. That's correct.

MS. COTTINGHAM: You're excused. I'm going to suggest we take about a 10-minute break.

(Whereupon, a recess was taken.)

MR. REAVIS: The port calls Dr. Mike Riley.

MICHAEL RILEY, Ph.D., having been first duly sworn on oath or affirmed to tell the truth, the whole truth and nothing but the truth, testified as follows:

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EXAMINATION

BY MR. REAVIS:

Q. Please state your name for the record.

A. Michael Riley.

Q. And how are you currently employed?

A. I am an employee of S. S. Papadopulos & Associates.

Q. And what sort of firm is that?

A. We are primarily a groundwater modelling/water resources analysis firm.

Q. Could you give us a brief run down of your educational background, please?

A. I have a bachelor's in history and a bachelor's in civil engineering and a Ph.D. in civil engineering with a specialty in water resource engineering and sub program called water quality hydrodynamics.

Q. Okay. Now, how long have you been engaged in civil engineering, specifically hydrogeology?

A. Well, civil engineering since 1980, more and more in hydrogeology since the late 1980s.

Q. Okay. Since you got your Ph.D., how have you been employed?

A. Worked in Seattle area at Parametrix for a number of years, then I went to Papadopulos & Associates in Washington, D.C.; came back to Seattle, worked for Converse Consultants; and then went back to Papadopulos

in Boulder, Colorado; and then returned here about four years ago, opened an office here for Papadopulos.

Q. And here is?

A. Olympia, Washington.

Q. Can you tell us what work you have been asked to perform with regard to the third runway project?

A. We were asked two different things. One, started out reviewing the work by Pacific Groundwater Group. Since we are a groundwater modelling firm, the port was looking to an outside peer reviewer to evaluate Pacific Groundwater's work. And then secondary to that, which actually became larger piece of the work, was to do a water quality model of the embankment looking at what concentrations might be expected to discharge out of the embankment.

Q. Concentrations of?

A. Metals, several organic compounds, including TPH compounds, DDT compounds and PCBs.

Q. Now, is your work summarized in a document?

A. Yes, it is.

Q. And I believe you have it there in front of you, it's Exhibit 1320?

A. Yes, this looks like our document.

Q. Now, can you just describe for us generally what type of work you were doing and the scope or the areas that you

have laid out for us?

A. Well, in the review of Pacific Groundwater Group's work, we actually obtained their input files and, in particular, one of their Slice models, which was a spread sheet model, and then we reviewed what work they had done in setting up those two models.

Q. Let me stop you there so it's clear for everybody. Pacific Groundwater is Mr. Ellingson who was here today?

A. Right, right. So we reproduced the Slice model with different models. Since their model was proprietary, we felt we had to verify it using a different approach. So we constructed a similar version of their model but a modflow, which is a public domain program. And we did run into some of the limitations that one would anticipate in using the modflow program, but we do have in-house versions of modflow that allow us to get around some of those problems.

In doing that, we were able to verify that their results were reasonable.

Q. And what's the name of the model that you used for the purpose of reviewing the PGG work?

A. It was the modflow, USGS modflow program.

Q. Okay. I notice in your report you refer to VS2DT?

A. VS2DT.

Q. Right. Can you tell me what that is?

A. That stands for variably saturated two-dimensional transport, and that's the model that we set up for doing the transport of water quality dissolved substances out of the embankment.

Q. And what were you attempting or what questions were you attempting to answer by using that model?

A. We were trying to find if the port could expect water quality exceedances in the material discharging from the embankment.

Q. Can you provide us then a brief description of how you performed that particular modelling task.

A. I'll refer to this for some of our figures.

Q. Are these figures contained in your report?

A. Yes, they are. So, in fact, the figure is at the bottom, the figure number is at the bottom, too, so these are actually reproductions from our report. And this I believe you saw when Linn put up the same figure. And this is what we start is the conceptual understanding of what the area looks like. This is a cross-section through the fill. And when you say a two-dimensional model, it means you're only working, in this case, just a horizontal and vertical direction. So we took a model that takes a slice through the fill, and when you do that, you come out with something that looks like this. And in making a model, you have to basically grid the

whole thing, so each one of these little points in here, each one of these rectangles gets a series of values, including hydraulic conductivity that Pony spoke about, initial concentrations, initial soil moisture, which was an issue of debate earlier today, too.

So then this model is basically just turned on with recharge coming in at the surface and monitor what the model predicts what's coming out down here at the end of the drainage layer.

Q. Now, you've talked in your prefiled testimony about a number of parameters for the model. I don't want to go into all of those, but can you explain for us what the parameter called KD is?

A. KD, that's just coefficient that refers to how a substance will partition between a solid phase, such as attached to soil, and in the dissolved phase. So if you take the ratio of the concentration in the solid and divide by the concentration that leached off of that solid, that would be your KD. So it's just a partitioning.

Q. What's the significance of that variable?

A. In this case, it has two significances. The first one is that it defines what the concentration is that you would be starting with in the model, because you have soil with some amount of, say, some amount of metals in the soils,

and then based on that, what amount would be in the water that's in contact with that soil.

Then the second part of it is as the metals start to move from one type of soil to another, that parameter defines whether or not it will bind up with that other soil.

Q. Is that the globbing on again?

A. Well, globbing is a little too strong of a term, but --

MR. WITEK: Then I object.

[Laughter]

Q. (Continuing By Mr. Reavis): Now, what model inputs did you use then for the concentrations of chemicals in the embankment?

A. Within the embankment, we took the fill criteria and using the partitioning, we calculated an initial concentration in the water phase all through here. Now, the solid phase, what's on the soil, would be what's in the criteria. And then through here, the bottom, the drain layer, we took that as actually taken SPLP testing that we had done specifically on some drain layer material. And then this area here was also considered part of the drain layer material because this is, again, ultra clean stuff.

Q. Now, with regard to the specific numeric criteria, then, how did you plug those into your model? I'm talking

about the numeric criteria contained in the 401 certification. What numbers did you use for your model?

A. Well, there's two tables or two columns on the table. We used the higher of the two for what we call the general fill in our report.

Q. So did you use the minimum amount, the maximum amount, or how did you go about selecting what number to use for the table?

A. Just the higher of the two.

Q. Now, there's been some questions raised in this case about fill accepted prior to the date the 401 was issued. Did you perform any modelling to determine whether or not that has any risk to water quality?

A. Yes, we did.

Q. Can you describe that for us?

A. What we did is actually took -- had a site tour and we went out and looked at the areas where some of this material was deposited, and then we made two versions of the same model. This one here shows where the Black River Quarry and First Avenue Bridge material is disposed up in kind of the higher more eastern end of the embankment. And then the second one we did --

Q. Before you move that, can you tell us is that outlined in red there?

A. Yeah, the red area in here. Then what we did is we had a

number of sample results, we had the sample results from the First Avenue Bridge construction project and we also had the sample results from Black River Quarry. And the highest value was 270 milligrams per kilogram for TPH.

Rather than trying to make a distribution through here, saying some of this is clean, some of this is dirty, we just took that highest concentration and applied it to the entire fill, very much a worse-case kind of analysis.

Q. So then I think I interrupted you when you were switching cards there.

A. So when we saw where the Hamm Creek material was being deposited or had been deposited, we realized that it was actually more out towards the end of what would become the future embankment. Here the issue were DDT compounds and PCBs. And within that class of compounds, the worse concentration was actually for a compound that's a breakdown compound of DDT called DDD.

So we took this entire fill as being that highest concentration of DDD that we had from lab results, and similarly, we took the PCB concentration for the highest PCB that was detected. And, again, the whole fill was treated as being that highest concentration.

Q. Okay. Now, maybe you should stay standing for a minute. I wanted to ask you what were the results of your

modelling and if there's some table that reflects the results.

MR. WITEK: Objection. We just wanted to note our continuing objection because this is a post February 1 planning report, and I recognize that you ruled on that earlier in our motion in limine. I just wanted to note our objection for the record.

MS. COTTINGHAM: It was post February 1st but before February 28th or --

MR. REAVIS: Correct. There's been an order entered I think on this issue.

MS. COTTINGHAM: Okay.

A. In terms of results, we ran the case of metals out of the general fill. And so we have the maximum predicted discharge over a model simulation of 1,000 years. And compared then the highest concentration that we're predicting coming out of the fill to what we call the threshold values which are a combination of either ambient water quality criteria or what was mentioned earlier today was Charlie Wisdom of Parametrix had done some analysis to say what thresholds might apply to some compounds that don't have water quality criteria, they're not in the ambient water quality table. So these are a combination of those. As you can see in all cases, we're well below the applicable concentrations for all of the

metals.

Then we ran one special or two special cases involving arsenic. And in this case what we did is we took our most conservative transport parameter, being the KD value, and we gave it the lowest number, which means that we make something more transportable, and then we took the fill criteria and instead of doing 20 milligrams per kilogram, we raised it to first 100 and then to 200 and we ran it again and we found that there was actually no change with that. Those were actually relatively small changes in both parameters with respect to the way the embankment functions.

Q. So what does that tell you then, that sensitivity analysis?

A. Well, overall, it tells you if you made changes in the model, if somebody disagreed with you in terms of, oh, you should have used a higher hydraulic conductivity or you should have had more water passing through the system, that your results really won't change based on small changes in the model setup.

Then, in terms of the organic compounds, we have Hamm Creek, and we ran DDD and PCB, Arochlor 1254, and in both of those cases -- and this was actually no surprise to us because these compounds adsorb very strongly to soils, and, consequently, we don't see any movement being

predicted in these compounds over a thousand years. The First Avenue Bridge/Black River Quarry material, here we are going to get back to that TPH issue that we had earlier, what is TPH. Well, it's a whole set of ranges of carbon chains. So we had to break that down because we can't actually model a whole host of compounds, so what we did is we broke it down into these different ranges: 10 and 12 carbon, 12 to 16, 16 to 21, and 21 to 34 we looked at, but by the time we'd gotten down this far, we realized that nothing was being transported.

So we started out with an existing concentration then for something in this range of carbon. And this is why TPH is such a hard thing to work with because the TPH test doesn't really tell you what's there, it just tells you that there's something there. So we had to break this down based on some Department of Ecology recommendations on the type of compounds you get in heavy oil, because that's what was detected here were heavy oils. We ran that out for 1,000 years, and the lighter phase, the lightest phase material we did see some movement in it. It does come out, but it comes out well below a water quality criteria for naphthalene, which is a substance that falls within this range.

Similarly, we saw some movement of the next heavier range of carbons, but, again, much less than the

acanaphthalene, which is a typical compound for that range. And then as we get into heavier carbon ranges, there is less movement, and so you see this starts to drop off and then by that time, it's pretty much just done.

Q. Based upon those results, do you have an opinion about whether the numeric fill criteria in the 401 certification are protective of water quality?

A. Yes, I do.

Q. And what is that?

A. It looks very protective to me.

Q. Now, did your model account for all of the natural processes that could affect these concentrations?

A. We limited the modelling to just within the embankment, so there are processes that when you are looking at water quality impacts to the stream, we did not actually carry these out to the stream. For one, we didn't have to because if it's already coming out, no need to make a more complicated model already -- it's complicated enough as far as I'm concerned. And so we left out any mixing with ambient groundwater, anything that, any adsorption on to existing soils that the water was infiltrating through.

There's a number of other processes that were left out. That's why even this is a conservative evaluation.

Q. Okay. Now, have you read Dr. Lucia's prefiled testimony?
A. Yes, I have.
Q. And were you present when he testified last week?
A. Yes, I was.
Q. One of the concerns that he raised was the substitution of the wedge, I think he called it the sandwich, which basically includes a 6-foot layer of this ultra clean fill along the entirety of the bottom of the embankment and substituting in place of that the wedge. Do you remember that testimony?
A. Right.
Q. How did your model address protectiveness of that wedge, or does it address the protectiveness of the wedge?
A. We had the wedge in there as a separate unit. And so anything in the general fill that starts to migrate has to migrate through the wedge before it gets down to the discharge point here. If the wedge wasn't there and this general fill extended down here, it would only have to migrate a relatively short distance to get out.

So the wedge in this part of the model is very, very protective, was very protective towards the point of discharge.

Q. And while you're up there, then, the other, I think, part of this concern was you have sort of eliminated that 6-foot layer uphill from the wedge there. Could you show

us where that would be?
A. Right here.
Q. Yeah. And under the original 401, where would that 6-foot layer have run?
A. Would have run just above the drainage layer here, which is just one cell wide, so if it would have went up like that, you see that we'd be beyond the wedge out here.
Q. Now, do you have an opinion as to whether or not elimination of that layer for the uphill portion is protective of water quality?
A. Well, the critical element here is how far, how long is this pathway as it's going down through here, so initially just the 6-foot layer here, from this point it would be six feet through the clean blanket and then into the drainage layer and then out. In this case, now we have several hundred feet, approximately 500 feet, before this can actually get out through this pathway. In one sense, it's less protective because this is now, instead of a 500-foot pathway, it would have before been a 506-foot pathway, so there is not really much protectiveness involved in that. Where the protectiveness really comes in is down here instead of having a only 6-foot pathway, now it has a 40-foot pathway, so more time for the metals to attach on to soil particles.
Q. Okay. Thank you. Now, let me switch gears then and talk

about the other part of your work, which I believe you described as a review of the PGG work, Pacific Groundwater work.

Can you describe what documents you reviewed in preparing that review?

A. I looked at -- I already had a copy of their earlier work for Department of Ecology, and then I obtained, I believe it was, an August 2001 document and then a second one, which was November 2001, I believe it was, and concentrated largely on the November 2001, because that was their final report.

Q. And do you have an opinion about whether the approach that Pacific Groundwater took to the modelling was appropriate?

A. Yeah, I think it was appropriate.

Q. Now, one other question about Dr. Lucia's testimony. Do you recall the figures that he had, the cross-sections of the embankment that were red and yellow?

A. Mm-hmm (witness nods head affirmatively, that Pony showed earlier?

Q. Right. Do you have an understanding of what Dr. Lucia's concern is there?

A. Yes, I do.

Q. And do you agree with that?

A. No, I don't.

Q. Why not?
A. Well, it makes a number of assumptions that I don't really think are very realistic either for the construction project or for western Washington.

The construction project will take years to construct, and during the years of construction, it will be exposed to the elements, so it will be receiving water as any other part of western Washington receives water over a span of years.

Also, the initial way of establishing the soil moisture before he starts the model is what we would use in a desert climate, and that is to have the groundwater at the bottom of the model used to distribute soil moisture vertically all the way to the surface. When you don't have much in the way of rainfall, that's the sort of starting condition that you would have because you would be saying that most of your soil moisture is coming from groundwater. In western Washington, we know most of our soil moisture comes from rainfall.

So the difference in the approach between what Pacific Groundwater Group did and what Dr. Lucia did was much more realistic on the part of Pacific Groundwater Group and quite unrealistic on the part of Dr. Lucia.
Q. What about Dr. Lucia's criticism relating to the layering that would occur in the embankment and the effect of that

on transport of water through the embankment?

A. Well, we incorporated some of that into our modelling approach because we actually allowed more, a higher hydraulic conductivity in the horizontal direction, so in our modelling, the water has ten times less resistance to flow horizontally than vertically. But even with that difference, we were seeing very little movement along the face of the embankment.

Q. Okay. That's all I have. Thank you.

MS. COTTINGHAM: Mr. Kray.

MR. KRAY: No questions.

MS. COTTINGHAM: Cross examination.

MR. WITEK: Thank you.

EXAMINATION

BY MR. WITEK:

Q. Hi, Dr. Riley. I am Mike Witek for the Airport Communities Coalition.

A. Hello.

Q. Actually, could we go back to your figure 2.

A. Sure.

Q. So, as I understand it on your model, there are two basic components, there is the general fill and the type 1 fill; is that right?

A. Correct.

Q. And the general fill, is that sort of, I guess, pinkish or salmon-colored layer?
A. Yes.
Q. And then the type 1 fill is the drainage layer cover, the face of the embankment and the actual drainage layer itself; is that right?
A. Correct.
Q. Okay. Do you have a copy of your report there?
A. Yes, I do.
Q. Can you turn to table 1.

MS. COTTINGHAM: Are you in his prefiled?

MR. WITEK: Exhibit 1320.

MR. KRAY: What page are you on?

MR. WITEK: Well, I'll tell you as soon as I get there.

Q. Have you found table 1 in your report? Can you tell us what page that's on?
A. It's not numbered.
Q. Okay.

MR. REAVIS: I believe it's the first table in there, about two-thirds of the way to the back.

MS. COTTINGHAM: Is that the table that follows figure 5?

THE WITNESS: Yes, it is.

MR. WITEK: That's the one I had in mind.

Q. So this table sets out the soil fill criteria, correct?
A. Correct.
Q. And as I look at this, the column all the way over on the right is the general fill criteria?
A. Right.
Q. And the criteria for the type 1 fill is the column that's just over on the other side of that?
A. Right.
Q. To the left. And footnote it looks like E or 3, actually I guess it's 3, says that these are the criteria from the 401 certification?
A. Attachment E.
Q. Attachment E. So there are actually additional criteria in there for gasoline, diesel and heavy oil in attachment E, right?
A. Correct.
Q. Can you look at table 7 in your report, Exhibit 1320. That has discharge concentrations in it; is that right?
A. Right.
Q. Can you show me on figure 2 where the discharge concentration occurs, or if there's one of the other figures that's more appropriate to refer to, that's fine.
A. This is fine. It's right at the toe of the slope.
Q. Thank you. And while we're looking at figure 2, can you look at Exhibit 1178. The copy of it has a little tab

that says "Figures" and then I have a figure 3-5 "Simplified West Wall Cross-Section for Modelling."

A. 1178?

Q. That's right.

A. What page?

Q. I have just a tab I think after the report that says "Figures."

MR. REAVIS: Ours don't have tabs.

MS. COTTINGHAM: What is the figure number?

MR. WITEK: It's figure 3-5 "Simplified West Wall Cross-Section for Modelling."

MS. COTTINGHAM: It's a cross-section of the embankment so I can --

MR. WITEK: That's right, figure 3-5.

MS. COTTINGHAM: Okay.

Q. (Continuing By Mr. Witek): And this is the June 19, 2000 PGG report, isn't it, Dr. Riley?

A. Which date did you say? June 19, 2000?

Q. That's right.

A. Right.

Q. Okay.

A. The one prepared for Washington State Department of Ecology?

Q. That's right. So looking at figure 3-5, you can see that's a schematic, I guess, similar to your figure 2; is

that right?

A. It's a different section through the embankment.

Q. And what's the layer below the embankment? See where it says slice and then it shows a layer that runs -- there's an arrow pointing out the layer on figure 3-5. Do you see that?

A. Are you reading it at the bottom of the page there?

Q. I'm actually --

A. Is it the one with the little stipple marks on it?

Q. I guess I'm looking at the figure at the top of -- figure 3-5 has two figures, so I'm looking at the one at the top. I guess what I want to know is what is the layer that's below the drainage layer on this?

A. The one with the slice and the arrow in it?

Q. That's right.

A. That's native soil.

Q. If you take a look at the key, doesn't that describe that as till?

A. The one with the slice and the arrow pointing approximately 45 degrees down and to the left I think is Qvr, isn't it, Vashon recessional.

Q. I'm sorry, I'm asking about the layer that's under the word "slice" on the figure at the top of figure 3-5, and I think if you look at the key, I think you will agree with me that that's --

A. Is that the one with the little hatch marks in it?
Q. That's described as Vashon till, isn't it?
A. Okay, I see what you are talking about. Okay.
Q. Is that till represented on your figure 2 that's up there on the board?
A. Yes, it is. It's the greenish layer.
Q. And those don't seem to be the same length, do they, from your figure to this figure 3-5; is that right?
A. We map them differently.
Q. So your figure on figure 2 you don't have the till going under the wall, do you?
A. Pardon me?
Q. I'm sorry. So on your figure 2, you don't have the till extending under the embankment wall, do you?
A. In this particular section it doesn't extend all the way out.
Q. I wanted to ask you about table 4 on your report, going back to Exhibit 1320.
A. Okay.
Q. So as I understand it, these are the initial conditions for the model; is that right?
A. The initial concentration conditions.
Q. So this is for soil and groundwater?
A. It is for the groundwater.
MR. REAVIS: Which table are we on?

MR. WITEK: Table 4 in Exhibit 1320.

Q. So if I am reading this right, it's got initial concentration in micrograms per liter on the far right-hand side; is that right?

A. Right.

Q. And then general embankment criteria is the set on the top, and then the type 1 fill is down below; is that right?

A. Correct.

Q. And as I understand it, the numeric criteria in the 401 certification are stated in soil concentrations in milligrams per kilograms; is that right?

A. Correct.

Q. And so you have applied, for the general embankment fill criteria, you have used the soil concentrations from the 401 and you have applied a KD value to it to come up with the initial concentration I guess in the liquid phase?

A. Correct.

Q. Should I use a different term for that?

A. No, that's one way of saying it.

Q. But you took a different approach for the type 1 fill, though, didn't you?

A. Yes, we did.

Q. So as I understand it, for the type 1 fill, the initial concentrations, those aren't based on the fill criteria

that are applicable, say, to the drainage layer cover, are they?

A. No, they are not.

Q. Instead, aren't they based on SPLP test results for the Kent Kangley site; is that right?

A. Yes, they are.

Q. Can you go to page 9 in your report, that's Exhibit 1320.

A. Page 9?

Q. That's right. I'm looking at a sentence, I think it's the second to the last sentence on the page, and it says, "The initial condition for the drainage layer used only the partitioning coefficient and soil concentrations for the Kent Kangley material since the bulk of the drainage layer material has come from this source." Did I read that correctly?

A. Yes, you did.

Q. It says the drainage layer material. Now, the type 1 fill is actually more than the drainage layer material; isn't that right?

A. Correct.

Q. It would also include like the face of the embankment?

A. Yes, it would.

Q. And the face of the embankment hasn't been constructed yet, has it?

A. I don't believe it's all the way extended out.

Q. So do you know whether or not it's been constructed?
A. No, I don't know.
Q. Now, I want to ask about I think the simulations that you ran based on these concentrations. So if I understand this correctly, for the model run you did for metals, you assumed that there would be metals in the general fill criteria present in the embankment at the maximum soil concentrations in milligrams per kilogram as stated in the 401; is that right?
A. Correct.
Q. Now, for the TPHs, if I understand it correctly, it looks like you didn't run a model run assuming TPHs were present in the embankment at the maximum allowable concentrations; is that right?
A. We did not make that run.
Q. So you did a model run for the First Avenue Bridge and the Black River Quarry fill; is that right?
A. Correct.
Q. And in that you assumed heavy oil concentrations of 810 milligrams per kilogram for First Avenue Bridge and 270 milligrams per kilogram for the Black River Quarry; is that right?
A. No, that's not right. We used 270 for the Black River Quarry.
Q. Didn't I just say that? I might have misspoke.

A. You said 810, but I'm not sure what that refers to.
Q. I think I said 810 for the First Avenue Bridge.
A. Right. No, we did not use that number.
Q. Okay. Is the number that you did use stated in your report?
A. Yes, it's on page 11.
Q. And what is that concentration?
A. Went with the maximum detected amount that was actually used in the fill, which is 270.
Q. Okay. And that's for the Black River Quarry?
A. Well, they were placed actually one on top of the other, so they are one unit there.
Q. Okay. And then for purposes of the model run, you put that fill in a specific location in the embankment; is that right?
A. Correct.
Q. And that's depicted on figure 4 and figure 5?
A. Figure 4 is the Hamm Creek.
Q. I'm sorry, you're right.
A. Figure 5 is the First Avenue Bridge.
Q. Okay.
A. And Black River Quarry.
Q. Okay. I think I might have asked you before, gasoline, diesel and heavy oil were allowed under the attachment E to the 401 certification?

A. I can't remember which way they break down the TPH compounds.

Q. Why don't we look at Exhibit 1, attachment E, the very last page. So if I'm reading this right -- do you have it there?

A. Yes, I do.

Q. So for the final --

MR. REAVIS: Which exhibit?

MR. WITEK: It's Exhibit 1, very last page.

Q. So it says, "Final Drainage Layer Cover," so that's the drainage layer cover we see on your figure 2, and then it's got gasoline, 30; diesel, 460; and heavy oils 2,000; right?

A. Correct.

Q. And did you do any model runs with gasoline, diesel or heavy oil in the drainage layer cover?

A. No.

Q. Thank you. ACC doesn't have any more questions.

MS. COTTINGHAM: Any redirect?

MR. REAVIS: Just a couple.

EXAMINATION

BY MR. REAVIS:

Q. I wanted to ask you about this area that appears to be olive green, if I'm looking at it correctly, till, is

that right?

A. Your color choices are probably better than mine, but go ahead.

Q. Probably worse, but I think we agree on the glacial till layer there?

A. Correct.

Q. How did you arrive at the information of where the till is located in this particular cross-section?

A. We have mapped out the till connected with a separate project for the port across most of the area from east of the airport all the way to Puget Sound. And then what we did is we overlaid that map of the thickness of the till, the elevation at the top and the bottom, with the topography, and we found for the most part when we get out to Miller Creek, much of Des Moines Creek and much of Walker Creek, that the topography is actually cut through the elevation of the till, so the till is actually missing in those areas.

Q. Okay. Now, Mr. Witek asked you some questions about this figure 3-5 in the PGG report.

A. Right.

Q. And whether the till was in the same location?

A. Right.

Q. Can you tell us by looking at Mr. Ellingson's figure where his cross-section appears as opposed to the one

that you have here?
A. I believe his cross-section is farther to the south into an area where the MSE wall would be constructed.
Q. So is that in the same area or a different area from where your figure --
A. I think it's several hundred feet south.
Q. Is the till in that area continuous or discontinuous?
A. The extent of the till, it varies quite a bit. For most of the area along the embankment, it looks like the till has been eroded away. There are a few small areas where it extends and one or two areas where it actually extends out to Miller Creek.
Q. Now, have you developed an opinion in the course of your work about whether the embankment would be, the criteria, if the criteria for the remainder of the embankment were used in the entirety of the embankment, in other words, just eliminating the wedge all together, have you done any sort of calculations to determine whether that would be protective of water quality?
A. We have for those.
Q. And what does that show?
A. We found that even with the wedge removed, it's still protective of water quality. The concentrations creep up, predicted concentrations from the model are slightly higher but on the order of only a few percent higher.

Q. Have you reviewed Ms. Gould's calculations for TPH concentrations and whether or not those are protective?

MR. WITEK: I am going to object. This is beyond the scope of the questions we asked on cross.

MR. REAVIS: I think he went into some detail about running the model for TPH and, you know, what Mr. Riley did with TPH, and I just wanted to follow up to see whether he had done any sort of review of TPH.

MR. WITEK: We didn't ask him anything about what Ms. Gould did or didn't do.

MS. COTTINGHAM: I'll allow the question.

Q. (Continuing By Mr. Reavis): Do you have any opinion about the results Ms. Gould came up with based upon her TPH review?

A. I actually haven't spent much time on that.

Q. Okay. I think that's all I have. Thanks.

MS. COTTINGHAM: Mr. Kray, do you have any questions?

MR. KRAY: No, Your Honor.

MS. COTTINGHAM: Any board questions?

MR. LYNCH: No questions.

MR. JENSEN: No.

MS. COTTINGHAM: Thank you, Mr. Riley. You're excused.

MR. REAVIS: Ready for our next witness. John

Strunk.

JOHN STRUNK, having been first duly sworn on oath or affirmed to tell the truth, the whole truth and nothing but the truth, testified as follows:

EXAMINATION

BY MR. REAVIS:

Q. Could you please state and spell your name.

A. Certainly. John Strunk, S-T-R-U-N-K.

Q. How are you employed, Mr. Strunk?

A. I am a partner with environmental water resources consulting firm called Aspect Consulting located on Bainbridge Island, Washington.

Q. And could you give us a brief run-down of your educational background.

A. I have a bachelor's degree in geology and a coordinate major in environmental studies from University of Vermont which I received in 1984.

Q. And how have you been employed then since receiving that degree?

A. Since that time, I worked for a consulting firm in Burlington, Vermont called Wagner, Heindel and Noyes, which was a groundwater consulting firm. After that, from '84 to '89, worked for the Vermont State Agency of

Environmental Conservation as a hydrogeologist in their hazardous materials management program evaluating hazardous waste sites.

From '89 to '95 I worked for the consulting firm Converse Consultants in Seattle, Washington; '95 to 2001 as a geologist for Associated Earth Sciences, which is a consulting firm in the Seattle area; and currently I'm a partner with Aspect Consulting.

Q. And is your CV attached to your prefiled testimony?

A. Yes, it is.

Q. Can you tell us what work you have performed relative to the 401 certification and the third runway project?

A. Specifically, I was involved in what has been termed the preferential pathways analysis, which I believe you heard about earlier this week.

Q. Is that what Mr. Wang testified about?

A. That's correct.

Q. Were you here when Mr. Wang testified?

A. Yes, I was.

Q. The diagrams that he was referring to, who produced those?

A. That was work that primarily I produced.

Q. Did you complete a report summarizing your conclusions?

A. Yes, I did, and I believe that report is dated June 19th of 2001.

Q. Let me ask you to refer to Exhibit 76. Does that appear to be a copy of your June 19th, 2001 report?
A. Yes, it is.
Q. I don't want to repeat all of what Mr. Wang testified about, but are there conclusions in your report that weren't addressed by Mr. Wang the other day?
A. I believe there's a few conclusions. Mr. Wang did a very good job going over the materials in his report. Primarily, the main issue I think is associated with the construction of the existing utility lines in association with the third runway. And I believe Mr. Wang didn't necessarily show that the only existing utility lines is for a communications duct bank that will actually tie in to an existing communications duct bank that is actually established for the two existing runways. So, in short, there won't be an actual construction of utilities from the main terminal area, or the AOMA, where some of the contamination sources are, out to the third runway.
Q. Do you have a figure that shows that particular utility?
A. I should. I believe this figure, which I believe it's figure 8 in the report, last figure, highlights the known utilities associated with the third runway. They are highlighted in the green color along the third runway area. There's also a number of utilities that were constructed in 2000 that are also highlighted in that

same olive green and they're just west of the main terminal area.

It's a tough figure to see, a lot of utility lines of course out there associated with this infrastructure, but right at the main portion just west of the main terminal area, there's a set of red lines that are associated with some existing communications duct banks that are located about four and half feet deep, and my understanding, in discussions with port environmental staff, is that those are the only lines that currently are planned for the third runway project.

Q. And what, if anything, is being done then in the construction of those utility corridors to prevent migration?

A. One of the conditions in the 401, condition F(1), establishes best management practices for areas within the AOMA that could potentially encounter contaminated groundwater, and those conditions state that the BMPs should use a controlled density fill, which is a lean concrete type mixture, to place in newly-constructed utility backfill lines if contaminated groundwater is encountered during construction activities.

Q. What does that concrete backfill do for it?

A. Essentially a CDF, or controlled density fill, is very similar to a concrete mixture. It sets up, it's readily

used in the construction industry, it's a much lower permeability than a granular backfill material and, therefore, by decreasing the permeability, essentially you're preventing any type of migrations of liquids or groundwater in that utility line trench.

MS. COTTINGHAM: You can go ahead and have a seat unless you need to continue pointing to a map.

Q. (Continuing By Mr. Reavis): Can you just describe for us what a perched groundwater zone is?

A. Certainly. In the areas of the airport there's units called glacial till unit, which we have heard about this week. That is a relatively low permeable unit, it has been described as hardpan or would look like a concrete type of mixture. When rainwater or infiltrating precipitation encounters that layer, it tends to pool up and, therefore, it's termed a perched water condition.

Q. How does that differ then from what has been referred to as the Qva or regional aquifer?

A. The Qva aquifer is a sand and gravel aquifer that is throughout the entire Des Moines upland area, which includes the SeaTac International Airport, and it is a rather large -- encompasses a much larger area. Perched zones tend to be much more isolated.

Q. Do you have a figure that illustrates that?

A. I believe I do. This figure is essentially a

cross-section that goes through the airport that is in the report, I believe it's figure 6. It shows the location of the glacial till unit, which is a unit that varies in thickness throughout the airport. It's actually missing in fairly substantial areas, especially under the existing runways that were perhaps due to grading activities associated with build-out of the existing runways.

Perched water is contained either on top of this glacial till unit in fill or recessional outwash deposits or actually within interbedded sandier zones within the glacial till. Those are isolated roughly 20 to 30 feet in depth from the more regional Qva aquifer, which is this zone here denoted in blue.

Q. Okay. Thank you.

MS. COTTINGHAM: Can I ask a question. What color did you say the perched till was on this?

THE WITNESS: The till zone is a green color.

MS. COTTINGHAM: The perched.

THE WITNESS: The perched water appears as little perched areas of blue and then there's contaminated zone that are shown in yellow within that.

Q. (Continuing By Mr. Reavis): Let me ask you before you sit down, do you have a copy of figure 1 there?

A. I don't believe I do.

Q. I think there should be one in the exhibit. Can you find figure 1 in your copy there?
A. Yes, there is one right here.
Q. Maybe it would be helpful for us if you would point out to us the example of the perched groundwater as opposed to the Qva.
A. The Qva aquifer is this main aquifer zone here in blue. Perched water occurs on top or within the glacial till unit and is primarily associated with these fill or recessional outwash deposits that are deposited on top of the till as well as sandier or interbedded zones within the till. There's roughly a 20- to 30-foot difference between elevations in the perched zone as compared to down into the Qva.
Q. Are the perched zones continuous or discontinuous?
A. The perched zones are discontinuous.

MR. REAVIS: That's all I have. Thanks.

MR. KRAY: Nothing for Ecology.

MS. COTTINGHAM: Cross.

EXAMINATION

BY MR. STOCK:

Q. Mr. Strunk, could you refer back to your figure 8. On page 9 of your prefiled you state, "Construction of the third runway includes the completion of only one utility,

a new communications duct bank between the AOMA and the third runway project site." Now, you don't mean to suggest there's only one utility line connecting the airport operations and maintenance area and the third runway site, do you?

A. My understanding is from construction that occurred in 2001, there was one utility line that was primarily associated with the communications duct bank.

Q. In fact, if we look at figure 8, don't you agree that every green line around the site of the proposed runway is a utility line that's going to be constructed or proposed to be constructed by the third runway project?

A. That's correct, but in terms of actual construction, new construction of utilities that would occur within the main AOMA area where contamination zones would be present to the third runway, there is only one such utility line that --

Q. It's a simple question: You agree there's significantly more utility lines that are proposed to be constructed by the third runway project?

A. Yes, I believe I testified earlier I stated that those were highlighted in that olive green.

Q. The groundwater underneath the airport operations and maintenance area is contaminated, is it not?

A. In certain areas there is contamination that's present,

yes.
Q. And that's the Qva aquifer?
A. I believe there's several sites in the Qva aquifer.
Q. And there are, in fact, several sites in the Qva aquifer that are contaminated above MTCA cleanup levels; isn't that true?
A. That's correct.
Q. And the Qva aquifer discharges at some points to Des Moines Creek, does it not?
A. Yes, it does.
Q. And the Qva aquifer also feeds some of the wetlands in the third runway site; isn't that true?
A. Yes, that's correct.
Q. In fact, it feeds -- a majority of the wetlands receive a component of discharge from the Qva aquifer; isn't that true?
A. Based on some of our mapping, that would be true.
Q. And one of your conclusions is that the drainage layer cover will not be a preferred pathway for the contaminants in the AOMA; is that correct?
A. That's correct.
Q. And you came to that conclusion without doing any sort of analysis to determine whether the drainage layer cover underneath the embankment would be a preferential pathway for those contaminants; isn't that right?

A. That's not necessarily true. I --

Q. Well, do you recall me taking your deposition on --

MR. REAVIS: Can he finish his answer to that question before he moves on?

MR. STOCK: Well, he's answered it enough for me to impeach him with his answer in his deposition.

Q. Do you recall me taking your deposition on February 13th?

A. Yes, I do.

Q. And do you recall me asking this question and you giving this answer on page 58: Question: "Did you do any sort of analysis to determine whether the drainage layer underneath the embankment will be a preferential pathway for contaminants in the airport operations and maintenance area?" Answer: "No, I have not. Based on the data I reviewed, I have concluded that there isn't the potential for contaminants to migrate beyond the boundary of the AOMA."

Do you recall me asking that question and you giving that answer?

A. Yes, I do.

Q. So you didn't do any sort of analysis, you just drew that conclusion; isn't that right?

MR. KRAY: Objection. Mischaracterizes the witness's testimony in the deposition.

Q. Isn't that right?

A. I didn't do analysis; I reviewed the PGG report that concluded there would not be an effect of the Qva flow conditions as a result of build-out of the third runway embankment.

Q. And you haven't performed any modelling other than on a conceptual basis with respect to the lateral movement of known contaminants in the Qva aquifer; is that right?

A. I've used the actual measurements that were collected from monitoring wells that bound various specific contaminated sites out at the airport, so I'm using actual real data that various consultants over a 15-year period have collected measurements from.

Q. But you have only done a conceptual model; isn't that true?

A. I have used actual data.

Q. It's a conceptual model, isn't it?

A. I have used actual data to draw conclusions in terms of the extent of that contamination and used the conceptual understanding of the geologic conditions out at the airport.

Q. Right, you defined it for the Department of Ecology as a conceptual model?

A. That's correct.

Q. And the main purpose of the groundwater study required by the agreed order is to perform a numeric modelling of the

fate and transport of contaminants underneath the airport operations and maintenance area, correct?

A. That's correct.

Q. And that numeric modelling required by the agreed order has not been done, has it?

A. Large portions of the work to support the numeric modelling has been done, but the actual modelling has not been done.

Q. Right, the modelling itself, the numeric modelling itself that will predict the fate and transport of contaminants underneath the airport operations and maintenance area has not been done?

MR. KRAY: Objection, asked and answered.

Q. Correct?

MR. KRAY: Objection, asked and answered.

MR. STOCK: I don't think he answered it. It's a simple question.

MR. KRAY: Address my objection.

MS. COTTINGHAM: You want to repeat the question.

MR. STOCK: I'll just reask it.

Q. You agree that numeric modelling required by the agreed order to predict the fate and transport of contaminants in the Qva aquifer underneath the airport operations and maintenance area has not been done?

MR. KRAY: Objection, asked and answered.

MS. COTTINGHAM: I'm going to allow the question.

A. Actual modelling simulations haven't been done, but there's been a tremendous amount of work to build the model, and so I would say the modelling process is well under way.

Q. No numeric modelling has been done, correct?

A. No modelling simulations, that's correct.

Q. Now, there are areas outside of the airport operations and maintenance area, but within the proposed third runway site, where there are areas of contamination; isn't that true?

MR. KRAY: Objection. Vague.

Q. You understand the question, don't you, Mr. Strunk? You answered it in your deposition.

A. Could you repeat the question again.

Q. Sure. There are areas outside of the airport operations and maintenance area, but within the proposed third runway construction site, where there are areas of contamination?

A. I would guess that would be how you define the word contamination.

Q. Well, one of the sites that you identified in your deposition was the industrial waste system lagoons,

correct?

A. That's correct.

Q. And one of the constituents of concern in the industrial waste system lagoons was 1,1,1-trichloroethane, correct?

A. I believe I made a correction to my deposition and corrected that to that compound should be 1,1-dichloroethane, but there is one monitoring well that I am aware of that is below MTCA method B cleanup standards for that particular constituent.

Q. But with respect to that particular constituent, 1,1-dichloroethane, that constituent is above groundwater quality criteria, isn't it?

A. The groundwater quality criteria for that constituent is 1; the sample data that we collected from that has varied by 1.3 to 1.7, so it's very slightly elevated.

Q. It's over the groundwater criteria for that constituent, isn't it?

A. Right, but the MTCA cleanup level is much higher than the groundwater quality criteria.

Q. We are dealing with water quality criteria here, so I just want to make sure you agree with me that that constituent is over the groundwater quality criteria; isn't that correct?

A. Just very slightly.

Q. And you also found TPHs and other volatile organics at the industrial waste system lagoon, correct?
A. We detected them above method detection limits; however, they were below any type of regulatory standard.
Q. And you didn't do any sort of analysis as to the potential impact on the fate and transport of the contaminants in the area of the industrial waste system lagoons from the third runway construction, did you?
A. It's my opinion that the industrial waste system area is --
Q. Well, I'm not looking for your opinion right now, Mr. Strunk, and Mr. Reavis can offer that if he wants to on redirect. What I want to know is an answer to my question, and that is, you didn't do any sort of analysis with respect to potential impacts of fate and transport of these contaminants, these known contaminants in the industrial waste system lagoon area with respect to third runway construction, did you? You didn't do any sort of analysis?
A. We evaluated whether or not those contaminants were above MTCA standards and there were no such indications on any of the perched wells or wells completed in the Qva at that facility that would have triggered that.
Q. You didn't do any analysis determining the fate and transport, did you?

A. There's essentially the groundwater quality below regulatory standard for MTCA criteria, which was the criteria we were utilizing for when we performed the preferential pathways analysis.
Q. So the answer to my question is no, you didn't do any sort of analysis?
A. Yeah, in my opinion, it wasn't necessary.
Q. So the answer is no?
A. Correct.
Q. And the same with respect to the site of the old Weyerhaeuser hangar, there's contamination at that site on the west side of the runway, isn't there?
A. Not that I am aware of.
Q. Well, I can go through your deposition, and that's a site that you told me about at your deposition, the old hanger, the old Weyerhaeuser hangar. Do you recall that testimony?
A. I recall we had discussions about other sites that I was aware of in the third runway build-out footprint. I mentioned Weyerhaeuser, but I don't believe I gave you an indication that there was contamination associated with that facility.
Q. Well, there's TPH in that area, isn't there?
A. Not that I am aware of.
Q. You're going to make me eat up some of my time going

through your deposition. Page 74. Question: "Are you aware of any other areas of contamination outside of the airport operations and maintenance area within the site of the proposed third runway construction where there were constituents of concern below MTCA standard?" Answer: "The only site that I can think of that we looked at in evaluating the groundwater study would be the Weyerhaeuser hangar located on the west side of the existing runway." Question: "And what did you find in terms of constituents of concern in the area of the Weyerhaeuser hangar on the west side of the runway?" Answer: "Again, it would be hard to specifically address that without looking at the report. However, it was an underground storage tank system primarily associated with fueling Weyerhaeuser private aircraft. Therefore, it would be aircraft fuel types of compounds, primarily total petroleum hydrocarbons, perhaps benzene, toluene, xylene and ethylbenzene." Do you recall me asking those questions and you giving those answers?

A. I do recall that, but, again, I believe I said I'd have to go back and look at the report to give any kind of specifics on that facility.

Q. Right. And you didn't do any sort of analysis to determine the fate and transport of those contaminants at the site of the old Weyerhaeuser hangar, did you?

MR. KRAY: Objection to the term contaminants. I think it mischaracterizes the testimony.

MR. REAVIS: Well, I don't think there's been a foundation laid that this witness has any knowledge that there is contamination.

MS. COTTINGHAM: Sustained.

MR. STOCK: He just said it in his testimony.

MR. KRAY: I disagree.

MS. COTTINGHAM: Sustained.

Q. (Continuing By Mr. Stock): Did you do any sort of analysis of the constituents concerned at the old Weyerhaeuser hangar in terms of their fate and transport?

A. Again, using the data that we compiled in the data base for performing the analysis on the preferential pathways, that site did not show that there was any types of contamination that would have been above a regulatory standard, so, therefore, it's my opinion that it wasn't necessary to evaluate that site any further.

Q. All right. Let's shift gears and talk about your preferred pathway analysis, which was Exhibit 76. That preferred pathway analysis is a conceptual model, is it not?

A. There's a conceptual understanding of the hydrogeologic conditions that are a foundation of this report; however, the report also utilizes actual field measurements of

groundwater chemistry that has been collected for, again, on some of these facilities over a 15-year period.

Q. Essentially, what you did to come up with this preferred pathway analysis was to sit down, look at the data, plot it out on a map, and use your professional judgment to draw the conclusions you reached in this June 19 technical memorandum; isn't that right?

A. The data speaks for itself when you -- it's a very standard technique in this industry to plot out and map contaminant boundaries using actual data that you collect and measure in the field.

Q. Other than using a computer to plot the environmental data on the maps, you didn't do any sort of computer analysis to come to your conclusions in the preferred pathway analysis; isn't that right?

MR. KRAY: Objection, confusing.

MS. COTTINGHAM: Why don't you recharacterize your question.

MR. STOCK: Certainly.

Q. Other than plotting the data points out on a map, you didn't do any sort of computer analysis to come to your conclusions in the preferential pathway analysis, did you?

A. I'm not quite clear on what you mean by computer analysis.

Q. Well, let me refresh your recollection with your deposition. Page 40. Did I ask this question and did you give this answer: Question: "So other than using a computer to plot the environmental data on the maps, you didn't do any sort of computer analysis to come to your conclusions; is that right?" Answer: "That's correct."

Do you recall that question and answer?

A. If you're referring to computer analysis by computer modelling, then that would be correct. However, we used the computer to query data in the data base, we used the computer to plot that data on a series of maps, we used the computer to generate flow directions in Qva and the perched water-bearing zone, so, in a sense, those are types of analysis, but in terms of actual modelling, no, we did not use a model to support this report.

Q. So you're changing your answer from your deposition answer?

MR. KRAY: Objection, argumentative.

MS. COTTINGHAM: Why don't you ask a question, rather than being argumentative, ask a straightforward question.

MR. STOCK: I don't have any further questions.

MS. COTTINGHAM: Any redirect?

MR. REAVIS: Yes.

EXAMINATION

BY MR. REAVIS:

Q. Let me ask you some questions about this whole issue of the AOMA contamination and what you did or didn't do to analyze that. And why don't you just tell us what you did do in order to define where the contamination is and whether it's likely to move.

A. Well, essentially, one of the tasks that I was tasked to for the agreed order groundwater study, which is a very broad study of an area of roughly about 30 square miles around Sea-Tac Airport, is to compile a very extensive data base of information on groundwater chemistry, information on monitoring wells, soil contamination, groundwater contamination, what have you. And we utilized that data base to draw conclusions on where various compounds of concern would be detected above MTCA method A or method B groundwater cleanup levels.

Using that information, we were then able to plot those locations on a base map. And the majority of those sites fall within what's been termed the aviation or airport operations and maintenance area, which is the area of Sea-Tac Airport where historical aircraft-fueling activities have occurred since roughly the late 1940s, early 1950s. Those are the areas where your main fuel underground storage tank systems are situated at, your

hydrant piping lines and your large volume type of release sites. And both perched water and Qva water that has been impacted by constituents of concern above MTCA standards all plot out within that area.

Q. Now, how much data did you have to come up with those?

A. The data base contains hundreds of wells. It probably has tens of thousands of analytical chemistry information in that. It has information on total petroleum hydrocarbon compounds, volatile organic compounds, glycols, metals, general groundwater parameters. So it's quite an extensive data base.

Q. During what time period was that data collected?

A. I believe the earliest records that I am aware of are roughly 1985 through the present. It's actually an on-going data base, and it's one of the conditions in one of the F(1) conditions to keep that data base updated.

Q. And how often or how frequently are those wells sampled?

A. It varies between various airline tenants and their consultants. The majority of them, I would say, are sampled on a quarterly basis or four times a year.

Q. Now, with that quantity of data, do you need a model in order to draw the conclusions that you have drawn here?

A. Again, I think the data represents on some of these facilities monitoring data over a 15-year period, and essentially what it has shown is that the contamination

is well bounded within the AOMA area. I believe the largest length of a contaminated source area that we have seen is roughly about 550 feet. And, again, the western boundary from the AOMA is over half a mile to the third runway construction area.

Q. Now, do you know whether these IWS lagoons that Mr. Stock was referring to are part of the port's master plan update projects?

MR. STOCK: Object, no foundation.

MR. REAVIS: I'm just asking if he knows, and if the answer is no, then we won't go on, but if it's yes, then I think he has established the foundation.

MR. STOCK: Well, that won't be a proper foundation, but I can --

MS. COTTINGHAM: I am going to sustain the objection.

Q. (Continuing By Mr. Reavis) Do you know what's included within the master plan update project scope?

A. I'm not that familiar with the full master plan, no.

Q. Now, where is the IWS located where that contamination that Mr. Stock was referring to is?

A. It's in the southwestern portion of the airport; it's well outside of the area for the third runway construction project.

Q. Do you know which way the groundwater flows from that IWS

location?

A. Yes, it flows in the Qva aquifer, it flows to the southwest.

Q. Would that be toward or away from the third runway?

A. That would be away from the third runway area.

Q. Do you have any information that this Weyerhaeuser site is or is not contaminated?

A. I believe Hart Crowser did an assessment of that facility, and the information that I reviewed from that showed no indications of contamination.

MR. STOCK: I'm going to object to the word contamination unless he defines it. Mr. Reavis objected, or I think it may have been Mr. Kray objected to my use of the word and I had to switch to constituents of concern, so if we're going to object to people using the word contamination, then it ought to be defined each time.

MS. COTTINGHAM: Sustained.

Q. (Continuing By Mr. Reavis): Can you tell us what you know about the constituents in the area of the Weyerhaeuser location?

A. Certainly. My understanding of that facility, there were three monitoring wells that were established to a depth of about 15 to 17 feet, which was just beneath the bottom of the underground storage tanks. There was no

indication of any odors of petroleum compounds that were detected during drilling. There was field detection with a photo ionization unit, which is a field instrument which is used to measure volatile organic type of petroleum compounds. Those were all non-detected. And there was no perched groundwater encountered in any of those wells.

Q. Okay. I think that's all I have. Thanks.

MS. COTTINGHAM: Mr. Kray, do you have any questions?

MR. KRAY: No questions.

MS. COTTINGHAM: Any board questions?

MR. JENSEN: No questions.

MR. LYNCH: No questions.

MS. COTTINGHAM: Thank you, Mr. Strunk. You're excused.

JAN CASSIN, Ph.D., having been first duly sworn on oath or affirmed to tell the truth, the whole truth and nothing but the truth, testified as follows:

EXAMINATION

BY MR. PEARCE:

Q. Good afternoon, Dr. Cassin. Could you state your name and spell your last name for the record.

A. Jan Cassin, C-A-S-S-I-N.
Q. Could you give us a brief rundown of your educational background.
A. Yes. I have a bachelor's in biology from the University of Colorado. I have a master's of science in ecology and evolutionary biology from the University of Michigan, and also a Ph.D. in ecology and evolutionary biology from the University of Michigan. My specialty was in wetland ecology.
Q. Is your professional resume' attached to your direct testimony in this matter?
A. Yes, it is.
Q. What is your current employment?
A. I am a senior scientist at Parametrix.
Q. Do you have a specialty there?
A. I am a wetland scientist there.
Q. How much experience do you have as a wetland scientist?
A. I have more than 15 years experience working as a wetland scientist since about 1982.
Q. Okay. Could you describe briefly some of your experience.
A. Yes. I primarily have worked in ecosystem restoration and wetland ecosystem restoration or aquatic ecosystem restoration.

I also do regulatory assistance, wetland

delineations, and functional assessments.

Q. What has been your role in the port's master plan update project?

A. Shortly after I started working at Parametrix, I was asked by Dr. Kelley to provide a review of the natural resources mitigation plan and, specifically, to review that plan for its adequacy in mitigating for the functions that were impacted by the third runway project.

And I also assisted in providing responses or clarifications or dealing with issues that were raised by the Corps of Engineers or Ecology in their comments on the mitigation plan.

Q. The board has your testimony, and I don't want to repeat it, especially in the interest of the hour, but I have a few questions about selected topics.

Does the natural resources mitigation plan propose creating any forested wetlands?

A. Yes, it does. It involves restoration and enhancement of forested wetlands and also creation of forested wetlands.

Q. We haven't moved these boards out of the way yet, let me do that, and get you to identify them on a map for us, if you could. Could you identify this? We have seen this before with Mr. Stockdale's testimony.

A. That's an aerial photo of the project area that's pre-project conditions, as I understand it. The sort of

bright green areas are the existing wetlands.

Q. Could you show us generally where the forested wetlands would be created?

A. This is way too high. There's going to be --

Q. You want to set it down. As long as the board can see it.

A. There will be forested wetlands along the Miller Creek relocation area and the Vacca Farm. There also will be forested wetlands throughout what we have been calling the riparian corridor or riparian area along Miller Creek, also along wetland A17, the tributary to Miller Creek. Those are the in-basin forested wetlands. There also will be forested wetlands at the Auburn mitigation site.

Q. If you could use that exhibit, could you explain to the board what that is and where the drawing is from?

A. This is the Vacca Farm mitigation site. I'll just put it this way because that will orient it the way everything else is.

MS. COTTINGHAM: Can you see it okay?

MR. LYNCH: Oh, yes.

A. This is Lora Lake right here. This is the existing channel of Miller Creek. This is the proposed relocated channel of Miller Creek. This is the sort of prior converted cropland area here, the plowed area.

Q. Where is the forested -- did you say there was a forested wetland being created in that area?
A. Yes. The area along the riparian zone of the relocated channel of Miller Creek here and here and extending on down to there will be forested wetland. And I believe that the planting tables in the appendices to the natural resources mitigation plan contain the planting plans. It specifies the species that will be planted there and the densities that will be planted there.
Q. Could you look at the natural resource mitigation plan, that's Exhibit 2014.
A. Do we have the appendices?
Q. The appendices are in that copy and in the board's copy. It's Ecology binder 2.
A. I believe it's the appendix A.

MS. COTTINGHAM: How far back do you think appendix A is?

THE WITNESS: Almost to the end.

MR. PEARCE: They're the folded sheets toward the end. If I could just, with ACC's indulgence, if I could explain briefly. Appendix A through F are separate sheets to the NRMP, and for this exhibit they have been reduced slightly and inserted at the back.

THE WITNESS: They're folded over.

MS. COTTINGHAM: I don't think our copy is

going to show the folded over --

THE WITNESS: It's appendix A and it's sheet L5. It has a text table on it and it has a bunch of little planting details shown.

MS. COTTINGHAM: I can find appendix I.

MR. PEARCE: It's after I.

MS. COTTINGHAM: Oh, it's after I. I was going on the alphabet I know.

MR. PEARCE: A through F are attached separately and they are at the back.

MS. COTTINGHAM: I found appendix L.

THE WITNESS: Keep going.

MS. COTTINGHAM: Appendix O. Is it after that or before that?

THE WITNESS: After.

MS. COTTINGHAM: Appendix A.

THE WITNESS: And then sheet L5. It's at the very, very end.

Q. (Continuing By Mr. Pearce): In fact, while we are there, could you explain briefly for the board what sheets L2 through L6 show?

A. L2 through L6 show a couple of the details for planting the Vacca Farm site. The first two sheets are an irrigation plan and then the sheet after the irrigation plan just shows, and that's this big board up here, that

shows the planting zones. The different hatches on this plan are areas where different plant communities will be installed.

MS. COTTINGHAM: I'm not sure we're in the same spot. We have appendix A, but it only has like four pages. It's got boring logs, hand auger log and then we go into appendix B, groundwater seepage analysis.

MR. PEARCE: Could Wendy take a look at it.

MS. COTTINGHAM: Yes. Is it this appendix A, subsurface explorations?

MR. PEARCE: Perhaps we should just move on if we can't find it. I can just have Miss Cassin explain what the appendices show and I think that gets the point.

MS. CLEMENTS: I don't see them in here. We have an extra copy right here if that would --

MR. PEARCE: Why don't I just have her explain what's in those. It's not a big point.

A. It's basically a cable that calls out the different planting zones that are shown on this figure here, the planting plan. For each of these different hatched areas, there's a list of species that are going to be planted and the densities that they will be planted in. And for this area that I have referred to as forested wetland along the relocated channel of Miller Creek, the species are things like big leaf maple, Oregon ash, and

black cottonwood. And there are also a variety of shrubs that will form a sub canopy or understory to the forested wetland. The density of tree species are 280 stems per acre, which is a typical forested tree density in the Puget Sound lowlands. I believe Ms. Walter testified about the typical densities of forested wetlands in Puget Sound lowlands.

MR. EGLICK: Can I just clarify we are looking at appendix A, sheet L5, just so I know and for the record, that's what we are looking at, L5?

THE WITNESS: Yes.

MR. EGLICK: Thank you.

Q. (Continuing By Mr. Pearce): Are there any forested riparian buffers being proposed for creation as part of the natural resource mitigation plan?

A. Yes, there are, and I will show you where those are. There will be forested riparian buffers, both wetland forest and upland forest, created along Miller Creek and the Vacca Farm site and all the way down Miller Creek from south of the Vacca Farm down here through the mitigation site. This dark green area shows the extent of what's called the riparian buffer zone. Those areas will be forested. There's much existing non-forested area within here right now. Some of the wetlands and uplands are open fields, lawns, pastures. Those will be

planted as forest as part of the mitigation plan, as well as this area along A17, this tributary to Miller Creek.

There will also be forested buffers at the Auburn mitigation site as well as there will be buffer areas along Des Moines Creek as well.

MS. COTTINGHAM: Can you remind me what exhibit number this large aerial photo is?

MR. PEARCE: It is actually in the -- it's in this Exhibit 1323. It's a demonstrative exhibit.

MS. COTTINGHAM: Thank you.

Q. (Continuing By Mr. Pearce): Are there planting plans in the appendices that you could describe for us that refer to the planting plans for the forested buffers?

A. Yes, there are. They're in appendix B, but I won't ask you to look at them.

Q. D as in dog?

A. B as in boy. They're very similar to the planting plan that I discussed for Vacca Farm. There are tables that call out for different plant communities and for each community, there is a list of trees and shrubs that will be planted in that area and the densities that they will be planted in in terms of stems per acre. And for all of the forested areas, the density of trees is 280 trees per acre when non-forested areas are being planted. There are some areas of enhancement where trees will be

infilled, and in those instances, the density of trees is 80 stems per acre because there are already trees existing in those areas and the mitigation plan is supplementing the number of trees in those areas.

Q. Could you show the board these schematic drawings from the natural resources mitigation plan and explain to them what they are.

A. This figure is a schematic that's based on the densities and the spacings in the planting plans. And this shows the buffer area around Lora Lake that's proposed and the sort of regraded reshaped shoreline of Lora Lake. This is the existing conditions of Lora Lake. There is currently lawn and houses, a retaining wall and a concrete bulkhead along the edge of the lake.

And in part of the mitigation plan the bulkhead will be removed, the retaining wall will be removed. The shoreline will be modified to a more gradual slope that's a more natural lake shoreline slope. And the area immediately next to the lake will be planted with shrubs and then a forested buffer along the edge of the lake. That's one example of forested conditions on the site.

And this is another schematic that shows a cross-section of the Miller Creek riparian buffer zone. And, again, the top is existing conditions with in many places houses right along the creek, landscaped gardens,

lawns, and the bottom cross-section is what the area will look like after the proposed mitigation plan is implemented. It calls for forested wetlands and forested upland buffers with a shrub understory. And this, again, this schematic, it is a schematic, but it's based on the densities and spacings of the plants in the planting plan and also the types of trees and shrubs.

Q. Thank you, Miss Cassin. Switching subjects. Are you familiar with the concept of wetland hydro period?

A. Yes, I am.

Q. Can wetland hydro periods vary?

A. It varies quite a bit naturally both temporally and spatially. It varies between years and also at different locations.

Q. Do you have an opinion about -- well, are you familiar with the slope wetlands on the master plan update site?

A. Yes, I am.

Q. Do you have an opinion about whether those hydro periods would vary?

A. They would vary quite a bit from year to year.

Q. With respect to the wetlands to be remaining down slope of the embankment, have you formed an opinion about whether a performance standard that would try to mimic the hydro period is an advisable performance standard?

A. I don't believe that it makes much sense to try to match

a specific hydro period as a performance standard to either maintain existing conditions or to meet some kind of target condition for a mitigation. And the reason I say that is that it would be almost impossible to write a performance standard for a specific hydro period for a single wetland because of the variability between years, and also particularly in slope wetlands within the same wetland in the same year, there will be different hydro periods at different parts of the site. So I don't think it's a useful performance standard to try to match a specific hydro period. I believe that the use of multiple performance standards, some of which capture hydrology and patterns of hydrology as well as other attributes of the wetland that are related to hydrology, such as vegetation, are more feasible and more realistic for wetland mitigation.

Q. Have you reviewed the performance standards in the 401 certification?

A. Yes, I have.

Q. For the remaining wetlands?

A. Yes, I have.

Q. Do you have an opinion about whether they are adequate?

A. I believe that those performance standards will allow those wetlands to meet the targeted functions in the mitigation plan.

Q. Are you aware of any monthly monitoring with respect to the wetlands that will be remaining on the site?
A. Yes, there's been monthly monitoring that has been conducted in the wetlands down slope from where the embankment will be. I believe the monthly monitoring began in February of 2001. Since about August of or September of 2001, the monitoring data has been collected twice a month, so there is monthly monitoring data from February 1st until now, there's twice-monthly monitoring data from September 2001 until now. So there is monitoring data for those wetlands.
Q. Have you observed those wetlands prior to the monitoring?
A. Yes, I have. I conducted a series of site visits as part of my review of the mitigation plan. I visited those wetlands a couple of times in 2000, early 2000, and then again in summer of 2001 and the fall of 2001. So I've seen those wetlands over the course of several years, a couple years.
Q. Finally, do you understand what's meant by adaptive management?
A. Yes, I believe I do.
Q. Could you explain to the board whether that is an experimental strategy?

MR. EGLICK: Objection. The witness may understand, but I don't think that the answer provided

any basis for the vagueness of the question to be solved for anyone else. I think the witness needs to explain what she means before she can go on.

MR. PEARCE: I can lay a foundation.

Q. Can you explain what you mean by adaptive management?

A. Adaptive management is a method for managing natural areas or mitigation sites, and it's simply a method where you use monitoring to track the actual conditions on the site and use those actual conditions to guide any kind of management actions or decisions that you make. For mitigation specifically, doing that detailed monitoring and using the actual site conditions tells you whether your mitigation is meeting its targeted goals or whether it's trending in that direction. And the monitoring guides any contingency actions or measures that you take to insure that the mitigation is a success.

Q. Based on that understanding of adaptive management, do you consider it, in your opinion, to be an experimental strategy?

A. I don't consider it to be experimental.

MR. PEARCE: Those are all the questions I have for Dr. Cassin. Thank you.

MS. COTTINGHAM: Mr. Kray.

MR. KRAY: Nothing for Ecology

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EXAMINATION

BY MR. EGLICK:

Q. Dr. Cassin, you were talking about monitoring of wetlands at the site just a moment ago. Do you recall that?

A. Mm-hmm.

Q. You said you had gone out there and visited a few times over the years; is that right?

A. Mm-hmm.

Q. Have you actually monitored groundwater piezometer readings in the wetlands that you visited?

A. I wouldn't say that I have actually monitored those because I haven't been one of the people who has routinely collected that data, but I have gone out and visited the piezometer sites and I'm familiar with the monitoring design for collecting that data, and I've also looked at some of the data that has come in from that monitoring.

Q. And has that data been, to your knowledge, correlated to rainfall?

A. I don't specifically remember seeing any correlations in the data that I've looked at.

Q. You know, I think I need a new prescription because I can't quite read the figure number on that board that's up there. Maybe you could help me out.

A. Figure 5.2-2.

Q. And that's from the NRMP?
A. Yes, it is.
Q. And that's supposed to be representative of what the upshot is going to be of the planting plan for what area again?
A. That is for a typical cross-section of the Miller Creek riparian buffer, and so it's not supposed to be a specific cross-section; it's a typical cross-section across basically this area or this area. And it shows a 100-foot average buffer, so it's not intending to show that specifically or that specifically.
Q. So could you just call out for us what are the tree species shown in this typical cross-section?
A. I don't believe that these are supposed to be -- well, I don't know which species are represented by the graphic itself, but I do know that the trees --
Q. That answers my question then.
A. This graphic wouldn't be used alone by anybody trying to determine what would be planted in this zone. There's a planting plan that calls out the names of the trees and the densities.
Q. I appreciate that, but my question was can you call out the species represented in that figure?
A. I can tell --
Q. Is the answer no?

A. I can't tell you if this is supposed to be a Sitka spruce, but I can tell you that this drawing represents Sitka spruce, western red cedar, black cottonwood, big leaf maple, red alder and a variety of other trees.
Q. Are there any willows shown?
A. There are some shrub willows down here along the creek.
Q. So would it be correct to say that the taller trees are the ones you named first and then the willows are the shrubbier items?
A. Some of the shrubby items could be willows. There are some other shrubs in there as well.
Q. Then the taller trees are again, you said --
A. There's a variety of tree species, there's black cottonwood, big leaf maple, red alder, Sitka spruce, I believe there's some western hemlock as well as western red cedar in there.
Q. And you're not representing, are you, that this schematic shows the actual mix of trees required under the planting plan, are you?
A. No. That kind of detail and specific information is included in the planting tables and the planting plans. There are also some schematics that show looking down on a site and the typical section. There's some drawings that have little circles that represent the spacings of different species and those actually are labeled with the

specific tree names. So using a combination of that information, you determine what the actual planting composition is. This is intended to be a schematic to show a forest, a typical forest strata and cross-section.

Q. And, by the way, did you perform any of the functional assessments for wetlands on the site?

A. No, I didn't perform the functional assessments.

Q. Okay. Thank you. I think we're done with that if you would like to take a seat.

Could you look, if you would, please, on page 5 of your prefiled testimony, paragraph 13. And you have got a number of bulleted items on that page.

A. Yes.

Q. For example, do you see it says "Remove riprap, bridges, trash, weirs," do you see that list there?

A. Mm-hmm.

Q. Is this list of bulleted items a list of wetland functions or a list of activities?

A. This is a list of activities.

Q. Thank you. Could you then look, if you would, please, at page 6 of your prefiled testimony, paragraph 16, the last bulleted item, so it's the last part of the text on the page, if you see where I am.

A. It starts, "Significant sources."

Q. Yes. And I was wondering, do you have any study that

quantifies the amount of these pollutants that you're citing that came supposedly from the residential buy-out area that you're describing here? You can expand through your counsel, I just want to know if you have any study that quantifies this.

A. In the actual buy-out area itself?

Q. Yes.

A. Other than relative concentrations in a study that includes Miller and Des Moines Creek. No, I don't have in the specific buy-out area, but the study that I refer to here has information or data from Miller and Des Moines Creek.

Q. Right. And do you have any study that quantifies the relative contribution of airport activity to Miller and Des Moines Creek as opposed to residential activity?

A. No, I don't.

Q. I did want to ask you another question. You were talking earlier with Mr. Pearce and you talked about -- well, actually, here's maybe a quicker way to do it. You have attached to your testimony, I think, table 4.1-3 from the NRMP. You've got your vita and then some fold-out maps and then you've got this table or a version of this table from the NRMP that's called "Summary of Wetland Mitigation Credit." Do you see that?

A. Yes.

Q. Okay. Now --

MR. PEARCE: Which one is that, Peter?

MR. EGLICK: Table 4.1-3 page 4-13.

MR. PEARCE: I think it's tab D.

MR. EGLICK: I don't have tabs on the one we got.

MS. COTTINGHAM: Tab D.

MR. EGLICK: Thank you. I appreciate that.

Q. (Continuing By Mr. Eglick): So just looking at this for a moment, I notice that the category of -- you were talking about creating, I think you called it, forested wetlands. Do you recall talking about that?

A. Yes.

Q. Now, can you show me on this table where it's listed the amount of acreage for creation of forested wetlands on site?

A. There is no forested wetland creation in basin.

Q. So the only forested wetland creation is at Auburn; is that right?

A. There's what I would call restoration and enhancement of forested wetlands in basin; there is creation at Auburn.

Q. Okay. So when you were talking before with Mr. Pearce in talking about creation of forested wetlands and going through a description of that, that was then using perhaps a different term than this table uses from the

NRMP; is that correct?

A. Or I may have included creation when I was summarizing this, but I intended to say wetland creation occurs at Auburn, wetland restoration and enhancement occurs in basin.

Q. And then in terms of creation of something that's forested in basin, the only creation of forested areas in basin, actual creation, is in what you're calling riparian buffers; is that correct?

A. Well, in terms of creating forested wetlands in the sense that you create a wetland where there wasn't a wetland before, that's correct. The only created wetlands are in Auburn. But along the Miller Creek riparian buffer, there are numerous areas where there are existing wetlands that are lawn, they're not forested, or they're houses on top of wetlands or there's landscaped gardens, and those areas will be forested areas once the mitigation plan is implemented.

Q. I did want to ask you about that. Let me ask you another question first. If you would look at page 11 of your prefiled, the bottom of the page, you refer to an Army Corps regulatory guidance letter. Do you see in paragraph 29, do you see that?

A. Which page.

Q. That's page 11 of your prefiled, paragraph 29, an Army

Corps regulatory guidance letter.

A. Yes.

Q. Now, that letter is still out for comment by interested agencies, isn't it?

A. I believe it is.

Q. Then if we could go on then to your prefiled testimony, page 15, paragraph 40. Are you with me?

A. Yes.

Q. You're talking, again, about what's being replaced currently, residential lawn, garden, nursery and so on. With regard to the residential lawns and gardens, do you know what the average age was of the residential lawns and gardens in question?

A. I don't know the average age, no.

Q. And are you aware of any inventory of the trees and shrubs that existed in those gardens and lawns?

A. I'm not sure exactly what you mean by inventory, but there is information on the composition of vegetation in much of that Miller Creek riparian zone. There is detailed parcel-by-parcel information on the existing vegetation.

Q. By inventory, I mean number of, for example, conifer trees.

A. I don't believe there has been a census of conifer trees.

Q. Census is probably a better word. Or the age of the

trees in those areas?
A. Not that I am aware of.
Q. And then looking down at your paragraph 41, you talk about, on line 14, the benefits, I think you're talking about what's going to be created and you call it predominantly forested -- do you see that?
A. Mm-hmm.
Q. Now, what do you mean by predominantly forested?
A. Well, I mean that more than half of it is forested, but, actually, I don't know the percentage, but most of that area that I'm talking about between Lora Lake and the end of the Miller Creek riparian corridor, so down to about here, the entire area from Lora Lake down to there would be mostly forested; there will be much more forest than any other type of plant community or vegetation. The only areas that are not forested are areas in the Vacca Farm where there will be shrub wetlands.
Q. If we wanted to know what you meant by forested, we would look at the planting plan specifics; is that correct?
A. You could look at the planting plans to know what I mean by forested, but there's a standard definition of a forested wetland which is that more than 30 percent of the canopy cover comes from woody trees, and this whole area will fit that definition once the mitigation is --
Q. If we want to know what the performance standard is here,

though, the specific performance standard as to what you're expecting to see in terms of forested comes from the planting plan, doesn't it?

A. It comes from the planting plan and the performance standards in the mitigation plan.

Q. Now, if you could look at the top of page 20 of your prefiled paragraph 54, and I'm looking particularly at lines 2 and 3. Do you see where you say the peat soils on the Vacca Farm site are saturated to the surface even in late summer?

A. Yes.

Q. Now, is there some performance standard in the 401 that you can point us to that will maintain that condition?

A. In the 401?

Q. Yes, in the 401 certification.

A. I don't believe there is a performance standard in the 401 certification; however, there are performance standards for that mitigation site in the mitigation plan.

Q. And is there a specific performance standard you can point to that would require that, as you have said is the case now, the peat soils in the Vacca Farm site be saturated to the surface even in late summer?

A. I don't believe there's a performance standard that is phrased that way. However, there are performance

standards that go to maintaining the plant community on that site, and the plant community that's planted in the area that's currently peat requires that type of saturation to be maintained. And the other thing is that much of the mitigation action and restoration action at the Vacca Farm site -- I would like to take a second to explain this because I think it's important. The existing hydrology on that site --

Q. I think I asked my question and I think you have answered it and gone beyond, so I will let your counsel take you even beyond that if he wants to.

I don't have any other questions.

MR. POULIN: None from CASE.

MS. COTTINGHAM: Any redirect?

MR. PEARCE: Just briefly.

EXAMINATION

BY MR. PEARCE:

Q. Mr. Eglick asked you a question about the saturated-to-the-surface conditions at Vacca Farm, and you were explaining about, I believe, about how the plant community requires that type of saturation to be maintained. Could you explain that further to us?

A. Yes. The existing hydrology on that site maintains saturated soils into the summer in the peat areas in the

low parts of the site. That site has been drained. There are ditches in the site right now, there are tile drains that are there from the agricultural operation that were designed to dry out the soils so that it could be farmed. As part of the mitigation, those ditches and drains would be removed. There will be some grading as well which will lower parts of the elevation of the site, and those two things in combination will result, if anything, in wetter conditions on parts of that site. There is no reason to expect that those peat soils will be less wet than they are now.

In addition, the planting plan is composed of willows that typically require saturated soils for long periods of time into the growing season, and maintaining those plant communities on those sites are part of the performance standards. So plant performance standards maintaining the plant communities in areas where plant communities require very specific moisture regimes is an indirect performance standard for hydrology in my opinion.

Q. Thank you, Dr. Cassin. I don't have any further questions?

MS. COTTINGHAM: Any board questions?

MR. LYNCH: I have a couple questions.

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EXAMINATION

BY MR. LYNCH:

Q. Hi, how are you today. I have a couple questions here just because you're here and there's a big map up there that you can help me remember something.

Does the headwater wetland in the Walker Creek basin, is that something that you can show me on that map?

A. Yes. I believe that's this wetland here, 43.

Q. Okay.

MS. COTTINGHAM: What did you call that?

THE WITNESS: Wetland 43.

Q. (Continuing By Mr. Lynch): And is that more than 10,000 feet from the third runway site?

A. I don't believe it is, but I don't know exactly, I'm not sure exactly how far that is. I believe it's within 10,000 feet.

Q. I don't need you to stand anymore. Thank you.

I guess my last question to you is, is the out-of-basin mitigation that's being proposed, when you compare that to what could have been achieved by doing more in-basin mitigation -- if there was more in-basin mitigation that was done, is the out-of-basin mitigation more effective at replacing and improving the wetland functions impacted by the project? That's a long

question, but --

A. From my understanding of the mitigation opportunities that might be present in basin, other than the ones proposed by this project, most of those are relatively small wetlands and they're surrounded by urbanized areas, as you would expect. Those types of mitigation sites are generally not as sustainable over the long term because they are surrounded by an urban environment.

The Auburn mitigation site is designed to replace the functions impacted by the project, including some of the wildlife habitat that can't be restored near the airport. And it's also a large wetland site, so it's a large area of habitat. It has large buffers around it because there was a large piece of property to work with. It's currently not in an urbanized environment. One edge of it is along the Green River.

So, in my opinion, it's more sustainable and more viable as a long-term wetland site than some of the small isolated areas that were apparently potential mitigation opportunities in basin. So, yes, I think the long answer to your question is yes.

Q. It was a long question. Thank you. No more questions.

MS. COTTINGHAM: Any questions as a result of the board's questions?

MR. PEARCE: No.

MR. EGLICK: No.

MS. COTTINGHAM: You're excused. Thank you.

MR. PEARCE: If we'd like to get started with Dr. Kelley, he is going to take a lot more than ten minutes, or do you want to start ten minutes early tomorrow? I don't know what the board's wishes are.

Would it be appropriate to turn off the clock now?

MS. COTTINGHAM: You may turn off the clock. We have two witnesses by the port in the morning and potentially four rebuttal witnesses. Are you still with those four, Sheldon, Rozeboom, Lucia and Wingard?

MR. STOCK: Yes, although not necessarily in that order. It may be that Dr. Lucia will go first. He came in to California and now he is flying up from California, and I don't know whether he is coming tonight or tomorrow morning, but if he is here, we'll be putting him on first.

MS. COTTINGHAM: How much time do we expect on your two direct witnesses?

MR. PEARCE: If I had to do him right now, I would expect 45 minutes for Dr. Kelley, and if I had to do him in the morning, probably 30. And I'm not sure how much we have for Mr. Bailey. He would be less than a half hour, probably 20 minutes for us.

MS. COTTINGHAM: Okay.

MR. PEARCE: We have another hour of direct at the most and, of course, that didn't count any cross examination of those two witnesses. I don't think it's going to take us an hour, actually, to get both of them.

MS. COTTINGHAM: Why don't we adjourn for the day and why don't we start at 9 o'clock tomorrow morning, does that work for you? We'll start at 9 tomorrow morning just to give us an extra half an hour.

MS. COTTINGHAM: And how much time -- did you start the clock over after noon?

MR. POULIN: Yes, we did. We reset the clock at noon and the time elapsed since then for appellants, one hour, nine minutes, 41 seconds; for respondents, two hours, one minute, two seconds.

MS. COTTINGHAM: Thank you. And with that, we'll go off the record and see you tomorrow morning.

(Hearing adjourned at 4:50 p.m.)

C E R T I F I C A T E

STATE OF WASHINGTON)

) ss

COUNTY OF THURSTON)

I, Kim L. Otis, a duly authorized Notary Public and Certified Court Reporter in and for the State of Washington, residing at Olympia, do hereby certify:

That the annexed and foregoing Transcript of Proceedings, consisting of pages 9-0001 through 9-0232, was reported by me and later reduced to typewriting by means of computer-aided transcription; that said transcript as above transcribed is a full, true and correct transcript of my machine shorthand notes of said proceedings heard on the 28th day of March, 2002, before the Pollution Control Hearings Board.

WITNESS MY HAND AND OFFICIAL SEAL this 10th day of May, 2002.

Notary Public in and for the State of Washington, residing at Olympia.
My commission expires 11-2-2004.

KIM L. OTIS NOTARY PUBLIC STATE OF WASHINGTON COMMISSION EXPIRES 11-2-04

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