THE BEFORE POLLUTION CONTROL HEARINGS BOARD

STATE OF WASHINGTON

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

ORIGINAL

TRANSCRIPT OF PROCEEDINGS

DAY EIGHT

March 27, 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 Eight commencing on the 27th 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 Sixth Avenue SE, Rowe Six, Building 2, 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

E X H I B I T S

NUMBER	DESCRIPTION	IDENTIFIED	ADMITTED
1247	Letter to FAA	82	
0266	Letter to FAA from NMFS	82	
1175	Excerpt from the BA	42	

March 27, 2002

Day 8

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MS. COTTINGHAM: We will go on the record. We left off with just beginning the cross-examination of Mr. Smith by ACC.

MS. OSBORN: Thank you. I just have a few questions for Mr. Smith.

KEITH SMITH, having been previously sworn testified as follows:

EXAMINATION

BY MS. OSBORN:

Q Could you take a look at the blue volume below you there, No. 2, and Exhibit No. 578.

Is this the water right application that the Port of Seattle filed with the Department of Ecology?

A Yes, it is.

Q This is a water right application seeking a change or adding a purpose of use to the Tyee Golf Course well; is that correct?

A That's correct.

Q And the purpose of use that you are adding is proposing to add a flow augmentation for Des Moines Creek; is

that correct?
A That's correct.
Q If you look at the previous exhibit in this, Exhibit No. 577, is this the letter from the Port that accompanied the application?
A Yes, it is.
Q And this indicates that it's the Port's intent to add flow augmentation for Des Moines Creek as a purpose of use in the water right; is that right?
A That's correct.
Q And at the time that this was filed, the Port was proposing for low-flow augmentation the maintenance of 1 cfs, 1 cubic foot per second, flow in Des Moines Creek; is that right?

MR. PEARCE: I would object to this line of questioning, Ms. Cottingham. ACC has not even called Mr. Smith, listed him as a witness, and it's beyond the scope of his direct.

MS. OSBORN: Actually, we have Mr. Smith listed on our final witness list.

MS. COTTINGHAM: I'm going to allow the questioning.

A The intent when this letter was sent was that both the Port and the basin plan committee was going to --
Q Mr. Smith, I asked you a yes-or-no question. I would

appreciate a yes-or-no answer.

A Okay. Could you repeat the question, please.

MR. PEARCE: I would object to counsel coaching the witness. If it's not appropriate for a yes-or-no answer, he can answer the question completely.

MS. OSBORN: I believe the protocol here has been if I ask a yes-or-no question, that is simple enough anyway, that's the answer I'm entitled to.

MS. COTTINGHAM: Why don't you restate the question, and you can bring out anything on cross-examination.

Q (By Ms. Osborn) Is it correct that at the time that this water right was submitted, the Port's low-flow augmentation proposal as a component of its section 401 application, was to maintain a 1 cfs flow in Des Moines Creek?

A No, I do not believe that is correct.

Q Well, let's take a look at the September 2000 low-flow augmentation plan. That's Exhibit 681, which is in volume 3 of your ACC exhibits.

MR. LYNCH: I'm sorry. Can you say the number of the exhibit again.

MS. OSBORN: 681.

Q (By Ms. Osborn) Is this the Port's Des Moines Creek

flow augmentation plan?

A It's the preliminary design report for the flow augmentation plan, dated September 2000.

Q And if you look over at page 2-1, down in the middle of the second paragraph, it says, the system will be programmed to maintain creek flows of 1 cubic feet per second at the monitoring station; is that correct?

A That's correct.

Q And this was the flow augmentation plan that was submitted or the preliminary design that was submitted to Ecology in support of the Port's 401 certification; is that correct?

A I don't recall if this was submitted in support of the 401.

Q Who would know this, if you don't know?

A I just can't recall right now if this was part of the 401 or not.

Q So this might have been prepared for some other purpose?

A The purpose was to --

Q Would this have been prepared for some other purpose?

A No, I don't think so.

Q Now, in this September 2000 design plan, it states there at that point you are talking also possibly about using Seattle Public Utilities' water; is that right?

A There were several options that we went through for a source of water for low-flow augmentation.

Q And Seattle Public Utilities' water was one of them; is that right?

A That's correct.

Q At this point, the Tyee Golf Course well was cited as an alternative or possible backup supply; is that right?

A That's correct.

Q Then if we go back in time, the 1998 low-flow proposal from the Port also proposed a 1 cfs, a maintenance of a 1 cfs flow in Des Moines Creek; is that right?

A I believe the target flow for Des Moines Creek for mitigating all impacts throughout the basin was 1 cfs.

Q And wasn't that 1 cfs target incorporated into the 1998 section 401 certification that was issued for the Port and then later withdrawn?

A It might have been. I don't recall specifically.

Q Let's have you take a look at Exhibit 1104, and look at page 7.

A Page 7?

Q Yes.

MS. COTTINGHAM: Why don't you wait for us to catch up.

MS. OSBORN: You bet.

MS. COTTINGHAM: Page 7, did you say?

MS. OSBORN: That's correct.

Q (By Ms. Osborn) Looking at paragraph D4a, second bullet down, does it say there that flow augmentation shall be implemented whenever streamflows in Des Moines Creek at a certain spot drop below 1.0 cubic feet per second?

MR. PEARCE: Objection. Lack of foundation. And I don't know if this witness has even seen this.

MS. COTTINGHAM: Do you want to lay a foundation.

Q (By Ms. Osborn) Please take a look at the front page of this document.

Is this the section 401 decision that was submitted to the, was issued to the Port of Seattle for the third runway project?

A This document was prepared before my involvement in the project and before my employment with the Port, so I would have to read it to know what it is.

Q Okay. Fair enough.

So it was the December 2000 low-flow plan that was the first plan that was issued by the Port that indicated the stormwater might be a source of water; is that right?

A I believe that's correct.

Q And it was also at that point that the Port started

conducting this low-flow analysis in the three different streams --

MR. PEARCE: Do you need these anymore?

MS. OSBORN: No.

Q (By Ms. Osborn) It was at that point in time that the Port conducted a low-flow analysis and determined that the flow target that it would utilize for flow augmentation would be significantly less than maintaining that 1 cfs; is that right?

MR. PEARCE: Objection. Vague. The word significantly has no meaning.

Q In other words, would be less than the 1 cfs in Des Moines Creek; is that right?

A I believe that's a correct statement.

MS. OSBORN: That's all I have.

MS. COTTINGHAM: Mr. Poulin?

MR. POULIN: Yes.

EXAMINATION

BY MR. POULIN:

Q Good morning, Mr. Smith.

A Good morning.

Q I'm Rick Poulin on behalf of CASE.

In your prefiled testimony -- incidentally, did you write that testimony?

A I reviewed it and signed it.
Q You didn't write it?
A I did not write it.
Q Who did write it?
A I don't know; one of the attorneys.
Q You don't know who wrote your prefiled testimony?
A Not specifically, no.
Q In that testimony, you state that the Port's NPDES permit is a BMP-based permit?
A That's correct.
Q And, consequently, the purpose of the stormwater monitoring undertaken is to determine the effectiveness of the BMPs?
A That's correct.
Q You use the phrase BMP-based permit. The permit doesn't use that phrase, does it?
A No, I do not believe that phrase is in the permit language.
Q But you are familiar with the permit itself?
A Yes, I am.
Q That's Exhibit 3.

On page 51 of Exhibit 3, the Port's NPDES permit includes special condition G6.

MS. COTTINGHAM: Can you tell us what page again.

MR. POULIN: Page 51 of Exhibit 3, special condition G6.

Q (By Mr. Poulin) Now, that condition states nothing in the permit shall be construed as excusing the permittee from compliance with any applicable federal, state or local statutes, ordinances or regulations.

Did I read that correctly?

A Yes, you did.

Q Are you familiar with that provision?

A Yes, I am.

Q And are you familiar with the permit fact sheet as well?

A Yes, I am.

Q That is Exhibit 136.

Now, with reference to that special condition G6 --

MS. COTTINGHAM: What page in Exhibit 136, or have you gone to a page yet?

MR. POULIN: That's page 35.

Is 136 the fact sheet?

MS. COTTINGHAM: Yes.

Q (By Mr. Poulin) It explains there that condition G6 prohibits the permittee from using the permit as a basis for violating any laws, statutes or regulations.

Are you familiar with that?

A I'm not sure which paragraph you are reading.

Q That's at the bottom of the page, general conditions. It's four lines up from the bottom, condition G6 prohibits the permittee from using the permit as a basis for violating any laws, statutes or regulations.

MS. COTTINGHAM: We're not in the same document or the same page as you are.

MR. JENSEN: Page 36, I have that.

MS. COTTINGHAM: We only have excerpts from the fact sheet.

Q (By Mr. Poulin) If you look at page 36 of that exhibit, you'll see, midway down the paragraph on page 36, is that same language; condition G6 prohibits the permittee from using the permit as a basis for violating any laws, statutes, or regulations.

Do you see that?

A I see that, yes.

Q So the permit fact sheet doesn't use the phrase BMP-based permit either, does it?

A Not to my knowledge, no.

Q Now, you testified about the purpose of monitoring. Would you please turn to page 29 of the fact sheet.

That's Exhibit 136, again.

MS. COTTINGHAM: Which page?

MR. POULIN: 29.

Q For context, you'll note that on page 28, the fact

sheet is talking about stormwater and toxic pollutants.

Do you see that?

A Yes, I do.

MR. PEARCE: Could we take a look at that original, because we have the odd numbered pages.

Q And there's a reference to the August 1996 EPA interim approach to stormwater.

Do you see that?

A Yes, I do.

Q So now on the top of page 29, do you see that the fact sheet states that, the interim permitting approach uses best management practices, BMPs, in first round stormwater permits and expanded or better tailored BMPs in subsequent permits were necessary to provide for the attainment of water quality standards.

So the purpose of BMPs is to provide for the attainment of water quality standards; isn't that right?

A That's what it says here.

Q Incidentally, the Port's NPDES permit is not a first round stormwater permit, is it?

A I don't know if it is or not.

Q Isn't it true that BMPs must be applied to prevent violations of water quality standards?

A No, not necessarily.

Q Are you familiar with the regulations governing BMPs?
A Generally familiar.
Q I have a section of the Washington Administrative Code, and if you will look to section 3(d), you will see a sentence stating that the activities which cause pollution of stormwater shall be conducted so as to comply with the water quality standards.

You weren't familiar with that provision?

A Not specifically.
Q That is Washington Administrative Code section 173-201A-160 sub (3)(d).

It further states that the consideration and control procedures in subsection (b) and (c) apply to the control of pollutants in stormwater.

Do you see that?

A I don't see where you are reading that. What paragraph are you reading that from?
Q That's the last sentence of subpart (3)(d).
A Okay. I see that, yes.
Q Then looking up to that subsection (b) it states, best management practices shall be applied so that when all appropriate combinations of individual best management practices are utilized violation of water quality criteria shall be prevented.

A I see that.

Q So would you agree that the intent is that BMPs shall prevent violations of water quality criteria?

MR. PEARCE: Objection. Lack of foundation. I'm not sure that the witness knows what the intent of Ecology was when this rule was implemented.

MR. POULIN: Well, the witness has signed a statement which claims that the purpose of BMPs is just really something other than the attainment of water quality standards, and I'm exploring his knowledge of what his understanding of the law was when he made that statement.

MS. COTTINGHAM: I'll allow the questioning.

MR. PEARCE: I do disagree with Mr. Poulin's characterization of what the witness testified to.

Q (By Mr. Poulin) Is that your understanding?

A I'm sorry. Could you repeat the question again.

Q Is it your understanding that BMPs shall be applied so as to prevent violation of water quality criteria?

A That's what this says.

Q You've also stated that what is required to comply with the Port's permit is to implement and monitor BMPs.

That's part of your prefiled testimony, isn't it?

A I believe so, yes.

Q The permit monitoring requirements apply to discharges, don't they?

A The monitoring requirements for the permits do monitor the discharges. That's correct.
Q And as a matter of usage, what you are monitoring is discharges, not BMPs; isn't that right?
A What we're monitoring is the stormwater coming off the Port's sites at points that allow us to characterize those discharges.
Q Looking at the fact sheet once again on page 29, the second sentence of that provision states, the stormwater permit should include a coordinated and cost-effective monitoring program to gather necessary information to determine the extent to which the permit provides for attainment of applicable water quality standards and to determine the appropriate conditions or limitations for subsequent permits.

Do you see that?

A Yes, I do.
Q So the purpose of monitoring is to determine the extent to which the permit provides for the attainment of applicable water quality standards; isn't that right?

MR. PEARCE: Objection. Lack of foundation as to whether this fact sheet is some sort of implementable regulation or not.

MR. POULIN: The fact sheet describes the permit and Ecology's approach in interpreting the

permit, and the permittee is assumed to be familiar with its terms and requirements.

MS. COTTINGHAM: I'll allow the question. Do you want to restate your question.

Q (By Mr. Poulin) So would you agree that the fact sheet describes the purpose of stormwater monitoring as determining the extent to which the permit provides for the attainment of applicable water quality standards?

A Yes, I would agree with that.

Q And, then, the third sentence there, it states that, such a monitoring program may include ambient monitoring and receiving water assessment, and it continues on.

Do you see that?

A Yes, I do.

Q And the Port's previous NPDES permit did require a receiving water assessment, didn't it?

A I'm not familiar with the permit that preceded this one.

Q But you are familiar with the receiving water assessment that was performed?

A Yes, I've seen that report.

Q That is the exhibit that was discussed during your direct testimony yesterday, Exhibit 426?

A Yes. Exhibit 426 is the Stormwater Receiving

Environment Monitoring Report.

Q And this June of 1997 Stormwater Receiving Environment Monitoring Report was conducted to satisfy a specific requirement of the Port's NPDES permit, wasn't it?

A I'm assuming it was. Again, I'm not familiar with the specifics of the NPDES permit prior to the current one.

Q But you are familiar with this report?

A That's correct.

Q And doesn't this report state in the executive summary that special condition S8 of the department requires a report evaluating the impact of stormwater flow from the airport to Miller and Des Moines Creek?

MS. COTTINGHAM: Can you get us to where you are reading from before you ask the question.

MR. POULIN: Sure. It's small Roman numeral page 8. It's the first page of the executive summary, of Exhibit 426, third paragraph in the introductory section.

Q (By Mr. Poulin) So this report was prepared pursuant to a requirement in the Port's NPDES permit; isn't that right?

A According to this language, that's correct.

Q In fact, the Port wrote this report, didn't it?

A I'm not sure who wrote the report.

Q Well, it was submitted to Ecology by the Port?

A It says Port of Seattle on the title page, so I would assume someone at the Port wrote it.
Q And this was based on instream monitoring, wasn't it?
A That's correct, as far as I know.
Q The report explains on small Roman numeral page 10 of the executive summary that dissolved metal concentrations were monitored at stormwater outfalls and at locations upstream slash downstream of these discharges in Miller and Des Moines Creek; isn't that right?
A Yes, that's what that says.
Q The report shows where the monitoring was conducted, doesn't it?
A I'm sure it does.
Q There's a figure 1 following the executive summary.

MS. COTTINGHAM: And what page are you on now?

MR. POULIN: That's where page 2 would be. It's between pages 1 and 3.

Q (By Mr. Poulin) That's an overall map showing features, isn't it?
A Figure 1 shows the watersheds of Miller and Des Moines Creek.
Q Now, if you turn all the way back to what would be page 29, you see figure 5?

A Correct.
Q And figure 5 shows instream sampling locations on Des Moines Creek, doesn't it?
A Figure 5 shows a Des Moines Creek schematic for loading estimates. It shows locations of contributions and features on the creek and discharges.
Q And the black dots, as explained on the left side, are instream sampling stations?
A That's correct.
Q And it shows sampling stations both above and below the Northwest Ponds on west the tributary?
A That's correct.
Q Incidentally, the Northwest Ponds are waters of the state, aren't they?
A I don't know if they are waters of the state or not.
Q But SDS 3 flows into the Northwest Ponds?
A That's correct.
Q On page 33, doesn't this report state that concentrations of total recoverable copper in ambient waters downstream of the stormwater discharges generally exceeded both the EPA and state acute criteria?

A That's what that statement says.
Q And, specifically, if you look at page 38 in the discussion of copper, this report states at Des Moines

Creek dissolved copper concentrations were highest in samples from the stormwater outfalls, particularly SDS 345, 45.5 micrograms per liter.

A Yes, that's what that says.

Q Now, if we look to page 39, we'll see the summary table 23 of dissolved metal concentrations in Des Moines Creek.

Now, these reports of the metals concentrations in the outfall stations report all the outfall stations, don't they?

A I'm not sure if this includes all the Port's outfalls or not.

Q It states all the outfalls are presumably on Des Moines Creek.

MR. PEARCE: Objection. Calls for speculation.

MS. COTTINGHAM: Do you want to lay a foundation for your question.

Q (By Mr. Poulin) This is a table reporting the summary of dissolved metal concentrations in Des Moines Creek, isn't it?

A That's correct.

Q And the second row, in bold, is titled, "Dissolved Metal Concentrations in Outfall Stations Combined."

A That's correct.

Q Now, the median number there, 25.95.

MS. MARCHIORO: Objection. Vague.

Q The median number in the second column for copper, 29.95.

A I see that.

Q That's significantly higher than the acute criteria of 4.64.

MR. PEARCE: Objection. No foundation as to what the acute criteria is. We all know it's hardness-directed.

MS. COTTINGHAM: Sustain the objection.

MR. POULIN: I'll be happy to lay a foundation. I'll object to the testimony.

Q (By Mr. Poulin) This table reports the acute criteria that was calculated using the hardness data as 4.64, doesn't it?

MR. PEARCE: Objection. Lack of foundation.

MS. COTTINGHAM: Sustained.

MR. POULIN: Well, the foundation for hardness has previously been laid and is explained in the report.

Q (By Mr. Poulin) You are familiar with that, aren't you?

A I'm sorry. Could you repeat that.

Q Are you familiar with this report and its calculation of hardness?

A I'm generally familiar with the report and the hardness monitoring data.

Q And the report used instream samples to determine hardness?

A I believe that's correct.

Q And they generated an acute criteria based on that hardness of 4.64?

MR. PEARCE: Objection. No foundation as to whether any acute criteria were generated.

MR. POULIN: This table is labeled acute criteria. I don't understand why a foundation would be necessary.

There's three places where this table states acute criteria and in the copper column 4.64.

MS. COTTINGHAM: I'll allow the question.

MR. PEARCE: I'm not sure whether the witness... Okay.

Q (By Mr. Poulin) Do you see that?

A I see on the table where it says acute criteria of 4.64 in the copper column.

Q And this table shows dissolved metal concentrations in upstream receiving water exceeded the acute criteria, does it not?

5.19 is greater than 4.64?

A Yes. It shows the median 5.19.

Q And the median of the dissolved metals in the outfall stations for copper is 25.95, isn't it?
A That's what this table states.
Q Then downstream, the median for copper is 6.66?
A That's correct.
Q That's both higher than the acute criteria and higher than the upstream value, isn't it?
A That's correct.
Q Now, let's turn back to the fact sheet. If you look at page 31 of the fact sheet.

MS. COTTINGHAM: Which exhibit?

MR. POULIN: Exhibit 136.

MR. JENSEN: Which page, please?

MR. POULIN: Page 31, second paragraph.

Q (By Mr. Poulin) In the center of that paragraph, the fact sheet states that the updated SWPPP, or Stormwater Pollution Prevention Plan, will need to address the copper, lead and zinc in stormwater discharges from SeaTac Airport; is that right?
A Yes, I see that sentence.
Q Now, you testified that you managed the NPDES permit?
A I provide general oversight and supervision to the staff that manage the permit.
Q And that includes the implementation of BMPs?
A That's correct.

Q And the BMPs are required by virtue of the permit condition that discusses the Stormwater Pollution Prevention Plan; isn't that right?
A I believe that's correct.
Q And that's permit condition S12?
A Yes. Condition S12 is a condition in the permit that requires implementation of a pollution prevention plan.
Q Now, you state in your testimony that the Port stormwater discharges receive additional treatment below the point of discharge?
A In many cases, that's true. Or in many cases, they receive additional treatments below the point in which the monitoring takes place.
Q You don't identify which outfalls you were discussing, do you?
A I don't think I specifically identified that in my testimony.
Q Do you believe that statement is true with respect to SDS 3?
A Yes, I do.
Q What BMP exists downstream of the monitoring point at SDS 3?
A Downstream of the monitoring point in SDS 3, there is a vegetated swale before the water reaches the Northwest Ponds. I believe that vegetated swale provides

additional treatment.
Q There is no mention of that vegetated swale in the Stormwater Pollution Prevention Plan, is there?
A I don't recall if it's mentioned or not.
Q There's no mention of that swale in the maintenance provisions for BMPs in the Stormwater Pollution Prevention Plan, is there?
A I don't think that it's mentioned in that section.
Q That swale was not identified in the summary of completed BMPs that we find in Exhibit 425, is it?
That's the Stormwater Prevention Pollution Plan.
A I don't believe that the SWPPP is meant to be an exhaustive or comprehensive list of every BMP that's implemented at the airport.
Q Now, you haven't provided any evidence to support your assertion that additional treatment takes place below the monitoring point of SDS 3, have you?
MR. PEARCE: Objection. Ask and answered.
MR. POULIN: That's a brand-new question, Your Honor.
Q (By Mr. Poulin) You have not provided any evidence to support your assertion, have you?
MS. COTTINGHAM: I'll allow the question.
A I haven't presented evidence of that, no.
Q Right. You have not provided any evidence. That's the

question.

You haven't quantified the effects of any such treatment, have you?

A No, I haven't.

Q And the downstream monitoring reflected in the 1997 Stormwater Receiving Environment Monitoring Report took place beneath that vegetated swale, didn't it?

MR. PEARCE: Objection. Lack of foundation. We don't know what was there, and I don't know if the witness knows what was there in '95 when that work was done.

MR. POULIN: Your Honor, the chart in the 1997 report plainly shows that the downstream sampling location was beneath the Northwest Ponds, which is in the waters of the state downstream of any conceivable vegetated channel or swale that has been alluded to.

MS. COTTINGHAM: I believe the witness answered that he didn't know whether it was waters of the state, so if you want to lay a foundation first.

Q (By Mr. Poulin) Have you walked downstream from SDS 3?

A Yes, I have.

Q And you are familiar that the channel from SDS 3 flows into the Northwest Ponds?

A Yes.

Q There's no engineered BMP that the point, is there?

A I'm not sure what you mean by engineered BMP.
Q The Port hasn't created a swale, according to the specifications of the stormwater management manual?
A I'm not sure how that swale was created. I'm not sure if it's natural; I'm not sure if it's vegetated or built.
Q Have you ever participated in any management of that swale?
A Personally, no.
Q Are you aware of any management that's ever taken place to make sure that swale is properly functioning?
A I'm not aware if maintenance has or has not taken place in that swale.
Q Looks a lot just like a creek, doesn't it?
A The portions I've seen look like a natural creek.
Q And that swale is above the Northwest Ponds, isn't it?
A It's upstream of the Northwest Ponds.
Q It's above the monitoring location identified in the 1997 report, isn't it?
A It's above the downstream monitoring point, as indicated on that drawing.
Q Thank you.
And the Port doesn't monitor its discharges beneath that swale, does it?
A It's not a requirement of the NPDES permit. I believe

that there have been several studies that have monitored below that, but it's not a specific requirement of the permit.

Q Have you reviewed those studies?

A I'm aware of them, in a very general term or sense.

Q You don't have any basis for asserting that swale reduces the contaminants contained in the SDS 3 runoff between the SDS 3 monitoring point and the lower point where those studies were conducted, do you?

A I don't have any specific data that shows that there is improvement of water quality by that swale; however, I have never seen a vegetated swale that hasn't provided some sort of improvement in water quality or treatment.

Q SDS 3 exists at a point in the stormwater system that's beneath the filter strips at the runway?

A The monitoring point for SDS 3 is below or downstream of the filter strips; correct.

Q So the water leaving the runway runs across the filter strips, works it way down to SDS 3?

A That's correct.

Q Then flows out through this vegetated swale?

A That's correct.

Q Are you familiar with a provision in Ecology's new stormwater management manual for Western Washington that discusses basic biofiltration swales?

A That document is a very large document, and I've reviewed it in very general terms. I can't recall now any specific provision.

Q There's a provision that states that - and this is on page 9-2 - swales downstream of devices of equal or greater effectiveness can convey runoff, but should not be expected to offer a treatment benefit.

A I don't have that document in front of me, so I don't know what it says or doesn't say.

Q It's Exhibit 1266, page 9-2, towards the back.

MS. COTTINGHAM: What volume?

MR. POULIN: It's in volume 5. Runoff treatment BMPs. Are we all there?

Q (By Mr. Poulin) Do you see the sentence now in limitations, swales downstream of devices of equal or greater effectiveness can convey runoff, but should not be expected to offer a treatment benefit?

A I see that statement.

Q Doesn't that statement suggest that the swale at SDS 3, which is downstream of filter strips, should not be expected to offer a treatment benefit?

A That's what it says, but I'm not sure that I agree with it.

Q Now, with respect to the stormwater management manual for Western Washington, I'd like to direct your

attention to a condition in the permit. That's Exhibit 3, permit condition S12, which you will find on page 37.

Now, this condition states that the permittee is required to submit an updated Stormwater Pollution Prevention Plan to the Department at least twice during the term of the permit and, specifically, an updated SWPPP shall be submitted no later than November 30th, 1998, and again with the application for permit renewal required in general condition G7.

Now, that second updated SWPPP has already been submitted along with the application for permit renewal; is that right?

A I believe that's correct.

Q Now, look at provision S12.B-5, which you will find at the top of page 39.

MR. REAVIS: Actually, it starts on the bottom of page 38 in my copy.

MR. POULIN: Yes.

Q (By Mr. Poulin) On the top of page 39, it states that BMPs shall be selected from the most recent published edition of the stormwater management manual, or other manuals determined to be equivalent by the Department, available at least 120 days before the selection of BMPs.

A Yes, I see that statement.
Q Now, the data selection of BMPs was the date that the SWPPP was submitted; isn't that right?
MR. PEARCE: Objection. Calls for a legal conclusion.
MR. POULIN: This witness has been testifying to legal conclusions all along, and it simply calls for an interpretation of the permit, which is what he does for his job.
MS. COTTINGHAM: Your question was the date submitted?
MR. POULIN: Yes. It involves the identification of BMPs.
MS. COTTINGHAM: Can you restate your question. I thought you were asking him a question about the date the permit was submitted.
Q The question involves the date that the updated SWPPP was submitted, and do you know when that date was?
A It was either in December of 2001 or January of 2002, I believe.
Q In fact, the Stormwater Pollution Prevention Plan has its date indicated as December 19th, 2001; isn't that right?
MR. PEARCE: Could you show us what you are referring to there, Counsel?

MR. POULIN: Sure. It's the exhibit. It's Exhibit 425, the second revision of the Stormwater Pollution Prevention Plan, dated December 12th, dated on its face December 2001 and signed on December 19th.

MS. COTTINGHAM: What exhibit are you in?

MR. POULIN: 425.

MS. COTTINGHAM: Mine says November '98. Am I in the wrong place?

MR. POULIN: No. That's the original date, and you will see there are two revised dates identified beneath that, two revision dates.

Q (By Mr. Poulin) So would you agree that this Exhibit 425 is the updated, revised SWPPP that was submitted with the permit application in December?

A Yes, I would.

Q And would you agree that this SWPPP was submitted more than 120 days before the new Ecology stormwater management manual took place?

MR. PEARCE: Objection. No foundation.

MR. POULIN: We have had testimony, Your Honor, about the implementation date of Ecology's manual.

MS. COTTINGHAM: I'm going the sustain the objection. The legal interpretation of this particular sentence is one that the Board will make a

determination, what 120 days refers to.

MR. POULIN: Well, I'd like to question the witness concerning his understanding.

MS. COTTINGHAM: You may ask him questions.

Q (By Mr. Poulin) Isn't it true that in your understanding, the Port's next reissued NPDES permit will not have to comply with the new, Ecology's new stormwater management manual for Western Washington?

MR. PEARCE: Objection. Calls for speculation. He doesn't know what the Ecology is going to require on a permit that's not even been issued yet.

MR. POULIN: That issue is resolved by terms in the existing permit, which we just looked at.

MS. COTTINGHAM: You can ask him his understanding.

MR. POULIN: Thank you. Which is what I just did.

Q (By Mr. Poulin) Isn't it true that in your understanding, the Port's next reissued NPDES permit will not have to comply with Ecology's new stormwater management manual for Western Washington?

A I don't have an understanding of what the next NPDES permit will have to comply with.

MR. POULIN: No further questions.

MS. COTTINGHAM: Any redirect?

MS. MARCHIORO: No.

MR. PEARCE: Yes, very briefly.

EXAMINATION

BY MR. PEARCE:

Q Mr. Smith, would you look at Exhibit 1094, which is the --

MS. COTTINGHAM: What color is the binder?

MR. POULIN: It's Exhibit 3.

MR. PEARCE: It's also Exhibit No. 3, so you can look at either one of those.

MS. COTTINGHAM: Which I have in front of me.

Q Could you look at page 8 of 52.

MR. POULIN: This is the permit.

Q Would you identify that exhibit for us, Mr. Smith.

A This is the Port's current NPDES permit.

Q And on page 8 of 52, could you read us the first sentence under S1, starting "Compliance with."

A Compliance with this permit is deemed compliance with the Federal Water Pollution Control Act, also known as the Clean Water Act, 33 USC Section 1251 and the Water Pollution Control Act, RCW 90.48.

MS. COTTINGHAM: I thought you said we were on Exhibit 3.

MR. PEARCE: Did I misspeak? Did I turn to

the wrong exhibit? I'm in Exhibit 1024. I believe Mr. Poulin said it that Exhibit 3 is the same exhibit, which is the national pollution discharge elimination system and water discharge permit.

MS. COTTINGHAM: I'm not sure that 3 is the same, at least the pages aren't.

10, what did you say?

MR. PEARCE: 1094 is the one that I know is the correct document.

MS. COTTINGHAM: Page 8, did you say?

MR. PEARCE: Yes.

MS. COTTINGHAM: It's not the same as Exhibit 3.

MR. PEARCE: Thank you, Your Honor.

MS. COTTINGHAM: Can you repeat your question so that we're all together.

Q (By Mr. Pearce) Could you read that sentence, which is the third sentence under paragraph S1 again for the Board, please.

A Compliance with this permit is deemed compliance with the Federal Water Pollution Act, also known as the Clean Water Act, 33 USC Section 1251, and the Water Pollution Control Act, RCW 90.48.

Q Thank you.

Mr. Poulin asked you some questions about Exhibit

426; do you recall that?

A Yes.

Q If I could find my copy, I'll ask you a question as well here.

Could you turn to page 33 of that document, please. Does it show there when the stormwater samples were collected?

A Yes. It gives a list of specific dates for both Miller and Des Moines Creek showing when samples were collected.

Q What is the range of dates there?

A Like Miller Creek, December of '95 through December '96; Des Moines Creek from May of '96 through November of '97 or, excuse me, November of '96.

Q Have additional BMPs been -- well, let me ask you. When did you start your work at the Port of Seattle, at the airport?

A I started in September of 1999.

Q Do you know if additional BMPs have been installed at the airport since the dates of these samples?

A Yes. I believe some additional BMPs have been installed since then.

Q Would you look at the next page, the top of the page at page 34, top paragraph, what does that describe, if you are familiar with it?

A It describes how the samples were collected.
Q And I believe you told us yesterday how the samples were collected. Could you remind us what the average -- of the time periods over which the samples were collected and how they were averaged.

MR. POULIN: Objection. The reference to averaging assumes facts not in evidence.

MR. PEARCE: He testified to that yesterday, Your Honor. I believe a foundation was laid.

MS. COTTINGHAM: I'm going to allow the question.

A The samples were collected by a method called flow-weighted composites, where a series of samples are collected and then combined to show an average value for the constituents of concern over a specific storm event.

And as storm events vary in both intensity and duration, typical flow-weighted composite samples might reflect a time period in the range of, say, a half a day to several days.

MR. PEARCE: Thank you. That's all I have on redirect.

MS. COTTINGHAM: Any Board questions?

You are excused, Mr. Smith.

Go ahead and call your next witness.

MR. PEARCE: We call Dr. Charles Wisdom.

CHARLES S. WISDOM, Ph.D., having been first duly sworn upon 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, Dr. Wisdom. Could you state your name and spell your last name, for the record.

A My name is Charles S. Wisdom. My last name is spelled W-i-s-d-o-m.

Q And what is your -- could you describe for us, briefly, your professional education.

A I have an associate of arts degree in biology from Orange Coast College; a bachelor of arts degree in biology from the University of California, San Diego; and doctorate in chemical ecology from the University of California, Irvine. I also did a three-year postdoctoral scholarship at the University of California, Los Angeles.

Q Did you submit written direct testimony in this matter?

A Yes, I did.

Q And is your curriculum vitae attached at tab A to your

testimony?

A Yes, it is.

MR. PEARCE: I would note for the record, Your Honor, that a copy of his resume is stipulated in Exhibit 1023.

Q (By Mr. Pearce) Could you, again, briefly tell us about your work history in water quality.

A Certainly. After completing my doctoral studies, I worked as a professor at the University of New Mexico, where I was responsible for conducting research into the impacts of natural and manmade chemicals on ecological processes, both in terrestrial and aquatic settings.

Following working at the University of Mexico, I moved to the Northwest and started working in areas of -- I established and ran a laboratory that did whole effluent toxicity testing. I actually established a laboratory and gained accreditation with the state of Washington.

Q Would you slow down a little bit so the court reporter will not throw things at us.

A So I established, created and ran an accredited laboratory, conducted whole effluent toxicity testing, and then also, the last six years working at Parametrix, I've been involved in doing risk assessment

for aquatic systems and looking at the impacts of anthropogenic discharges from wastewater systems and from stormwater systems, and impacts on aquatic organisms and most particularly endangered species.

My familiarity with this particular project is I was an author on the biological assessment which received concurrence from the National Marine Fisheries Service in doing the toxicological analysis of stormwater discharge.

Q Thank you, Dr. Wisdom.

I don't want to go through everything in your testimony, but there's a couple of exhibits I would like to highlight.

Could you explain to the Board what whole effluent toxicity testing is.

A Certainly. Whole effluent toxicity testing is a process that was created by the U.S. Environmental Protection Agency and has been adopted by the Department of Ecology as a method for determining the toxicity of the whole effluent.

Its value in terms of determining the impact is a test of all the constituents that are present, rather than looking for any one individual constituent. It determines the complete mixture of materials that are present and what's being discharged and measures the

response of the organisms that are exposed over specific specified time periods for either determining acute mortality, whether the material causes death or chronic mortality, or chronic effects, whether it causes reduction in growth and survivorship.

Q What's your understanding of how it relates to water quality standards?

A It's part of the narrative standard in terms of determining, and the state of Washington has adopted as part of their NPDES permit process whole effluent toxicity testing to determine whether or not there's a need for assignment of effluent limits, for example, and also determine whether the effluent itself causes toxicity to the organisms that are representative of the receiving environment.

Q And without getting too technical, and I know that if you are talking to me, too technical comes pretty soon, but how does whole effluent toxicity testing measure the presence of contaminants in water?

How does it work?

A Okay. The material is collected, brought into the laboratory in a set time period and then put into a series of dilutions, so you first start off with the undiluted or the hundred percent effluent, and then create a series of dilutions into cups under controlled

environments where there's controlled temperature and lighting.

Then organisms are introduced into those environments, and then certain measurements are made daily to determine the response of either fish or invertebrates.

Q What, in your view, is the benefit of assessing the whole effluent?

A Again, it shows the response of the complete material that's being discharged to the environment, so oftentimes there can be interactions between chemicals, the effect can be greater than the sum of the whole, or it can be antagonistic, so whatever the levels of complexity, it shows the complete response to all the materials that are being discharged.

Q Can I ask you to look at Exhibit 1169.

A I have it.

Q Just to back up a little bit, do you know whether the Port of Seattle at the airport is required to conduct whole effluent toxicity testing?

A Yes. It is my understanding that they are.

Q And do you know what this exhibit is?

A This exhibit is a report of the stormwater whole effluent toxicity. This is a final report issued in May 2000.

Q Have you reviewed this report?
A Yes, I have.
Q Did you incorporate that review into the biological assessment you mentioned earlier?
A Yes, we did.
Q Could you identify Exhibit 1175 for us.

MR. PEARCE: For the record, I would say there are excerpts of the biological assessment in other exhibits, but I believe this is the full copy.

Q Could you identify this for us, please.
A Yes. This is the --

MR. POULIN: Your Honor, if we might hold for a moment. We may have a pending objection to this exhibit.

MS. COTTINGHAM: Why don't we stop the clock for a second.

MR. STOCK: Your Honor, ACC will object to this on the grounds of hearsay.

MS. COTTINGHAM: The burden shifts back to you according to our earlier...

MR. PEARCE: Thank you.

Q (By Mr. Pearce) Have you reviewed this document, Dr. Wisdom?

A Yes. I assisted in its preparation.
Q What portion did you assist in preparing, all of it or

just portions?

A I was responsible for editing the entire document. I was also responsible for personally writing several sections in chapter 7 related to the toxicological analysis of stormwater discharge done before it.

Q Was this document submitted to federal agencies?

A Yes, it was.

Q Is this the type of document you normally rely on in your professional practice?

A Certainly. It's a very complex biological assessment, but it's a very complex project.

MR. PEARCE: Move for the admission of 1175.

MR. STOCK: Well, with respect to the sections that Dr. Wisdom can point to that he wrote, they may be able to overcome the hearsay objection. But with respect to the balance of the document, it is still hearsay, and they are offering it to the prove the truth of the matter asserted in the document.

MR. PEARCE: That complies with the Board's hearsay rule. What it has to be to satisfy the Board's rule is it has to be the type of document that a reasonable person would rely on in the conduct of their affairs, and this is exactly that.

This was the biological assessment prepared by the Federal Aviation Administration and Port of Seattle to

submit with respect to this project, to submit to the United States Fish and Wildlife Service and to the other federal agencies with respect to the stream impacts of this project.

It's the type of document that he relies on in the conduct of his affairs. The Board can give the sections what weight the Board believes they deserve.

MR. STOCK: Well, with respect to whether he can rely upon it as an expert or not doesn't get over the hearsay objection. I agree under the evidence rules that experts can rely upon evidence that would otherwise be inadmissible. That doesn't get over the fact that it's still hearsay.

It also doesn't matter that it was prepared by the FAA or the Port of Seattle. That's why it's hearsay. If there are sections of this document that Dr. Wisdom prepared and he can point to those sections and say, these are my words and I'm here to tell you these are my words, then they can overcome the hearsay objection with respect to those sections of the document, but with respect to the balance of the document, they are offering it to prove the truth of the matter asserted, and that's hearsay.

MR. PEARCE: It complies with the Board's --

MS. COTTINGHAM: I'm going to allow this in.

This is type of record that people usually rely on, and for that reason, I'm going to overrule the hearsay objection.

MR. PEARCE: Thank you, Your Honor. And I would ask if ACC would confine themselves -- I believe we stated that one attorney will do cross-examination of a witness and one attorney will put on a witness.

MR. STOCK: What's the problem there?

MS. COTTINGHAM: One per party. We asked to have the lead person.

MR. STOCK: Could we start clock again, please.

MS. COTTINGHAM: Stop the clock for a second. I'm going to clarify my ruling. We're going to allow this in based on the fact that the Board generally relies on this type of evidence and based on the Board's rule for allowing this in.

MR. PEARCE: Thank you, Your Honor.

MS. COTTINGHAM: You can start clock now.

Q (By Mr. Pearce) Could you just briefly describe to us, Dr. Wisdom, the results of the whole effluent toxicity testing, and if you need to refer to the biological assessment and the discussion in there, feel free to.

A Thank you.

Q Actually, I believe it's in table 7-15, is it not?

A Yes. That's the one I would like to refer to page 7-15, or excuse me, table 7-15 on page 7-25.

MR. POULIN: Which exhibit?

THE WITNESS: In 1175.

MR. LYNCH: Can you say the page number one more time.

THE WITNESS: It's 7-25.

MR. LYNCH: Thank you.

A You can see that this particular test goes through and has examined the stormwater outfalls on a series of dates for SDN 1, SDN 4, SDS 3 and SDE 4 using two different types of organisms.

It used the Daphnia pulex, which is a water flea. That's an invertebrate. Its importance, in part, is -- it's actually one of the more sensitive organisms to metals. So it's considered one of the driver organisms for water quality criteria for metals, particularly copper.

The Pimephales promelas is a fish. It's a fathead minnow.

So both of these tests, you can see the durations were done for 48 hours and 96 hours. These are acute tests, and we can see going across the various columns of data that we have the NOEC, that's no observed effect concentrations, so that's the highest

concentration at which the effluent caused no effect to the exposed organisms.

So you can see, for example, with SDS 3, which is of importance, because this is the outfall for which currently, my understanding is, drains the runways, and is assumed to be of the same effluent quality as the future runways.

You can see there that the NOECs, the concentration of which there was no adverse effect on the organisms for either the water fleas or for the fat-heads was at a hundred percent. That's pure undiluted effluent that they were exposed to. And at the LOEC, the lowest observed effect concentration, was greater than 100 percent, which is essentially saying that there is, the response of the animals in the unpure, undiluted effluent is identical to that of the control animals that are in pure laboratory water.

Q And were there some adverse results in SDN 1?

A Yes, there was. You can see that on three cases.

On March 24th, 1999, there was detectible toxicity for the fathead, and then also on two separate dates -- excuse me. The '99 one I was referring to was for the water fleas. Then two days to the fathead minnows.

Q Do you know if the Port did any testing to see where that toxicity came from?

A Yes. They did source tracing and were able to identify that there was elevated zinc concentrations in the samples that were coming from a galvanized roof, and they have actually undertaken, through the course of having done the forensic bioassay testing been able to identify and undertake methods to start addressing how to reduce that.

Q And SDN 1 eventually goes to Lake Reba, doesn't it?

A Yes.

Q If I could switch gears a little bit, were you present during Dr. Strand's testimony?

A Yes, I was.

Q Did you hear him make reference to the Ontario sediment guidelines?

A Yes, I did.

Q Are you familiar with those guidelines?

A Yes, I am. I have reviewed them.

Q Does the state of Washington have any -- well, what do they talk about?

Are they more metals and sediments?

A Yes, they are, specifically freshwater. Freshwater sediments.

Q Does Washington have any freshwater sediment guidelines?

A Not at this time.

Q Has the scientific literature discussed those Ontario sediment guidelines?

A Yes. There's, basically, an outstanding criticism of the methods that were used to derive the Ontario sediments guidelines and the fact that they are taken from observations of organisms in the field that had multiple sources of contamination present in those sediments.

So consequently it's not possible to derive direct cause and effect relationships between what you've measured and the response of the organisms that are present or not present in those sediments.

Q Is it possible for metals and sediments -- well, why don't you explain to us how metals get bound in sediments.

A There's --

Q Without too much chemistry. Thank you.

A Well, the specific concept is that the sediments themselves typically have a negative charge, and the metals that we're dealing with here are positively charged, so they form an ionic bond, and they will equilibrate into what's referred to as the interstitial pore water, but also present in the interstitial pore water can be the acid volatile sulfide, which is basically a decomposition product from organic matter.

So sediments that have organic matter as they decompose, they release sulfur that has become sulfides. The sulfides bind with those metals. They are also negatively charged. They bind with positively charged metals and reduce their bioavailability, so consequently people now are measuring acid volatile sulfides at the same time as measuring metals concentrations to make a determination of whether those metals are bioavailable to the organisms in the sediments.

Q And what does it take to redissolve those metals, get them out of the sediments and back into the stream in a dissolved state?

A Well, first off, the metals concentrations that you measure are typically in equilibrial already in terms of what's in the water column versus what's in the sediments.

In order to do -- the resuspension, typically, would take relatively strong acid exposure, something probably on order of like a pH 3 or pH 2 in order to have a significant resuspension or resolving of that material.

You, basically, have to replace the metals where they are binding with the protons in the acidic material, so they have to competitively interact, so it

takes fairly strong acids in order to redissolve them.

Q Could you give us an idea of how common a pH 3 or pH 4 is in streams in Western Washington.

A Very uncommon. Typically, the only time it would occur would be the result of some form of a spill.

Q Could you give us your opinion about whether these types of particle-bound metals can cause toxicity in fish.

A Dr. Strand alluded to, in his testimony, in my opinion, the fact that one source of toxicity could be that fish could consume particle-bound material, particularly that would be bound to organic material.

However, this is only a theoretical exposure pathway, and I was reviewing a recent paper that was published in 2001, and not a lot of evidence is available one way or the other to indicate this is a source of toxicity, but there was a recent publication that was brought to my attention, published in 2001, that showed that metals -- it was specifically a study of copper with rainbow trout -- that there was no discernible change in survivorship or growth --

MR. STOCK: Your Honor, I'm going to object to this testimony, because there's no foundation. He hasn't give the name of the reference that he's referring to.

MS. COTTINGHAM: Do you want to lay a foundation.

Q (By Mr. Pearce) Could you refer us to the study that you are discussing, Dr. Wisdom.

A It was a specific paper that was published in the Canadian Journal of Fisheries & Aquatic Sciences.

Q Do you recall the author?

A I'm afraid I don't.

MR. STOCK: Then I'll object to any further testimony on this.

MS. COTTINGHAM: I'm going to sustain that.

Q (By Mr. Pearce) You don't know when it was published?

A In 2001.

Q Is that journal published quarterly or annually?

A It's published monthly.

MR. STOCK: I have a continuing objection. There's no foundation. There's no way to cross-examine this witness unless a proper foundation is laid.

MS. COTTINGHAM: I'm going to sustain the objection.

MR. PEARCE: If I could ask one more question.

Q (By Mr. Pearce) Do you have a copy of that article?

A Yes, I do. In my car.

Q Perhaps we can get it after a break.

MS. COTTINGHAM: Perhaps we could. Might this be a good time for a break?

MR. PEARCE: Yes, I think so.

MS. COTTINGHAM: While we are on the break, why don't you see if you can share the document.

MR. PEARCE: We'll get a copy somewhere.

MS. COTTINGHAM: We'll go off the clock and off the record. Why don't we come back at a quarter after 11.

(Recess taken.)

MS. COTTINGHAM: We are back on the record.

MR. STOCK: Ms. Cottingham, Dr. Wisdom did provide the reference, so I'll withdraw the objection.

MR. PEARCE: Thank you, Your Honor. Thank you, Mr. Stock.

EXAMINATION (Continued.)

BY MR. PEARCE:

Q Dr. Wisdom, do you have an opinion about whether particle-based metals can caused toxicity?

A Yes, I do.

Q What is that opinion?

A Based on the material that's been passed out by the Kamunde, et al. reference that concentrations as high as 1,000 micrograms per gram copper in dietary food

would not cause any effect on the growth or the survivorship or mortality of exposed rainbow trout.

Q Thank you.

I'd like to talk briefly about glycols. Has the EPA promulgated any water quality criteria for glycols?

A No, they have not.

Q How about the state of Washington, have they promulgated -- has the state promulgated any criteria?

A No, they haven't either.

Q Are glycols toxic themselves?

A Yes. But only at very high concentrations.

Q Are there other constituents in them?

A Right.

Q Let me re-ask that question. Why are glycols or de-icing agents a constituent of concern, then?

A They are a concern specifically because of their use for anti-icing and de-icing. The formulations that are used are typically around 40 to 50 percent glycol, either a propylene or ethylene glycol, and then another 40 or 50 percent water.

And anywhere from about 1 to 10 percent can be a series of additives that increase their emulsion so that they will stick to the planes and so on, and it's the additives that are thought to contribute to the toxicity.

Q Are there are different types of glycol mixtures used for de-icing aircraft?
A Yes, there are. As I said, there's type I. Type I can be primary either ethylene glycol or propylene glycol. That's the primary compound used for de-icing. Then there's a type II and type IV that used for anti-icing. Those are applied to planes. They have a higher viscosity so that they will stick to the plane to inhibit the icing after the plane leaves the ground.
Q Which types are more toxic?
A The type II and type IV. The anti-icing compounds typically have a higher toxicity, about five to 20 times more toxic than the type I.
Q And I believe you said you wrote chapter 7 of the biological assessment?
A Chapter 7, yes. The section dealing with ethylene glycol and propylene glycol, in particular.
Q Do you know what percentage of these different types of glycols are used at the Seattle-Tacoma International Airport?
A Yes. I'd like to refer to a specific page, if I may.
Q Certainly. It's in Exhibit 1175, in chapter 7 somewhere.
A Yes. It's on page 7-18 in Exhibit 1175, table 7-7. It's that little thin table at the top of the page.

Q If you would explain what types are used.

MR. JENSEN: What page are you on?

THE WITNESS: 7-18.

MR. JENSEN: Thank you.

Q (By Mr. Pearce) And which table are you referring to there?

A Table 7-7.

Q Is that at the very top of the page?

A Yes.

Q Could you tell us what the percentage of type I and type II and IV glycols are in use at the airport.

A You can see that approximately 99 percent of the glycols fall into the type I or anti-icing -- de-icing, excuse me, the de-icing formula. 4.1 percent is ethylene glycol, 94.8 propylene glycol, and the type II propylene glycol constitutes about .8 percent of the anti-icers that were applied, and type IV propylene glycol was .2 percent.

So combined, type II and type IV, approximately, make up 1 percent of all the de-icing/anti-icing fluids applied at the Seattle-Tacoma International Airport.

Q And this section of the biological assessment, you did all the work for; is that correct?

A That's correct. I was assisted with staff, but I was the primary author on this section.

Q Did you make any conclusion in here about the glycol impact to habitat in the area streams?
A Yes, we did.
Q What is that conclusion?
A The conclusion was that the concentrations of glycols that have been measured in the Miller and Des Moines Creek are below, significantly below those levels that are identified to cause mortality to exposed organisms, and you can see there in table 7-8, you can see where we reiterated data that was taken from the fluid manufacturers supplied to the EPA for the LC-50s. Those are values that will kill 50 percent of the animals that are exposed to that concentration, and you can see for type I and type II, they are very high. They are anywhere from 750 to 44,000 milligrams per liter.
Q And milligram --
A That's getting --
Q Go ahead, please.
A That's getting to the point where you are actually making up percentages of the water. That's very, very high.
Q Have you seen any glycol testing at the airport that is in those percentage ranges?
A No. None of the data that has been presented to me was

anywhere near that range.

Q Have you reviewed the data submitted in this proceeding by ACC?

A I have.

Q Is it in that percentage range?

A No, not in the percentage. It's actually reported as total concentrations.

The data that I was presented at Dr. Strand's deposition, which was submitted then, showed that the propylene glycol, if I remember correctly, was 11 milligrams per liter and 18 milligrams per liter on two separate dates. So that's orders of magnitude hundreds of times lower than the amount that would be reported here for the type I or type II in order to cause mortality for the exposed organisms.

Q Are you familiar with the Hartwell study relied on by Dr. Strand?

A Yes, I am. I read it several times.

Q Do you have any criticisms of that study?

A Yes. Hartwell attempted to do two things. First off, they reported experimental laboratory data, where they exposed fathead minnows, the same organisms we're talking about here, to different concentrations and observed, if I remember correctly, the numbers were 17 milligrams per liter for type II propylene glycol and

250 milligrams per liter for type I ethylene glycol that caused lesions on the gills of the exposed fish.

Now, that's the experimental data that Hartwell can provide. Hartwell then went on to quote a different paper by a different author that he claimed showed that those levels caused toxicity, caused mortality, killed the animals that were exposed, but that citation was incorrect. It was off by a factor of a thousand, so rather than saying 1.9 to 8 milligrams per liter propylene glycol killed fish, actually the number should have been -- I have it in my direct testimony, the exact numbers. They were in the thousands.

Q The Board can read your direct testimony in the interest of time. Thank you.

A But I confirmed that by calling Dr. Fisher on the phone and spoke with him directly, and he confirmed to me over the phone; (1) he was unaware of Hartwell, so he actually he had to read it and call me back, and upon calling me back, he informed me that he had been cited incorrectly and the numbers were a thousand times higher.

So what Hartwell failed to do was establish any linkage between gill lesions and mortality.

Q Are you familiar with any EPA studies about de-icing agents?

A Yes, I am.
Q I'm sorry. Any EPA reports about de-icing.
A That's actually what I was referring to was their summary report.
Q And how many different studies did the EPA report in that?
A There's several hundred that are reviewed for toxicity to a wide variety of organisms.
Q And were those reports consistent with your conclusions in the BA?
A Yes, they were.

MR. PEARCE: I don't have any further questions. Thank you.

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

MR. YOUNG: I do not.

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

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

MR. POULIN: Yes, I do.

EXAMINATION

BY MR. POULIN:

Q Good morning, Dr. Wisdom.
A Just barely.

Q Just barely.

Did you testify about your involvement in the biological assessment, which is Exhibit 1175?

A Yes, I did.

Q That assessment was performed to address concerns related to the Endangered Species Act; isn't that right?

A That's correct.

Q And the primary endangered species were chinook salmon and bull trout?

A That's right.

Q And isn't the current understanding discussed in the report that chinook salmon and bull trout used the mouth of Miller and Des Moines Creek?

A That is right. That is the conclusions of the biological assessment.

Q And so we see on page -- this question focuses on the level of copper at the mouth of the streams?

MR. PEARCE: Objection. Vague. I'm not sure what counsel is referring to.

Q Let's briefly look at page 7-22 of that exhibit, that biological assessment. That's 1175. It says copper concentrations at the mouth of Miller and Des Moines creeks are always below the brook trout copper toxicity value.

A That's right.
Q That was their primary concern is copper at the bottom of the basin?
A Right. Without exposure, there isn't any risk.
Q Now, you stated that you were involved both in the WET testing and in the preparation of this biological assessment?
A I was involved in reviewing the WET testing. I did not perform it.
Q But you were responsible for summarizing the WET testing in the BA?
A That's correct.
Q And you did so here on page 7-25, table 7-15?
A That's correct.
Q Now, this is not a table that you pulled out of the WET testing report, is it?
A This table was provided to me by the staff that actually had conducted the WET testing, so these were the staff members I was working with at Parametrix in preparation of the biological assessment.
Q And this discussion of the results of the WET testing in the BA, this does not identify the copper concentrations in the stormwater outfall, does it?
A No, it doesn't.
Q It doesn't discuss the number of samples conducted for

the WET test?

A Each one represents an individual sample, so each date there was a sample collected.

Q Well, let's look at the WET test itself, Exhibit 1169.

We've been there before, but please turn to page 13 of the stormwater whole effluent toxicity final report, Exhibit 1169.

A I have it in front of me.

I'm sorry. Does the Board?

MR. PEARCE: I'm sorry. I may have misunderstood you. What page?

MR. POULIN: Page 13.

MR. PEARCE: Oh, sorry.

Q (By Mr. Poulin) This indicates that the tests for SDS 3, the outfall below the runways, those tests were conducted on just two dates; isn't that right?

A That's right.

Q November 13th, 1998 and January 14th, 1999.

A The samples were collected on those dates.

Q It doesn't say how many samples?

A No, it does not. However, the testing methodology specifies the amount to be collected in order to be able to conduct a successful test.

Q And this doesn't report the concentration of the copper in the outfall discharge either, does it?

A On those dates, no, it does not.

Q While we have that information, let's look at it.

Please turn to Exhibit 139. It's the 1999 annual stormwater monitoring report.

Once you find the 1999 report, please turn to the spreadsheet at page 109, and once there, you will see that the results of WET testing sample data for SDS 3 are reported in the row at the center of the page.

Would you agree this spreadsheet indicates that the copper sample taken on November 13th, 1998 showed a value of 0.014?

A That's for the dissolved copper.

Q That's right.

And for the trace copper, it's 0.022.

A Total recoverable.

Q Total recoverable.

A The TR, I would interpret TR as total recoverable copper, yes.

Q Now, just comparing those two figures, does that indicate to you that more than half of that total recoverable copper was dissolved?

A Yes.

Q Now, those figures were not reported in either the WET report or in the biological assessment; is that right?

A That's right.

Q Now, let's look at the other sample date for SDS 3, and we'll find that in the year 2000 stormwater monitoring report, which is at Exhibit 1193.

And once you get to that report, the year 2000 report, Exhibit 1193, please turn to page 98, which is another spreadsheet.

A Page 98, is that what you said?

Q Yes.

A It's blank in this exhibit.

MS. COTTINGHAM: It's blank in our exhibit, too.

MR. POULIN: Well, I hope that's not a problem. If it is --

MS. COTTINGHAM: It's been copied. It has page 98 on it.

MR. POULIN: Well, I am looking at page numbers that are very small and are on the right side of the page.

MS. COTTINGHAM: Ours are actually fairly big.

MR. POULIN: Okay. Then you'll need to scroll back into what would be the mid-60s. I see a page 86, and then the bottom page numbers disappear.

MS. COTTINGHAM: Okay. They look like they say 87.

MR. POULIN: If you crank your head a little to the right side, you will see tiny numbers in the middle of the right-hand side.

MS. COTTINGHAM: Now, what are we looking for, again?

MR. POULIN: We're looking for page 98. In the top, the upper right side, it says page 2 of 10.

MR. STOCK: Could we stop the clock while we do that?

MS. COTTINGHAM: You may.

It ends at it -- those little numbered pages end at 94, and then it goes to 95, and it says appendix D, but it's a blank page and then 96 is blank. Then there's a little page that's 97.

MR. POULIN: Okay. We're in what would be appendix C, so that's confusing. The blank for appendix D says -- but we're earlier in the report than that, in what is appendix C.

I'm sorry. I misspoke. Apparently, appendix D starts at page 62. It's one of those reports with no tabs. I think we're in appendix B, yes, because appendix C is at 85, and we're before that.

MS. COTTINGHAM: Could we have made these numbers any smaller?

I've got a 97, or something 7.

MR. STOCK: Just for the record, this is a Port exhibit.

MS. COTTINGHAM: This says 4 of 11. What did you say at the top?

MR. POULIN: We want 2 of 10. I counted nine pages before the tab for appendix C that looks like page 85.

MS. COTTINGHAM: Nine pages before that?

THE WITNESS: It looks to me like it says 76 at the bottom of that. It's 10-4-00.

MR. POULIN: Perhaps it does. You are quite right. It is 76, and in fact, that's what my notes say. I just read it wrong. Page 76, 2 of 10.

MR. PEARCE: For the record, those were Mr. Poulin's notes.

MS. COTTINGHAM: 2 of 10, is that what you said?

MR. POULIN: Yes.

MS. COTTINGHAM: Well, it's a miracle.

Q (By Mr. Poulin) In the upper left, it should say, all composite sample data.

A I'm sorry. I didn't hear that. Can you repeat it, please.

Q The heading in the first column is, all composite sample data.

Now, if we look all the way down to the bottom, the fourth to the last row -- and this is admitted, a long series of samples from SDS 3 -- you will see in the second column, SDS 3, 01-14-99, and that's the January 14th, '99 sample for the WET test, and if we jump all the way to the far right, it says, concurrent WET NWER sample.

A I see that.

Q So if we look to the results of copper on that date, it says 0.023.

A That's how I read it.

Q So one might ask how representative are those copper concentrations when compared to the typical concentration of copper discharged at SDS 3, and if you will join me in looking to the latest annual stormwater monitoring report, which is Exhibit 6, you can find that comparative data.

And in the year 2001 report, please turn to page 106. It should be much easier to find, page 2 of 6.

Now, to summarize so far, we've had -- from the 1999 report of the November 13th sample, we had total recoverable copper of 0.022, and the year 2000 report shows 0.023; is that right?

A I'll have to verify that. I've got to juggle all these things.

Q Have we found page 106?
A I'm sorry. You have to bear with me for a second while I juggle all these.
Q Sure.
A Okay. Which one did you want me to look at?
Q Now, look to page 106 of the latest annual stormwater monitoring report, Exhibit 6, the year 2001.
A Okay.
Q In this report is NPDES composite statistics from September 1st, 1994 through June 30th, 2001, and in the center column of SDS 3, would you agree that the count shows that there are 56 samples.
A 56? I'm sorry. I'm not sure I'm looking at the right one.
Q Nevermind that question. Let's look to the copper, which is the third column from the right.
A Okay.
Q This shows --
A I'm sorry. We're on page 106 of the 2001 report?
Q Yes.
A Okay. I'm there.
Q In the top of the SDS 3 box, the count for copper is 58.
A I see that now. Thank you.
Q Would you agree that reflects 58 samples over the

years?
A Right.
Q And this table shows that the median value for copper was 0.029?
A That's correct.
Q And the 25th percentile is 0.022?
A That's what it says.
Q And the samples that were evaluated in the WET testing were samples of 0.022 and 0.023?
A That's right.

MR. PEARCE: I guess I object. I'm not sure whether we're comparing apples to apples here.

MR. STOCK: I'm going to object to that speaking objection, because that is a speaking objection, and it is suggesting an answer to Dr. Wisdom.

I would request that Mr. Poulin be allowed to conduct his cross-examination without speaking objections.

MR. PEARCE: I'm sorry about the form of the objection if it was deemed improper by the Board, but I guess my objection is to foundation. I don't know --

MR. STOCK: Then I would ask that opposing counsel just assert the objection instead of making a speaking objection.

MS. COTTINGHAM: I'm going to agree with that, so why don't you lay the foundation.

Q (By Mr. Poulin) Well, I believe we've seen the foundation. The 1999 report is labeled trace copper and shows a sample of 0.022 taken on, I'm sorry, total recoverable copper 0.022 on November 13th, 1998.

A You also have to remember that in whole effluent toxicity tests all the elements are present.

Q I'm sorry. There's no question pending.

A Okay.

Q And my question is, doesn't this table, in the year 2001 report, indicate that 75 percent of the samples taken at SDS 3 have higher levels of copper than those used for the WET test?

A Yes. That's what it says.

Q I'd like to direct your attention to the text of the year 2001 report.

MS. COTTINGHAM: Exhibit number?

MR. POULIN: Exhibit No. 6.

Q In the discussion of copper, let's turn to page 33.

Exhibit 6, page 33. We were just in Exhibit 6, and at the bottom of page 33, the carryover sentence states the top 3 SDS 3 copper results all occurred in samples from storms in the month of August after an extended dry period of two weeks to 33 days in 1996, 1998 and

2000.

Did I read that correctly?

A Yes.

Q Now, the WET tests were not performed under those August conditions, were they?

A No, they weren't.

Q I'd like to ask you about the criticism you made of the sediment sampling and the conclusions drawn by Dr. Strand.

You did not perform any independent analysis to verify the concentration of trace metals in the sediments of Miller Creek, did you?

A Total recoverable metals? You said trace metals.

Q I'm sorry. Total recoverable metals.

A No, we didn't.

Q So you have no opinion on the accuracy of Dr. Strand's sampling?

A No, I do not.

Q And you have no basis to dispute his report that there are significant amounts of metals accumulating in those sediments?

A Yes. My criticism was to dispute the fact that he could draw no conclusion as to bioavailability, because he did not make measurements of acid volatile sulfides, so therefore in terms of any kind of toxicological

interpretation of those numbers, you can't draw conclusion, good or bad, about those numbers because you are missing a critical component of that story.

Q And you didn't measure the presence of those acid volatile sulfides either, did you?

A No, we did not.

MR. POULIN: No further questions.

MS. COTTINGHAM: Any redirect?

MR. PEARCE: Very briefly.

EXAMINATION

BY MR. PEARCE:

Q You were asked about the biological assessment. Do you know whether the biological assessment assumes -- do you know what the biological assessment assumes with respect to exposure of bull trout?

A That the bull trout --

MR. POULIN: Objection. Vague.

Q Do you know if it's assumed that they are exposed only at the mouth or if it's assumed that they are exposed at the discharges?

MR. STOCK: Objection. Leading. All he needs to do is ask a nonvague question that isn't leading.

MR. PEARCE: I'll go back.

Q (By Mr. Pearce) Do you know what the biological assessment assumes with respect to exposure of bull trout?
A My recollection is it assumes the exposure of the bull trout is at the mouth of Miller and Des Moines Creek.
Q Mr. Poulin asked you to look at some data in the 2001 stormwater monitoring report. Do you have that in front of you?
A Yes, I do. The same page, page 106, is that what you are referring to?
Q No. Actually, first page of it.

Is that a compilation of data over a number of years?
A Yes, it is.
Q What years are they?
A July 1st, 2000 through June 30th, 2001.
Q No. Let me direct you, then, specifically to --
A I'm sorry. I was reading from --
Q Not from the cover, from the concentration they were talking about.

MR. POULIN: I'm sorry. I'm having a hard time hearing, Mr. Pearce. Could you please repeat.
A Oh, you mean at the top of the page, table 106, where it says --
Q What does it say at the top of 106?

A It says September 1st, 1994 to June 30th, 2001.
Q Yes. So that includes information or tests over that entire range?
A Yes. I presume, based on the way it's written. That's my interpretation.
Q Do you know whether the Port has initiated any new best management practices since 1994-95?
A I have been told they have.

MR. POULIN: Objection. This goes beyond the scope of cross.

MR. PEARCE: You asked him about this table.

MR. POULIN: I didn't ask him about best management practices.

MR. PEARCE: You asked him about the results of this table and about where they came from.

MR. POULIN: You are changing the subject and moving into an area that was not explored on cross-examination.

MR. PEARCE: Your Honor, the subject explored on cross-examination was this table and Mr. Poulin trying to compare this table to 1998 data.

MS. COTTINGHAM: Why don't you lay a foundation for your question.

Q (By Mr. Pearce) Do you understand that this table includes data from 1994 through 2000?

A Yes, I do.
Q And the data in the WET testing, what years was that WET testing done?
A It was done in '98 and '99.
Q Do you know whether there were additional BMPs installed at the Port of Seattle between '98 and 1994?
A Yes, I believe there was.
MR. PEARCE: That's all I have. Thank you.
MS. COTTINGHAM: Are there any Board questions?
Thank you. You are excused.
MR. PEARCE: Would you like to start with Dr. Weitkamp? We have about 20 minutes for him on direct, or would you like to take lunch now?
MS. COTTINGHAM: Why don't we take a lunch break. It's a good time for a lunch break.
Why don't we come back at a quarter after one, 1:15.
MR. PEARCE: Thank you.
(Recess taken.)
MS. COTTINGHAM: We'll go back on the record. And you were going to call your next witness.
MR. PEARCE: Thank you, Your Honor.
We would like to call Dr. Donald Weitkamp.

DONALD E. WEITKAMP, Ph.D., having been first duly sworn upon 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. Weitkamp. Could you give your name and spell your last name for us, please.

A Donald E. Weitkamp, W-e-i-t-k-a-m-p.

Q And you've submitted written direct testimony in this matter; is that correct?

A Yes.

Q Is your curriculum vitae attached as tab A to your testimony?

I think you have it there in front of you.

A Yes, it is.

MR. PEARCE: For the Board's convenience, it's attached at tab A. I would note for the record that it is stipulated as admissible under Exhibit No. 258.

Q (By Mr. Pearce) Does that CV include your representative project experience?

A It includes representative project experience pertinent to this matter.

Q Does it include a list of your publications?
A Yes, it does.
Q Would you give us a brief overview of your relevant educational background.
A I have a bachelor of science in zoology from Washington State University, a master of science in invertebrate pathology from the University of Washington, and a Ph.D. in fisheries from the University of Washington.
Q What has been your role in the Port's master plan project update, the master plan update projects?
A My role has been of reviewing work that was done by Parametrix regarding fisheries habitat, some on water quality and flow, providing advice to people in our firm working on the project and reviewing the documents they produced.
Q Were you here for Dr. Wisdom's testimony?
A Yes, I was.

MS. OSBORN: I'm sorry. I didn't hear the word.

MR. PEARCE: I'm sorry. I asked if he was here for Dr. Wisdom's testimony.

Q (By Mr. Pearce) Do you remember he spoke about the biological assessment?

A Yes.
Q Did you assist in the preparation of the biological

assessment?

A Yes. In the manner that I just described for other parts of the project.

Q Are you familiar with the conditions in the Miller, Walker and Des Moines Creek basins?

A Yes, I am.

Q Could you give us a summary of the existing conditions prior to the beginning of the master plan update projects prior to about 1996.

A The three streams are typical of lowland Puget Sound streams that occur in urban areas. They have been highly modified over the years by the human residents and businesses and agriculture that occurred in the basins. The riparian zones have been primarily changed throughout the majority of the basins. They have had portions channelized, moved. They are relatively typical of those urban streams. They have a reasonably abundant fish life, again, very typical of the species, from what I can tell, in reports done on the basins of the abundance of fish.

Q Are there places in the upper reaches of these streams where they have been moved and altered anywhere?

A Yes. Particularly in Miller Creek, you can tell by looking at the maps going back quite a number of years that the upper portion of the stream typically flows

through straight ditches with right angles or sharp angle turns that are atypical of a natural stream, indicating that it has been placed in a ditch for various purposes.

You can also tell by looking at the topography that Miller Creek is essentially perched a little higher than the lower point within the contours in the basin indicating it was moved sometime in the past, rather than flowing through a natural course.

Q Are any of those areas, where you believe the stream has been moved, are any of these areas on the Port's property?

A Yes. Much of what I just described is on the Port's property.

Q Do you have an opinion about how the Port's master plan update projects will affect these streams?

A Yes, I do.

Q Could you tell us that opinion.

A I believe it will improve the habitat in that upper portion of the watershed, as well as the portion that still retains more natural stream characteristics.

You can see evidence of that occurring today. I was out there in the basin approximately a month ago, and the removal of the residences, the businesses, and the agriculture out of that portion of the basin has

already resulted in substantial changes to the riparian zone, making it obvious that it's returning to a more natural state.

Q Could you describe those changes, briefly, to us.

A It's primarily development of natural vegetation. You can see that in the past people have cut down vegetation that started to grow along the stream banks.

The stumps of saplings and small trees are still evident that have been cut some time ago. Today those things are growing unhindered by human activities.

Places where there was lawn are no longer maintained, starting to revegetate.

Q If I could return you to the biological assessment, do you know whether the biological assessment was submitted to any federal agencies?

A Yes, I do.

Q And what agencies was that?

A It was submitted to the U.S. Fish and Wildlife Service and National Marine Fisheries Service as part of the requirements under the Endangered Species Act for federal action.

Q Did the Fish and Wildlife Service issue a biological opinion?

A Yes, they did.

Q Could I ask you to look at Exhibit 1247. I believe

it's down here.

MS. COTTINGHAM: What number?

MR. PEARCE: 1247.

Q Could you identify this for us, Dr. Weitkamp.

A This is a letter from the U.S. Fish and Wildlife Service to Lowell H. Johnson, Federal Aviation Administration. It deals with the master plan update improvements to Seattle-Tacoma International Airport.

It provides the U.S. Fish and Wildlife Service biological opinion regarding the species that they regulate.

Q Have you reviewed the biological opinion?

A Yes, I have.

Q Do you agree with its conclusions?

A Yes, I do.

Q Is this the type of document that you customarily rely on in your work in the conduct of your affairs?

A Yes, it is. A biological opinion is required for the major projects that we're involved in that involve federal entities.

Q Could I ask you to look at one other document. It's Exhibit 266. Could you identify this letter for us, please.

A This is a letter from National Marine Fisheries Service to the Federal Aviation Administration. Again, it's

dealing with -- it's providing or dealing with the biological assessment for the master plan on Seattle-Tacoma International Airport.

Q Have you reviewed this National Marine Fisheries Service document?

A Yes, I have.

Q Do you agree with its conclusions?

A Yes, I do.

Q Could I refer you to page 13, the section entitled, "Wetland and Stream Habitat."

A I have it.

Q In particular, if I could refer you to the very last paragraph, the sentence that starts, the net effect.

Could you read that to us.

A The net effect of relocating a reach of Miller Creek is expected to be an improvement in water quality and macroinvertebrate and fish habitat in the relocated reach and downstream portions of Miller Creek.

Q Do you agree with that conclusion?

A Yes.

Q If I could ask you to look at one additional document. It's Exhibit 263. It should be in the same book there.

Can you tell me how this document was prepared or by whom or why it was prepared.

A This document is required in the Magnuson & Stevens Act

as part of evaluation of effects of federal projects.

Q And what particular impacts does it address?

A It addresses potential impacts to habitat that supports commercially harvested species.

Q Could I ask you to look at section 6. I apologize for not having the page number handy.

MS. COTTINGHAM: Might it be 6 dash something?

MR. PEARCE: Yes. It begins on 6-1.

Q (By Mr. Pearce) In particular, if I can ask you to look on page 6-3, the section that begins, determination of effects on a central fish habitat.

Have you reviewed this document?

A Yes, I have.

Q Have you reviewed the determination section?

A Yes.

Q Do you agree with the determinations in that section?

A Yes.

Q Could you briefly summarize the conclusions of this section for us.

A Basically, it says that salmon are present, as well as cutthroat throat in Des Moines Creek and Miller Creek.

It says that there is a potential for short-term impacts on coho, but not long-term impacts.

Q In your opinion, what effect will the master plan of

the projects have on stream habitat?

A Over the long term, I expect it to be a substantial improvement in the habitat of Miller Creek, primarily due to things I described earlier.

MR. PEARCE: Those are all the questions I have for Dr. Weitkamp. Thank you.

MS. COTTINGHAM: Mr. Kray?

MR. KRAY: No questions for Ecology.

MS. COTTINGHAM: Cross by ACC.

MS. OSBORN: Thank you. I just have a couple of questions.

EXAMINATION

BY MS. OSBORN:

Q I believe it's paragraph 29 of your prefiled testimony, you compare the Port's low-flow mitigation plan, excuse me, not paragraph 29. Hold on just a moment.

On paragraph 42, on page 14, you compare the Port's low-flow augmentation plan to the multiple storage reservoirs on the Columbia River; is that right?

A What I'm referring to is the water budget program on the Columbia River, which uses multiple reservoirs.

Q Are you talking about the federal hydropower system on the Columbia River?

A The federal hydropower system is part of it. It also

involves private and public utilities.

Q Public and private utilities.

So you are comparing the Port's stormwater, use of stormwater to augment streamflows in Miller and Des Moines Creek to the federal dam, federal and private dams on the Columbia River; is that right?

A No. I'm not comparing the two. I'm saying this concept has been used.

Q Now, are you familiar with the water right permits, the reservoir permits and water right permits that are utilized for hydropower facilities on the Columbia system?

A I have reviewed the licensing. I have not reviewed the water rights.

MS. OSBORN: That's all I have.

MS. COTTINGHAM: Mr. Poulin.

MR. POULIN: Thank you.

EXAMINATION

BY MR. POULIN:

Q Dr. Weitkamp, Rick Poulin for CASE.

Those storage systems on the Columbia River do not involve the use of closed storage vaults, do they?

A Not what I'm referring to, no.

Q Now, you've testified concerning the biological

assessment and the biological opinion, central fish habitat.

Taking those one at a time, the biological assessment was conducted for the purpose of the Endangered Species Act; is that correct?

A That's correct.

Q It did not involve any determination about compliance with state water quality standards?

A I don't recall that it does.

Q And the biological opinion from the U.S. Fish and Wildlife Service, that likewise involved the potential impacts for the three identified species, the bull trout, bald eagle and marbled murrelet, under the Endangered Species Act?

A It does address those, yes.

Q This document does not address the issue of compliance with state water quality standards, does it?

A I don't believe that it does.

Q And the essential fish habitat assessment, this addresses conditions for chinook salmon, coho salmon, and Puget Sound pink salmon; is that right?

A Right.

Q And it's your testimony, as I recall, that they use, if any, part of the SeaTac area streams, the mouths at the bottom of the watershed; is that right?

A I didn't say that, no.
Q You haven't found any chinook salmon or coho or Puget Sound pink salmon in the upper watershed of the Miller Creek and Des Moines basin, have you?
A I have not, no.
Q And this essential fish habitat assessment doesn't address compliance with the state water quality standards, does it?
A No, it does not, to my knowledge.
Q Your opinion that the proposed master plan update actions will not likely adversely effect stream habitat assumes that the proposed mitigation will be implemented and will perform as intended, doesn't it?
A That is one of the assumptions, yes.
Q You've addressed what you described as benefits to the stream from decreased residential use of fertilizers and pesticides; is that accurate?
A That's a part of it, yes.
Q Now, it's true that stormwater discharges from SeaTac include fertilizers?
A I would assume that it does include nutrients.
Q And it's true that SeaTac's stormwater discharges include pesticides?

MR. PEARCE: Objection. Lack of foundation.
MS. COTTINGHAM: I'm going to sustain the

objection.

Q (By Mr. Poulin) Are you aware that pesticides are used at SeaTac International Airport?

A No, I'm not.

Q You are not aware of that.

Have you reviewed the best management practices in place at SeaTac?

A I have reviewed portions of it, but it's been quite some time.

Q Are you familiar with the Stormwater Pollution Prevention Plan at SeaTac?

A Generally, yes.

Q But you are not aware that plan discusses the use of many different pesticides?

A I don't recall the provisions for pesticides.

Q You state in paragraph 16 of your prefiled statement that urban development in drainage areas produces roadway pollutants, fertilizers and pesticides that alter the characteristics of urban streams. And then in the last sentence on page 4, treatment of STIA runoff prior to discharge to these streams avoids the impacts resulting from other urban development.

You haven't cited any evidentiary basis for your assertion that treatment of SeaTac discharges avoids the impacts resulting from other urban development,

have you?
A No.
Q In fact, the Port doesn't even monitor stormwater discharges for pesticides, does it?
A Not that I'm aware of.
Q In your evaluation of the impacts of the proposed development on stream conditions and habitat, you did not evaluate the impacts of construction dewatering?
A Not specifically.
Q And with respect to the new constructed wetlands to be built in the Green River basin, would you agree that those wetlands will not provide any benefits to the Miller or Des Moines Creek basins?
A Yes.

MR. POULIN: No further questions.

MS. COTTINGHAM: Any redirect?

MR. PEARCE: Very briefly.

EXAMINATION

BY MR. PEARCE:
Q With respect to the questions that Mr. Poulin asked you about the prior urban development in the buyout area, were those uses required to obtain an NPDES permit?
A No, they were not.

MR. PEARCE: I have no other questions.

MS. COTTINGHAM: I have a question, and you're probably the best witness to answer it.

EXAMINATION

BY MS. COTTINGHAM:

Q We've had reference to cutthroat trout, rainbow trout and bull trout. Are these three separate species or are they two?

A Yes. Actually, rainbow trout are technically a salmon. They are in the same genera Oncorhynchus as the rest of the salmon. It was in 1980s that they were reclassified, but we still call them trout.

The bull trout is not in the same group as cutthroat trout. It is technically a char.

MS. COTTINGHAM: Thank you.

Any other questions?

MR. LYNCH: I have a couple questions.

EXAMINATION

BY MR. LYNCH:

Q Thank for your testimony today.

I'm looking at page 10 of your prefiled testimony, and I just was hoping you could help me understand a couple things.

The first thing is paragraph 30, right at the top

of the page where you -- it's the heading, importance of chronic criteria, and the first sentence begins, maximum increases in concentrations of materials in the stormwater discharged from the STIA facilities will occur well-after streamflows have been increased by the same precipitation passing through the treatment and detention facilities, and then it goes on to say about the peak concentrations of materials and the discharges.

I'm not sure what, I guess, this paragraph means.

A What I was trying to get across was that when you have a substantial storm event, which is what would be necessary for there to be runoff increases, you almost within a very short period of time, it is almost immediately, get runoff from many areas, particularly in an urban area, because you have so much impervious surface area, which causes streams to start rising or the flow to increase very quickly.

With the Seattle-Tacoma International Airport system, you have detention that slows down its release, so you will already have had the streamflow increase, assuming that we're starting off in a dry period and you have a storm such as perhaps we had last August, then you would have the stream level come up, a flow increase first, and then after, sometime after it

increased, you would have the increase in discharge from the treatment facilities.

And the difference being they have the capacity to detain water for some period of time.

Q And then my final question I just want to make clear in my mind, it's on the same page, paragraph 33, when you were talking about the baseline conditions in the STIA area streams, were you looking at -- I think I'm getting my creeks correct, but for Des Moines Creek, were you looking at a cfs of one or something less than that, when you were formulating your opinions?

A I was reviewing the information as provided by the stream records, and they indicate that it does get down to less than one up in the headwaters.

MR. LYNCH: Okay. Thank you.

MS. COTTINGHAM: Any questions as a result of Board questions?

MR. PEARCE: No.

MR. POULIN: I have a question.

EXAMINATION

AR 056481

BY MR. POULIN:

Q Dr. Weitkamp, that discussion in paragraph 30 of your prefiled, essentially asserts that the Port gets the benefit of a mixing zone in the receiving waters,

doesn't it?

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

MS. COTTINGHAM: Can you restate your question.

MR. POULIN: Sure.

Q (By Mr. Poulin) Dr. Weitkamp, aren't you suggesting that the Port's discharges are less problematic because they will be diluted by streamflows in the receiving waters?

MS. COTTINGHAM: You can go ahead and answer the question.

A I'm just trying to portray the conditions that would occur in the stream when the discharges occurred that would have the higher concentrations.

Q Isn't it likely that those increased stream levels will likewise include higher concentrations of pollutants transported to the stream by the storm?

A If they are coming off the impervious surface areas that involve roads and vehicles, yes.

MR. POULIN: No further questions.

MS. COTTINGHAM: Do you have any questions?

MS. OSBORN: None here.

MS. COTTINGHAM: You are excused. Thank you.

MR. PEARCE: Thank you, Your Honor. I

believe our next witness will be Paul Fendt. Mr. Reavis will be doing direct examination.

MS. OSBORN: I have a question before we start.

MR. REAVIS: Can we stop the clock, then?

MS. OSBORN: My question that I have is that in review of Mr. Fendt's testimony, we discovered in one of the attachments, tab C, seven-day low-flow occurrences in Walker Creek, the third page, behind tab C, that this appears to be a replacement page to the December 2001 low-flow plan, probably in response to questions that were raised by Mr. Whiting in the mid-February meeting that he had. It seems to be responsive to that.

This document was never produced to us, so I have a specific objection to the use of this document on that basis, but also more generally, I'm wondering if it might be possible for the Port to identify in its witnesses' testimony and attachments where it has inserted new materials that are intended to be replacements to the December 2001 low-flow plan.

For example, further along in Mr. Fendt's attachments, there are materials that are completely undated and this one doesn't have a date on it either, so rather than playing a guessing game, I'm wondering

if it might be possible to get that identified for us so we can make our objections properly and in a timely manner.

MR. REAVIS: Maybe we can ask Mr. Fendt, and I think were going to need to get the July 2001 low-flow report and see if this is the same document.

Do you happen to know whether this is the same document?

MS. COTTINGHAM: Hang on just a second. Can we swear the witness in.

PAUL S. FENDT, P.E., having been first duly sworn upon oath or affirmed to tell the truth, the whole truth and nothing but the truth, testified as follows:

MR. REAVIS: Just in response to the question, then, because it's his exhibit, maybe if we can find July. Is it July 2001 that you need?

Okay. Do you know if this is, in fact, a replacement page?

MS. OBSORN: Are we on the clock now?

MS. COTTINGHAM: This is not testimony. This is clarifying for purposes of whether it's excluded or not.

MR. FENDT: It is a replacement page.

MR. REAVIS: I'm not going to be referring to this in his oral testimony. We can remove it from the materials at a later date. I guess I would like to take the opportunity at some point to discuss it with Mr. Fendt, but we're not going to be covering it here in his testimony today.

MS. OSBORN: We would ask that it be stricken and references in his prefiled testimony to it be stricken as well.

MR. REAVIS: I think if it is in fact a document that was submitted in response to Mr. Whiting's comments, we weren't intending to offer that. I think the prefiled was done, obviously, before we had the ruling. We haven't been through all of the attachments, so we can remove it and perhaps substitute the previous one if that would be acceptable after his testimony is over.

MS. COTTINGHAM: That's acceptable to me. Do you want me to do a written order to this effect with the redacted page?

MR. REAVIS: Perhaps what I can do is once we have a minute, maybe at the end of the day, pull out the previous one and we can read it into the record. I don't know that we need a written order on it.

MS. OSBORN: If we redact testimony from his prefiled -- he does make reference to it in his prefiled. It might be good to have a written order on that with the attached redacted page.

MR. REAVIS: That's fine. I guess what I would request -- I'm not exactly sure which testimony might be covered by the order. We'll take a look at it. Maybe if ACC has already done that, it would expedite the process and have them tell us which lines they believe should be redacted.

MS. COTTINGHAM: Perhaps when we take a break later this afternoon the two of you, or whoever is the lead on this issue, could speak with Mr. Eric Lucas, who is in the back of the room right now, so that we can codify this in some way for the record.

MS. OSBORN: That will be fine.

And as to the question of whether there are additional attachments in Mr. Fendt's testimony or that of upcoming witnesses that is, essentially, a replacement, I'm wondering at what point we might be notified, if that's appropriate.

MR. REAVIS: We will certainly ask our witnesses. The only ones that I'm aware of are the ones that have been removed, stricken from Mr. Ellingson's testimony already. But we'll ask our

witnesses. I guess if ACC has any questions about that, we're certainly willing to discuss it with them.

And before I get started, I've got some handouts, just pages from the low-flow plan and from the SMP.

MR. POULIN: Start the clock?

MS. COTTINGHAM: Start the clock.

EXAMINATION

BY MR. REAVIS:

Q Could you please state your name and spell it for us, please.

A Paul Steven Fendt, F-e-n-d-t.

Q Mr. Fendt, how are you employed?

A I'm employed with Parametrix.

Q And what is your position at Parametrix?

A I'm a water resources division manager, and I do stormwater engineering and stormwater management.

Q Are you a professional engineer?

A I'm registered as a professional engineer in the states of Washington and Florida.

Q And is a copy of your CV attached to your prefiled direct testimony?

A Yes, it is.

Q Can you give us a brief summary of your educational background, please.

A I have a bachelor of science degree in geological engineering from the University of North Dakota.
Q How long have you been employed at Parametrix?
A I've been at Parametrix for 11 years.
Q During that time, what particular areas have you specialized in, if any?
A My primary responsibility is stormwater management. I do stormwater master plans, stormwater comprehensive plans, sediment erosion control plans. I do water quality evaluations, sedimentation studies, river engineering, river design and stream restoration.
Q When was your first involvement with the Port's third runway project?
A First time I worked on this project was in June of 1995.
Q Are you currently the project manager for that project?
A I am.
Q What does being the project manager entail?
A Well, as the project manager, I'm responsible for the routine client management, which includes writing invoices and doing progress letters and working on scopes and budgets. I'm also responsible for coordinating all the work and the different tasks that we prepare under the contract.

So, for example, I'll attend meetings with the Port

and Port staff and make sure that what's going on in one part of the project is being carried over to other parts of the project.

Q And how long have you been the project manager?

A I've been the project manager for four years.

Q Are there particular tasks associated with the Port's MPU projects that you have been more involved with personally?

A Yes. I'm responsible, specifically, for the tasks regarding the comprehensive stormwater management plan, which I'll refer to as the SMP.

I'm also responsible for the low-streamflow analysis, and in addition, I'm a design engineer for the Miller Creek relocation plan.

Q Now, in your prefiled testimony, at paragraph 7, you talk about stormwater impacts from master plan update improvements. Can you tell us what causes those impacts.

A Well, the construction of impervious surfaces and the modification of the land and land cover results in changes to the hydrologic properties of the land. So, for example, if an area had impervious surfaces and a certain type of land cover, like tree cover, it would have certain runoff characteristics.

Once those are removed and impervious surfaces are

placed there, there would be an increase in runoff which would result in additional flows in streams which could cause scouring in streams, erosion in streams and the like.

Q And those are peak-flow impacts?

A Those are impacts from peak flows.

Q What effect, if any, does the addition of impervious surfaces have on low flows?

A The construction of new impervious surfaces on pervious areas reduces the amount of runoff or rainfall that's able to infiltrate into the ground and recharge the component of groundwater that provides the streamflows during base flow.

Q So the addition of impervious surfaces affects that how?

A It would reduce the amount of infiltration that's available and reduce the flows in the stream.

Q Let's talk about peak flows for a minute.

How do you go about mitigating for peak-flow impacts?

A Well, there are really two, typically, used ways to mitigate for stormwater peak-flow impacts. One is to infiltrate the stormwater back into the ground. So once it's collected from new impervious surfaces, you direct it toward an infiltration area where it can be

reinfiltrated much the same way that it infiltrates before the project is developed.

The second way is to use detention facilities, and what detention facilities do is they will collect the stormwater runoff. It comes from the new impervious surfaces and delays its release into the streams, and by delaying its release, it will prevent these peak impacts that I talked about earlier.

Q Is there a preferred method for controlling stormwater flows as between infiltration and retention?

A Well, infiltration is a preferred method, because it has the ability to more closely replicate what's going on in the watersheds before development occurs.

Q Now, are you using some infiltration at the airport?

A Yes, we are.

Q Why don't you use exclusively infiltration for this project?

A Well, infiltration requires, using infiltration for stormwater detention needs requires certain conditions that are, certain conditions to occur at the project sites.

So, for example, the soils into which you are infiltrating have to be able to infiltrate water. They can't be real dense soils. They have to be loose and able to infiltrate water.

Secondly, the groundwater has to be in such a location so that there's basically a place for the water to infiltrate to. If the groundwater is too high, there's no place for infiltration to occur.

Q How would you describe, then, the soils and the location of the groundwater as it relates to infiltration in the streams that we're talking about here?

A Well, generally throughout the area there's a mixture of what are called till soils, which tend to be very tight soils that have very highly compacted areas fairly close to the surface.

There are other soils that are typically called outwash soils that tend to have much better infiltration characteristics and have water tables that are much lower. These areas tend to be scattered throughout the watershed, and in the case of the airport, in the Walker and Des Moines Creek basins there are no good areas that have these good infiltrating soils and the lower water tables into which to infiltrate.

However, in the Miller Creek basin, we do have an area where we have some of these better infiltrating soils and where we have the water tables low enough so it's possible to infiltrate stormwater.

Q Let me turn, then, to detention. How do you determine how much peak-flow storage is needed?

A Well, there's a few things you need to know. One is that you need to know what standard it is that you are looking at, whether or not you are meeting a level 2 or level 1 standard, which is basically what's your point of comparison; do you need to compare peak flows at certain return frequencies for storms. For example, do you need to control peak from a two-year storm, a ten-year storm or a hundred-year storm.

The second part of it is that you need to have some ability to determine or calculate what these differences are going to be, and typically you use a hydrologic model.

Q You mentioned a level-2-versus-level-1 standard. Which one is the Port using at the airport for these MPU projects?

A The Port is using a level 2 standard for MPU projects.

Q What does that do to your stormwater detention requirements?

A Well, typically level 2 analysis, because -- I'll back up and explain a little bit of the difference.

When you are looking at level 1, you are really just trying to compare the peaks of storms, so you try to compare a ten-year storm, 24-hour storm, with

another ten-year, 24-hour storm before you develop the project and after you develop it.

With level 2, you are looking at it in a little different light. You look at it from the point of view of all the flows in the stream. Within a certain range, you are trying to match all the flows, and the reason we do this is that level 2 analysis looks more at the duration of the flow.

So as I described earlier, when you look at infiltration, when you consider how infiltration or impervious areas reduce infiltration, there's more water that has to be discharged, so even if you can hold onto it in a detention facility, you still have a little more water to get rid of.

And if you have to get rid of that water over a longer period of time, you need to provide a lot more storage, so typically level 2 detention requires a lot more detention storage than a level 1 would require.

Q You mentioned computer models. What model was used for the purpose of designing the stormwater detention for high, for peak flows?

A The HSPF model.

Q Do you have an opinion about the suitability of that model for the purpose that you've described?

A HSPF is considered the design standard or, basically,

the best available model to be used for doing stormwater management in Western Washington.

There's another model that is used, typically it is called KCRTS, and it's a derivative or it's sometimes referred to the HSPF light. It's a simpler model to use, but it uses the same basic calculations as the HSPF.

And the reason that these models are so good for Western Washington is that unlike other parts of the country where the big storms that occur tend to come in cloud bursts or thunderstorms and so on, as we all know, in Western Washington it rains for many, many days at a time, and these multiple-day rainfalls that occur in this area are what cause higher flows or what cause peak flows in creeks. And it's important to mitigate those peak flows from the multiple-day storms rather than just looking at a single storm.

Q Now, for the stormwater master plan, who performed the modeling for the peak flows?

A We've been working on the stormwater master plan for several years now, and with the life of the project, we've had different people model it.

Since 1999, Parametrix has been the firm that is responsible for doing all the peak-flow analysis; however, through that time, we've had either people

that were Parametrix employees or we had subconsultants working on it.

So the document that was prepared that for SMP, the SMPC with the replacement pages was assembled by, and mostly directed by Parametrix, but the HSPF modeling was done by two other firms, by Aqua Terra and specifically Joe Brascher, and the Des Moines Creek basin was done by Foster Wheeler, specifically Dr. Felix Kristanovich.

Q Now, is the modeling work that you've described for peak flows set forth in any documentation that we have here?

A Yes. All the modeling work that we prepared is in the comprehensive stormwater master plan. It's a four-volume set that includes volume A, the modeling report. It describes all the modeling specifically, and volume B is the calibration report.

Q Is that volume A or appendix A?

A Appendix A. It's volume 2.

Q Now, if you would please, then, I'd like to get you to describe for our benefit the basic layout of the stormwater management facilities at the airport, and if you need to you can use these demonstrative exhibits.

If you can just point out and describe the major features, that would be helpful.

MS. COTTINGHAM: Is this an exhibit that we have in front of us?

Q Well, let me ask you, Mr. Fendt, if you can identify at least the first page

A This is figure A7, which is a part in the volume 2, appendix A, of the stormwater master plan.

Q And I believe there is copies, is there not?

Is that attached to your prefiled or not?

A No, it's not.

MS. OSBORN: The Port didn't provide the stormwater management plan to the Board; is that right?

MR. REAVIS: No. We have one copy. I did not make multiple copies of this diagram, but it is in the stormwater master plan and the Board has, I believe, one copy of that exhibit.

A What this depicts is -- you've heard about the three streams that run off from the airport runs to, so what we needed to do is first of all those three streams are identified by this heavy, dark dashed line here.

So generally, all this land up here to the north of the airport drains to Miller Creek, which runs through here and takes a turn and heads to the Sound. All the area in the middle here and off to the south and off to the southeast side of the airport drains out generally to the south end to Des Moines Creek, which runs

through here, runs north and then turns toward the west or runs south turns to the west and goes to the Sound.

Then, finally, there is Walker Creek, and Walker creek has just a small area right through here, which is defined by this black line and runs in this direction, and generally runs parallel to Miller Creek, where it's a tributary of Miller Creek and joins the creek near the mouth, near the Sound.

And what you see in these colors is that these generally depict what are called subbasins, and what happens is when you do stormwater management, you try to collect all your water and discharge it at places that make sense, so all the water drains to a certain place. You are evaluating all that water that drains to a single point.

So what happens here is, for example, in all this purple area here, it most likely -- I mean, it's the best design decision to make all the water run to the north, so these subbasins describe water that runs to the north.

And then this subbasin, for example, this STW is all water that runs over to this point, so you can see as you go around that we need to evaluate, we need to subdivide the whole airport into smaller chunks or subwatersheds or drainage basins in order to evaluate

each of those areas, and we evaluate each of them individually and use each one of those as a point of analysis, so what we do is we look at one of these subbasins and determine what all the factors are that describe the hydrology, the land cover, the soils and so on, and then we determine how much water runs off from that area right now from 1994.

Then the second thing we do is look at, well, how is that going to change once the third runway is built and how would that change the hydrologic characteristics. Then we use the HSPF model to model that and determine how much runoff would come off then, and it's the difference between those two that determine how much detention volume we need to provide and the differences -- how much infiltration or detention volume that we need.

Q Could you, then, just point out for us where some of the vaults will be located and the detention facilities and so forth.

A Each of the areas that are shown here in dark gray blotches as you go around the airport are all detention facilities, so most of the detention facilities that are in that master plan update, for master plan update, are vaults. They are underground vaults. Some of them are actually partially above ground, and some of the

facilities are open ponds.

So, generally, these four facilities that are on the west side that are for part of Miller Creek and this one facility that is part of Walker Creek are all open ponds.

All these facilities you see to the north including the NEPL retrofit and SDN 1 and the cargo vaults that all drain to the north, those are all vaults.

Everything that goes to the south, with one exception, are all vaults. Those are all in the Des Moines Creek basin, so that's the SDS 3A vault. The SDS 3 vault, and so on.

Then there's one other pond that handles all the drainage from the east side of the airport that's called the SASA pond, and that's an open detention facility.

Q That's all I have for that explanation now.

Are those types of facilities that you described common with regard to stormwater management?

A Those are typical detention facilities that are constructed to manage the stormwater.

Q Can you estimate how many stormwater management systems you've designed using these same types of facilities?

A I would estimate in the last ten-years or so maybe 25.

Q Now, with regard to peak-flow management at the

airport, how long does the water actually stay in some of these detention facilities?

A Some of the detention facilities, especially the facilities on the west side in Miller Creek, some of the those detention facilities hold water for up to 90 days, that's the stormwater that drains into them, and 90 days for the purposes of stormwater detention.

Q To your knowledge, has a water right ever been required in order to detain water for peak-flow mitigation?

A No.

Q I want to turn, then, to the retrofitting issue, and what I'd like you to look at is Exhibit No. 1, which is the September 401 and specifically page 26 of that exhibit, 26 of 33, and primarily subsection (c) on that page.

A Okay.

Q Are you familiar with that particular provision of the 401?

A Yes, I am.

Q How did you become familiar with what's described in that provision?

A It's part of my job once we are issued the 401 certification that I need to read it and understand it and determine how it affects the projects that I'm working on and how would it define or determine other

deliverables that need to be provided.

Q Have you discussed that particular provision with anyone at Ecology?

A I have not, personally.

MS. OSBORN: At this point, I would just -- we're talking about subsection (c), the retrofitting provision; is that right?

MR. REAVIS: Correct.

MS. OSBORN: I would interpose our standard objection that this is outside the scope of the information contained in his prefiled direct, no mention of retrofitting in here.

MR. REAVIS: I think there is some reference to it, but in any event, Mr. Fendt has heard a lot of the testimony prior and I think he's entitled to be able to discuss retrofitting requirements that's part of his normal duties.

MS. COTTINGHAM: I'm going to allow the question.

Q (By Mr. Reavis) Can you explain for us, then, what the plan is to retrofit for flow control, as indicated by the 401 provision.

A Well, the way I understand the condition is that for every 20 percent of a project, a new impervious area that is constructed, or 10 percent of impervious area

that is constructed, we need to apply 20 percent of the retrofitting.

Q Can you describe for us, I guess, what is meant by retrofitting and what kinds of things is the Port planning to do to retrofit.

A There are two parts, two really significant parts of the retrofitting plan, and they are to be divided into the retrofitting for peak flows and the retrofitting for water quality.

Now, the peak-flow retrofitting has required us -- if you remember from Mr. Whiting yesterday, he talked about the 10-15-75 or the 75 percent forest cover.

What the Port is doing for the stormwater master plan is -- maybe I should back up and give a little bit of background.

Whenever one does stormwater management, remember I described earlier that we are always comparing some sort of existing condition to some sort of future condition. Well, in this case, in most cases, the existing condition would be how is it today or how was it in 1995 or 1996 before any of the projects started, and then comparing that to what is going on in the future, in 2006.

Well, in this case for peak-flow analysis, the Port has been required to retrofit back to a condition of

much less development than what's occurred in 1994, and that amount of development is assuming rather than the airport areas that you see in this figure here, we are assuming that each one of those individual subbasins has only 10 percent impervious surface and 75 percent of those areas is forested and the rest of it is a grass area or grass covering.

So we're undoing, as far as our understanding of the existing conditions, how much impervious area is already out there.

So the peak-flow retrofitting is actually comparing, basically, an undone or some predeveloped scenario of the airport with the future project.

With respect to water quality, water quality is different in that we'll be applying the manual standards to the entire airport, to the extent practicable. And there's a discussion in our stormwater master plan that demonstrates that with the exception of 80 acres, that the Port will apply stormwater BMPs for water quality to the entire existing facility, including areas that may not have BMPs right now.

And with regard to the 80 acres that's not being included, the reason it wasn't considered practicable is it includes the area out here in front of the

existing terminals, so you can see that just to the east are all the terminals, and this is basically where all the airplanes have to move through, and from a service disruption point of view, it was extremely difficult to disrupt the actual airport service in order to do retrofitting in this strip.

Q This provision in the 401 refers a table A3 in the stormwater management plan, which is actually part of the materials that I passed out a minute ago, the excerpts from the stormwater management plan.

Could you tell us what table A3 is.

MS. COTTINGHAM: Which document is this, again? The one with the fold-up maps in it or the other one?

MR. REAVIS: The one with the fold-up maps. If you notice, the cover sheet, the cover sheet on each or one of the cover sheets is the stormwater management plan; the other is the low-flow plan.

And this is just behind the fold-up map, is where table A3 starts.

A What table A3 is, it lays out when projects will be constructed, what type of detention is required, or where, where the facility is, and it lists the year in which the Port will construct the facility.

So basically what it is, and the way it was used,

is to determine, first of all, whether or not the facilities would be in place in time for when the construction was, the master plan project was in operation, and it also lays out the schedule in which it would be constructed.

Secondly, it talks about whether or not this is a new or a retrofit. So it says if this is a retrofit facility -- this is in the second to last column, second column from the right. It says, is it retrofit facility? Then it says, well, in which detention pond or which detention vault will we provide the retrofit?

Then the last number that you see in parentheses as you go through this is the year, the construction year in which it will be built, so basically, what this does is it lays out the schedule for retrofitting and construction of all the stormwater facilities.

Q Now, are there, then, feasibility issues regarding meeting this goal of 20 percent retrofitting for each 10 percent of new impervious surface?

A Well, there are problems that can arise with implementing this. I mean, if you think about it in terms of just doing the math, once 50 percent of the impervious surface is constructed, then a hundred percent of the retrofitting needs to occur.

Where the problem arises is that construction of

the facility itself is, as you are building the facility, you are actually building the retrofitting. A good example of this is the filter strips that go along with the runway.

So if we end up, if we've already constructed 50 percent of the impervious area and we haven't finished building the embankment for the runway, we haven't finished building the retrofit facilities that we need to provide.

So what we've done in the condition, the way I understand it, is intended to provide an ability to rely on the schedule that was agreed to and included in the SMP.

Q I want to switch gears and talk about low flows for a bit, and you have described in paragraph 37 of your prefiled testimony impacts on low flows in the Des Moines, Walker and Miller creeks; is that correct?

A That's correct.

Q And could you just briefly tell us what the impacts will be according to the work that you've done.

A The December 2000 low-flow report has determined that low-flow impacts in Des Moines Creek will be eight-hundredths of a cfs and Miller Creek will be no impact and Walker Creek will be eleven-hundredths of a cfs.

Q Now, have you prepared a figure that shows to scale what those impacts will represent in the streams themselves?

A Yes, I have.

Q And there is the other handout that has the cover page that says low-streamflow analysis on the top of it.

Can you tell me what the second page of that handout shows.

Let me just ask you first, is that to scale?

A Yes, it is.

Q And what does that show?

A What this figure shows is we made calculations of what we would expect the water depths to be in the creeks as they exist today during low-flow periods, during average low-flow periods.

Then we calculated what would the water depth be in the creek in the event that the low flow was not mitigated, and what we show on this page is in the individual creeks, what the change would be in the depth of water and the width of the wetted surface. So if you are looking down at the creek and you saw how wide the creek was, what you would see is these reductions in creek width or these changes in channel depth. Again, there was no low-flow mitigation provided.

Q Now, you were here when Mr. Smith testified today?
A Yes, I was.
Q Were you here for all of his testimony today or not?
A No, I wasn't.
Q There was some discussion of a 1.0 cfs target, I believe, for Des Moines Creek.

Now, are you aware of any studies -- well, first off, let me ask you, have you heard of that figure being used with regard to Des Moines Creek before?
A Yes, I have.
Q In what context did that figure arise, to your knowledge?
A That figure came out in the 1998 401 certification as a target for Des Moines Creek.
Q Are you aware of any studies supporting the conclusion that there should be a 1.0 cfs target flow in Des Moines Creek?

MS. OSBORN: Object. This is a leading question.

MR. REAVIS: Well, I'm not sure it's leading. I'm just asking him if he's aware of any studies.
Q (By Mr. Reavis) Let me ask it this way. Are you aware of any studies discussing the actual flows in Des Moines Creek prior to the development of the material that we've talked about, studies other than yours?

A I'm aware of analyses that we did before our own study, and that has to do with a study that was done by the Des Moines Creek basin plan.

Q Is that attached or is there a page from that attached as Exhibit B to your prefiled testimony?

A Yes, there is.

Q Can you tell us what that shows with regard to flows in Des Moines Creek.

A What that exhibit shows in table A11 is that in the basin plan, they determine that base flow in the main stem of Des Moines Creek, under current conditions, is .55 cfs. It also determined whether or not or calculated whether or not if the watershed was completely undeveloped what the flow would be.

Q Now, are you aware of any studies, then, that describe a 1.0 cfs in Miller Creek?

A No, I'm not.

Q Now, in your prefiled testimony, have you described the process you went you through to identify what the low-flow impacts to these streams might be as a result of the master plan update project?

A Yes.

Q I don't want to repeat that, then.

Can you just tell us, then, what is the plan for mitigating those impacts, and I think in paragraph 15

you discussed some of them.

A Well, we used three methods to mitigate low-flow impacts. The first is to evaluate the infiltration into the embankment that's being constructed for the third runway.

The second is to collect stormwater runoff from impervious surfaces in low-flow vaults for slow release during the low-flow period into the creeks.

And the third is the reduction of or the retirement of water uses that are occurring in Miller Creek.

Q Let me ask you about the second of those. Where does the seepage that you talked about come from?

The first time you mentioned it was seepage, I believe. Where does that come from, primarily, in connection with the low-flow plan?

A Seepage comes from either rain directly falling on the embankment or runoff from the new runways that runs off into the filter strips and then infiltrates into the embankment.

Q With regard to detention and release, then, do you have an opinion as to whether or not the detention and release facilities can be feasibly implemented?

A Yes. I believe it will be feasible to build and construct and discharge water.

Q Now, you mentioned retirement of existing water uses.

What are you referring to there?

A We determined, based on some interviews with people that had lived in the area and some other observations about pumps located in Miller Creek and the like and exploring water rights and water uses or water certificates that were in the creek and determined and made estimates as far as what kind of water uses were deemed, what kind of water uses there were from the creeks, and then knowing that since those properties have been purchased that those waters rights will be going away.

Q So is that discussed, then, in the low-flow plan?

A Yes, it is.

Q I believe you also mentioned or it's in the low-flow plan, a term called nonhydrologic impacts.

Can you explain to us what that is.

A What we did is rolled together or lumped together all things that were not related directly to runoff or precipitation, and in that category are these water rights that I just talked about.

We also evaluated, since there are somewhere around 300, as I recall, septic tanks in the area, what would be the effect of removing those septic tanks in those houses to low flows. By taking those flows away, would there be an impact to the creek.

Q Now, under the low-flow plan, then, is the water being released in order to maintain a specified minimum flow rate?

A No.

Q Can you describe for us how that's being done.

In other words, in terms of the target flow rate, how does the low-flow plan address that, if at all?

A Well, much the same as when we evaluate peak flows, what we needed to do is compare existing conditions with future conditions, and by taking a number of steps, we determined what the difference would be in low flows in the creeks for a certain time period, and then we provide that much water in order to make up the difference to mitigate the impact.

Q Let me ask you a few questions about model calibration. First, did you have anyway role, yourself, in the actual calibration of any of the models here?

A No, I did not directly calibrate any of the models.

Q As the project manager, did you have any supervisory role over that?

A As the project manager, I directed the work to be done, so I found the people and hired the people that needed to do the work and would respond to questions about the calibration, and then worked with the calibrators to determine schedules and so on.

Q Now, did you yourself request that any peer reviews be done of that calibration?
A Yes, I did.
Q And who did you or did you suggest any particular person to do that?
A Yes, I did.
Q And who was that?
A Norm Crawford.
Q And who is Norm Crawford?
A Norm Crawford is a hydrologist. He's a principal of a firm called Hydrocomp, and Norm is the developer of the HSPF model.
Q Are there ways or are there measures or ways to determine whether or not the low-flow augmentation proposal is performing as it was intended to?
A Yes. There are monitoring requirements in the 401 certification, and we included monitoring in our low-flow report.
Q Now, what happens, then, if you discover for example that the actual conditions post-construction aren't matching the model exactly?
A When we sized the detention facilities for the low-flow reduction, we did it considering the worst-case conditions, so much the same as you've heard or you will hear certainly about stormwater management and the

47 years of record we have, we used the 47 years of record in order to determine when the low-flow periods would occur.

And using that background information, we sized things for the worst-case condition of how long would it take to fill the vaults based on the whole record and so on. So what this is, is that rather than just looking at a fairly narrow range or a less extreme range, we provided mitigation for the entire range of potential low-flow impacts within the low-flow period.

And what this allows us is a couple things. One is that we can modify that, so that we know that, for example, if there's water left over at the end of the season, which there usually is, because it's designed for the worst case, we can continue to let the water go, and we have that as a proposal in our low flow.

Another option is to simply divert more runoff from the impervious areas to additional low-flows vaults. We can construct more low-flows vaults if necessary, and the reason why this is effective is that there's a direct linkage between the amount of impervious surface that is constructed and the reduction of low flow, so the impact is coming from the impervious area, so the mitigation can come from the impervious area.

Q Is that an example of adaptive management?

A Yeah, I would call it that. That's a good example.
Q Let me ask you a few questions, and I don't want to repeat a lot of your written testimony, but you discuss treatment of stormwater at the airport in your prefiled; correct?
A That's correct.
Q Let me ask just a couple of questions about treatment in these vaults that we've been discussing. And the first question is, is there any treatment that happens in those vaults?
A Well, the low-flow vaults are not unlike, actually, a water quality, best management practice, which is called a wet vault, where you store a large pool of water and you discharge additional stormwater into there, and as the water sits there, some of the constituents that are in the stormwater can settle out, so when there's water that's discharged or collected in the low-flow vaults, that same function will occur and the constituents that are in the stormwater can settle out.
Q Are there additional treatment options that could be employed?
A Yes. There are other best management practices that are available.
Q With regard to the vaults?

A With regard to the vaults or any other stormwater.
Q Is the Port currently considering or reviewing any other treatment methods, besides the ones that are being used now?
A The Port is continually evaluating and characterizing their stormwater runoff, and you may recall --
MS. OSBORN: I'm going to object to this question as outside the direct and outside the discovery cutoff period. There's nothing that has been provided to indicate that the Port is considering additional other treatment methods.
MS. COTTINGHAM: Can you lay a foundation for that.
MR. REAVIS: Okay.
Q (By Mr. Reavis) Does the Port have an NPDES permit?
A Yes, they do.
Q Is it part of compliance with that permit to investigate additional BMPs?
MR. POULIN: Objection. Leading.
Q Is there any investigation required under the NPDES permit of treatment options?
A No, not specifically.
Q Well, what happens if new BMPs are developed?
MR. POULIN: Objection. Vague.
MR. REAVIS: I'm just asking a general

question about sort of development of additional treatment methods. I'm not intending to question with regard to any particular BMP, just how that is dealt with in the NPDES process.

MS. COTTINGHAM: I'll allow the question.

A The manuals, the stormwater management manuals, typically allow for new and experimental BMPs to constantly be developed, and any best management practice that's available and understood and can provide water quality enhancements or performance would be available to any stormwater discharge.

Q Let me just ask you a couple of questions about some of the issues that were raised by one of ACC's experts, Mr. Rozeboom.

And first, are these discussed in your prefiled testimony, your responses to those comments?

A Yes.

Q Let me ask you about the lining of the lagoons, and the question is, is that, in your opinion, a significant issue?

MR. POULIN: Objection. Vague. We've been getting objections to words like significant for eight days now.

Q Is that a major or a minor issue?

A The lining of the lagoons is small. It's under eight

acres, and based on our evaluation of low-flow impacts, that's an insignificant amount.

Q Now, there's been some discussion about development of borrow areas, and let me ask you a question about borrow areas 3 and 4.

First, were you here when Mr. Rozeboom testified about those developments proposed or possible developments?

A Yes, I was.

Q He referred to, I believe, an agreement between the Port and the city of SeaTac. Do you remember that?

A I do.

Q Do you know whether or not that agreement has ever been signed by the Port?

MS. OSBORN: Objection. Lack of foundation.

MR. REAVIS: I'm asking him if he knows.

MS. COTTINGHAM: Sustained.

Q (By Mr. Reavis) Have you investigated the status of that agreement?

A Yes, I have.

Q And how have you investigated that?

A I contacted the Port.

Q Do you know whether or not that agreement has been signed?

MS. OSBORN: Objection. Hearsay.

MS. COTTINGHAM: I'm going to sustain that.

MR. REAVIS: Well, maybe I'll come back to that with another witness. That's all we have for now. Thanks.

MS. COTTINGHAM: Do you have any questions, Mr. Young?

MR. YOUNG: No, I don't.

MS. COTTINGHAM: I'm going to suggest that we take about a ten-minute break here. We'll come back for cross.

(Recess taken.)

MS. COTTINGHAM: We're back on the record.

MS. OSBORN: Thank you.

EXAMINATION

BY MS. OSBORN:

Q Good afternoon, Mr. Fendt.

I'd like to start with some questions about, just a follow-up to some of the questions that Mr. Reavis asked you about, and the first has to do with this attachment or this exhibit from the low-streamflow analysis that indicates depth and change of streamflow and so forth.

Does this show the depth and width of the streams itself?

A I'm not sure what you mean by itself.
Q Does this diagram show the depth and width of the streams, Des Moines, Miller and Walker Creek, that are discussed in the exhibit?
A No. It shows the change in those depths.
Q In particular, it doesn't show the depth in those streams at the point of compliance; is that right?
A What's the point of compliance?
MS. COTTINGHAM: You are going to have to speak up, Mr. Fendt.
A I'm not sure what you mean by point of compliance.
Q You don't know what the point of compliance is?
A In the context of low flow, the point of compliance?
Q Yes.
A In the context of point of compliance in low flow, I believe these are done -- if they are not at the points of compliance, it's in the vicinity of the points of compliance.
Q But those points of compliance, the stream diameters, widths and depths, are not shown here; is that right?
A The stream width and depth at those points is not shown there.
Q Okay. And do you know for those points of compliance for each stream, do you know what percent of the land that is above, watershed-wise, above the point of

compliance is airport property?
A I could make estimates.
Q Does that mean you don't know?
A I don't know specifically without looking it up.
Q Now, you indicated that you had some discussion about the areas where water will infiltrate and not infiltrate in a couple of the different basins. I think you mentioned Des Moines and Miller Creek; is that right?
A That's correct.
Q So I wanted to ask you -- this is the illustrative exhibit that was used for Dr. Leytham's testimony. It's also Exhibit No. 704.

Is this an example of an area where water is not infiltrating?
A That's an example of water sitting on a dirt surface.
Q Do you know where this is?
A I don't know specifically.
Q You don't know that it's on the embankment?
A I don't know that it's on the embankment.
Q I'd like to ask you some questions about your prefiled testimony, so we'll start with paragraphs 15 and 16 and then just go through the document with some questions that I have.

In paragraph 15, you talk about the three methods

by which low-flow impacts can be offset and indicate one of them is seepage of infiltrated stormwater.

Now, doesn't appendix C of the low-flow plan provide a memo that indicates that the Port will not be using infiltration facilities on the embankment?

A I would have to refer to appendix C.

Q You don't recall what's in appendix C?

A I don't recall exactly what's in appendix C.

Q Did King County ask the Port to include infiltration facilities on the embankment?

A King County asked the Port to consider methods that would enhance infiltration into the embankment.

Q And that's documented in Kelly Whiting's memo to the Port or memo or review comments on the December 2001 low-flow plan; is that right?

MR. REAVIS: Objection. Lack of foundation.

MS. COTTINGHAM: Sustained.

Q (By Ms. Osborn) So what you are calling an infiltration method in paragraph 15, what you are really talking about is rainfall falling on the embankment; is that right?

A That's correct.

Q Now, at paragraph 17 you state there at line 16 and 17 that detained stormwater will be discharged into the streams during the normal low-streamflow period for

each of the streams; is that right?
A That's correct. That's what it says.
Q But you are not providing any mitigation in June or in the first 23 days in July for low-flow impacts; is that correct?
A It depends on which watershed that you are speaking of.
Q Are you providing low-flow mitigation in any of the watersheds in June or the first 23 days in July?
A No.
MS. COTTINGHAM: I'm going to have to remind you again to speak up a bit.
Q Looking at paragraph 21, this paragraph seems to imply that Ecology's stormwater manual calls for the collection and detention of runoff which is then slowly released to avoid flow impacts.
Is it your testimony that the Ecology manual identifies such a technique for low-flow mitigation?
A No. The Ecology manual does not have specific requirements for low-flow mitigation; however, it includes --
Q That's the answer. Your counsel can follow up with you, if need be.
Looking a little further in this paragraph, you state this is the alternative required by Ecology to mitigate impacts.

Wasn't the idea of using, detaining stormwater for low-flow augmentation in the summer, wasn't that the Port's idea?

Looking at the very last sentence in paragraph 21.

A I don't understand your question. I would have to read back to see what "this is the alternative" means.

Q You can look at the prior sentence for context.

My question is, you seem to indicate that Ecology imposes on the Port, but it was actually the Port's idea to do this; right?

You created the plan and said this is how we would like to mitigate impacts, low-flow impacts; is that correct?

A The Port developed the plan to mitigate low-flow impacts.

Q Which was then incorporated into the 401 certification; is that right?

A Yes.

Q Now, in paragraph 22, you state, going over into the next page, that stormwater will be detained in vaults and ponds and then released to the streams at approximately same time and in the same amount that the natural system would have provided water to the stream.

This statement rests on the assumption that the Port's modeling is accurate; isn't that correct?

A Yes.
Q Now, looking on page 7, paragraph 26, you are discussing peak-flow detention facilities in this paragraph, aren't you?
A Yes, I am.
Q And these are, these peak-flow detention facilities are enormous, are they not?
A I don't have a context for enormous.
Q Are they large?
A Compared to a regional detention facility, no. Compared to something that would be at a 7-11, yes.
Q And then looking at paragraph 29 on the next page, page 8, you're discussing wet ponds and wet vaults and constructing wetlands with various stormwater BMPs.

Is it your testimony that these are projects that use detained stormwater for targeted low-flow mitigation?
A No.
Q When you describe these stormwater facilities, these are peak-flow facilities; right?
A No.
Q They are not peak-flow facilities?
A No.
Q They are treatment facilities?
A Yes.

Q You also state on paragraph 8, or excuse me, page 8, paragraph 31, the very final sentence that it's possible to determine the effects of new development to predict potential impacts with a high degree of reliability.

You are talking about the modeling here, is that right, the HSPF modeling for low-flow impact?

A What I described is that the models have the ability to determine or evaluate difference or changes due to development.

Q Was there any kind of sensitivity analysis done for the models?

A The calibration that's done, to my understanding, is --

Q Was there any kind of sensitivity analysis done?

A -- is part of the calibration is to evaluate the sensitivity of each of the parameters that are included.

Q Now, looking at page 10, paragraph 32, not paragraph 32, paragraph 39 is what I'm looking for here, a mistake in my notes, you take issue here with Mr. Luster's statement that 1.0 cfs is needed in Des Moines Creek to maintain characteristic uses; is that right?

A That's correct.

Q And wasn't the Port required to provide mitigation to

maintain 1.0 cfs in Des Moines Creek in its original, in the 1998 401 that was issued and then later withdrawn?

A My understanding is the Port was required to provide up to 1 cfs.

Q Maintain a flow of 1 cfs; is that right?

A To provide up to 1 cfs flow.

Q In Des Moines Creek?

A In Des Moines Creek.

Q And then in the summer or in September of 2000, the Port offered a low-flow mitigation plan that would also have maintained up to 1 cfs in Des Moines Creek; is that right?

A I'm not specifically recalling that.

Q In any event, when you say at the bottom of the page here that the suggestion of 1.0 cfs is entirely unprecedented, you are forgetting about the Port's precedent; is that right?

MR. REAVIS: Objection. Argumentative.

MS. COTTINGHAM: Restate your question to be nonargumentative.

Q (By Ms. Osborn) Well, when you state here that the Mr. Luster's suggestion is entirely unprecedented, you are forgetting about the Port's 1998 section 401 certification; is that right?

MR. REAVIS: I think that's the same question. I think it's argumentative because she is suggesting he is forgetting without asking him a question. I think it's a statement by counsel as opposed to a question.

MS. COTTINGHAM: Sustained.

Q (By Ms. Osborn) Looking at page 12, paragraph 45, first of all, could you tell me -- in this paragraph, there's some discussion of we have found this and we have also found that. Who is we?

A We is the Parametrix team that's working on low flow and streamflow.

Q And is this paragraph related to the Port's, the modeling for the Port, or is it a more general statement?

A This is referring to modeling done for the Port.

Q And you state here that new impervious surface is a predominant cause of base-flow reduction, changes such as vegetation and so forth have little or no perceptible effect.

So would you agree that cutting down a forest and changing the land over to, say, sports fields would have no effect on runoff?

A Changing land cover can have an effect on runoff.

Q So changing land cover in addition to changing

impervious surface, vegetative land cover in addition to impervious surface could have an effect; is that right?

A What it says in 45 is that I'm referring specifically to the relationship of impervious surfaces to base flow.

Q So is it your testimony that changing vegetative cover would not have an impact on base flow?

A No. What I said is that it has, that the predominant cause for base-flow reduction is impervious surface.

Q So moving on to paragraph 54 on page 15 --

By the way, you state that -- well, strike that.

Looking down at the bottom of the page, you have some general discussion of modeling and calibration in these paragraphs, and down at the bottom, you indicate that it's improper to, you don't consider the difference between existing measured flows and model-predicted future flows, but what you do is you look at the difference between the model existing flow and model future flow; is that right?

A That's correct.

Q So it's critical that you model those existing flows accurately; is that right?

A It's critical that you provide good data in your models.

Q Is it critical that your model be accurate in terms of predicting the existing conditions?
A Yes.
Q And you use calibration as one of the mechanisms to do that; is that right?
A Yes.
Q So if you undersimulate existing conditions in your model and then you go to, you attempt to monitor whether your modeling, later at postconstruction, you attempt to model whether your monitoring, excuse me, you attempt to monitor whether your modeling, model existing conditions are being met. If you undersimulate those conditions in your model, then you are going to be looking at a lower level of streamflow or what was actually existing in the stream under preconstruction conditions; isn't that right?

MR. REAVIS: I'm going to just object, because I don't think there's been a foundation laid for this witness to testify about the modeling. He said he didn't actually do any of the modeling here.

MS. OSBORN: Mr. Fendt has provided pages of analysis about modeling, the models in his prefiled testimony.

MS. COTTINGHAM: Are you asking him about this model or in general modeling?

MS. OSBORN: I can ask him specifically about the modeling.

Q (By Ms. Osborn) For example, in Des Moines Creek, if you undersimulate existing flows in Des Moines Creek, wouldn't that tend to lead you to believe when you are monitoring, postconstruction, that if the flows fall to that undersimulated level that in fact you are not meeting the existing targets or the existing streamflows; you are going to underpredict the impacts, too?

A I don't understand. I didn't hear a question, I guess.

Q If you undersimulate the existing conditions as, for example, in the Des Moines Creek model, and then after construction you are monitoring to see whether your modeled conditions meet what's actually going on in the stream, then you will be looking at this lower level in the stream, won't you, as modeled in the existing conditions model?

A You are not creating a hypothesis, that's correct.

Q Now, looking at page 16 of your testimony, paragraphs 57 and 58, going on over to page 17, twice in here you indicate that you were discouraged by King County for making any significant changes to the calibration model; is that right?

A That's correct.

Q And so it is your testimony that even though the Des Moines Creek calibration was undersimulating flows, the regulators told you not to fix the problem?
A I did no evaluation of whether or not the flows were being undersimulated or not. Those were your words.
Q You did no evaluation of whether the flows were being undersimulated?
A I did not personally do that as part of the calibration.
Q Are you saying that the regulators told you not to do it?
A The regulators told us not to change the Des Moines Creek calibration.
Q Looking at paragraph 58, again, you say that model calibration made use of all available data and all available gages, but you didn't use data from gage 11f; is that right?
A That's what I recall.
Q And the section 401 certification required you to use, to calibrate or compare at gage 11f; is that right?
A I don't recall.
Q You don't recall whether that condition is contained in the section 401 certification?
A No, I don't.
Q Let me have you take a look at Exhibit 1. Just take a

moment here to find it.

Take a look at page 23, section B, Des Moines Creek, small Roman numeral "i." The condition states, revised plan shall provide data comparing the existing simulation of low flows against the Tyee Golf Course weir gage data.

Is the Tyee Golf Course weir gage, gage 11f?

A Yes, I believe so.

Q Now, looking at paragraph 60 and 61, you're addressing Dr. Leytham's comment that different infiltration parameters were used for an identical piece of property, and you acknowledged that you did that; is that correct?

A No, that's not what I said here.

Q Did you use different infiltration parameters for the same piece of property?

A The infiltration parameters are used and not described for the same piece of geography in, I guess it's in the real world, would be the best way to put it, rather than in the modeling world.

Q Now, looking at pages 18 and 19 and paragraph 63 through 67, there's discussion here of the industrial wastewater system and low flow; is that right?

A That's correct.

Q And you didn't model changes in the groundwater flow

associated with the industrial wastewater system and the upgrade to the system, is that correct, as a part of the low-flow modeling?

A Would you clarify which item that is upgraded that you are referring to.

Q I'm thinking of, for example, the leak detection and upgrade or the lining of the lagoons.

A We did not evaluate the lagoon lining and report on it, nor did we evaluate the leak protection system.

Q Now, looking at paragraph 69, you discuss the issue of borrow areas 3 and 4, and you cite the Pacific Groundwater Group 2000 study for the statement that recharge to the shallow aquifer will increase as a result of excavating those borrow areas.

With respect to these excavations of borrow areas, doesn't the PGG study say that the timing of discharge in Des Moines Creek was not analyzed?

A I would have to go back and review the PGG study.

Q And the Port did a complex modeling exercise for the embankment which involved, I don't know, 17 or so million cubic yards and that involved the HSPF and Hydrus and Slice; is that correct?

A That's correct.

Q But there was no -- you didn't model the removal of about 6 million cubic yards of soil from the forested

uplands of Des Moines Creek; is that correct?
A That's correct.
Q Looking at the very top of page 26, you state, under the low-flow analysis, storage stormwater is being used solely to augment streamflows and not to ensure compliance with numeric low-flow water quality standards.

Isn't the low-flow mitigation plan intended to mitigate for the narrative water quality standards which are intended to protect beneficial uses in the stream?

MR. REAVIS: Objection to the extent it calls for a legal conclusion.

MS. COTTINGHAM: I'll allow the question.

A Could you repeat the question, please.
Q Isn't the purpose of the low-flow mitigation plan to mitigate for the narrative water quality standards which are intended to protect the beneficial uses of the stream?
A The purpose of the low-flow mitigation is to address low-flow impacts, mitigate the low-flow impacts.
Q And so you state at the very bottom of your testimony, the bottom of page 28 that there's reasonable assurance that water quality impacts have been fully mitigated.

Do you work for the Department of Ecology?

A No, I don't.

MS. OSBORN: That's all I have.

MS. COTTINGHAM: Mr. Poulin?

MR. POULIN: Yes.

EXAMINATION

BY MR. POULIN:

Q Mr. Fendt, Rick Poulin for CASE.

You said you were the author of the comprehensive stormwater management plan?

A That's correct.

Q And that's the plan that includes the Port's proposal on dealing with stormwater discharges that will result from the proposed projects?

A That's correct.

Q And you've been working on stormwater issues at the Port for a number of years?

A That's correct.

Q Let's look at two exhibits, Exhibit No. 663 and also Exhibit 139, which is the 1999 annual stormwater monitoring report.

MS. COTTINGHAM: What was the second number?

MR. POULIN: The first was 663 and the second was 139, and once you've found that second exhibit, 139, please turn to page 22.

MS. COTTINGHAM: Page 22, did you say?

MR. POULIN: Yes.

Q (By Mr. Poulin) Now, Exhibit 663 is a memorandum on Parametrix letterhead?

A That's correct.

Q And the from line says Ken Ludwa, Paul Fendt, Linda Logan.

Is that your name and initials?

A Yes.

Q Is Ken -- is it Lud-wa, Lud-way?

A Lud-wa.

Q Is he one of your coworkers?

A Yes, he is.

Q Do you supervise Mr. Ludwa?

A Yes, I do.

Q And who is Scott Tobiason, the recipient of this memorandum?

A Scott Tobiason is a Port employee.

Q Now, down in the fourth bullet that's not indented, which would be the second one from the bottom --

Sorry. Jump to the bottom here. On the regarding line of this memorandum, it states it's a review of the 1999 annual stormwater report.

Do you see that right up under your name?

A Yes.

Q You are reviewing that first draft of the 1999 report for Mr. Tobiason?
A That's correct.
Q You state here in that second to last bulleted paragraph: Section 4.5.3 states that standards apply to the receiving waters. This is true only if a mixing zone is allowed, otherwise standards must be met at end of pipe. A determination has not been made as to whether STIA stormwater discharges will be allowed a mixing zone. The first paragraph of section 4.5.3 should be deleted.

And you are referring to this discussion of metals that we see on page 22 of the 1999 stormwater report, isn't that right, paragraph 4.5.3?
A It appears to be the reference.
Q And you are not aware any of mixing zone that's been granted to the Port of Seattle for stormwater discharges, are you?
A No, I'm not.
Q Are you aware of a reasonable potential analysis that was done by the Port of Seattle for the Department of Ecology?
A I'm sorry. Done by whom?
Q By the Port of Seattle and/or the Department of Ecology.

A No, I'm not.
Q You are not. Okay.
Let's look at Exhibit No. 662. It should be right next to that memorandum.
Would you agree the first page is a fax cover page that indicates it was sent by Paul Fendt?
A That's correct.
Q Second page appears to be another version of the same sent by Paul Fendt, comments copper?
A That's correct.
Q On the third page, we see water quality, talking points, copper. This is a memorandum that you sent to Barbara, is it, Hinkle?
A That's correct.
Q And who was she? Who is she, I should say.
A Barbara Hinkle was the Port's project manager, the manager of our contract.
Q And in this memorandum to Ms. Hinkle, you state under background, a four-hour reasonable potential analysis was completed during the 401 negotiations last summer to determine the effectiveness of BMPs to remove metal from stormwater.
You don't remember that reasonable potential analysis?
A I wasn't at that reasonable potential analysis, and

you'll note that it's in quotes, which was basically if I put it in quotes, the only reason would be it's just a way to refer to it. It wasn't truly a reasonable potential analysis.

Q But whatever it was, you are aware of it, aren't you?

A I was aware that it occurred.

Q Yes. In fact, you wrote a memo about it, didn't you?

A No. This memo is not about, whatever, about the reasonable potential analysis.

Q Now, you state here that the results showed that standard BMPs would effectively remove all metals except copper. Do you remember that?

A I remember the document that was prepared that reflected the study.

Q No. I'm asking if you remember making this statement.

A Do I remember making this statement?

Q Yes.

A No.

Q And then in the next paragraph it says, the 401 certification required that one of eight BMP treatment trains be used and that each requires a sand filter or compost filter.

Do you understand what a treatment train is?

A Yes, I do.

Q It's a sequence of BMPs, isn't it?

A That's correct.
Q And this reference to the 401 certification must be referring to some 401 certification that took place prior to October 27th, 1998; isn't that right?
A Yes.
Q And then it states here in your memo, in the third paragraph below the bold word, issues, the Port has been required to meet water quality standards for stormwater discharges in the 401 certification. This is a departure from stormwater discharge compliance through BMPs.
A Yes, that's what it says.
Q Are you suggesting there that you don't feel the Port should be required to meet water quality standards?
MR. REAVIS: Objection. I think that mischaracterizes the document.
MR. POULIN: That's the question.
MS. COTTINGHAM: Can you repeat your question.
Q (By Mr. Poulin) Are you asserting here that you don't believe the Port should be required to meet water quality standards for stormwater discharges?
A What I say is what it says there and that is that the Port is required, based on the 401 certification, to meet water quality standards.

Q That's the previous 401 certification.
A That's right.
And the second part of it says, this is a departure from stormwater discharge compliance of BMPs.
Q And that's a reference to the NPDES permit, isn't it?
A I don't recall specifically, but I believe so.
Q Let's look briefly at Exhibit 652, which again is nearby the previous exhibit, in the same binder.
This is a preliminary comprehensive stormwater management plan and stormwater management quality plan?
A Yes.
Q Did you have occasion to review this draft in your report?
A I reviewed this draft around the time that it was prepared.
Q And if you looked at page 10 of this draft, you will see a statement under paragraph 3.3.3.
It states, no formal water quality treatment BMPs are in place for the SDS. That's the stormwater detention system?
A That's correct. No. I'm sorry. That's the stormwater drainage system.
Q Do you believe that statement is accurate as of the date?
A I believe that was our understanding in July of 1998.

Q That there was no formal water quality treatment BMPs in place?
A Not for the stormwater drainage system.
Q And turning to page 18 of this same document we find another discussion of the reasonable potential analysis.

MR. REAVIS: I'm sorry. What page?

MR. POULIN: Page 18, under the heading at the top, paragraph 4.

Q (By Mr. Poulin) It explains that preliminary reasonable potential analysis was performed, results were adjusted according to documented pollutant removal effectiveness of the BMPs, and resulting predicted pollutant concentrations were then compared to water quality criteria.
A That's what it says.
Q Were you kept abreast of this work as it proceeded?
A That's what I recall.
Q And it states here that the RPA was performed on June 30th, 1998, in a working meeting attended by representatives of the Port and the Department?
A That's correct.
Q The purpose of that reasonable potential analysis was to determine whether the best management practices that the Port was considering for the third runway would

enable it to meet water quality standards; isn't that right?

A I don't recall what the purpose was.

Q Now, with respect to criteria, doesn't this analysis state that criteria reflecting Washington State water quality standards were calculated for Miller and Des Moines Creek and there's a reference there to table 4.1?

A I'm sorry. Could you repeat the question.

Q On page 18, paragraph 5.3, it explains that criteria reflecting Washington State water quality standards were calculated for Miller and Des Moines Creek, and it refers to table 4.1.

A Yes.

Q And that table shows criteria for Des Moines Creek for copper, lead and zinc, doesn't it?

A Yes, it does.

Q And the total copper criteria is 6.7 parts per billion. Do you see that?

A For Des Moines Creek, yes, I see that.

Q Now, as a result of that information, the Port embarked on a process to consider how it might possibly satisfy water quality criteria; is that right?

A I don't recall.

Q I'm sorry.

A I don't recall.
Q You don't recall.
Well, take a look, if you would, at Exhibit 646. This is a memorandum to you from Ken Ludwa.
Do you remember receiving this memo?
A Not specifically.
Q It states here on the second page, using the assumption described above, pollutant concentrations are predicted to be at approximately the criteria values or less, except for copper. Copper concentrations after treatment remain higher than the criteria.
A That's what it says.
Q And in the following year, you were kept abreast of efforts to find a way to satisfy the criteria for copper; isn't that right?
A I don't understand what you mean by kept abreast of.
Q Your staff would inform you about the results of their work on the issue.
A No. We weren't working on the issue.
Q Well, let's take a look at Exhibit 645, please.
This is another memorandum on Parametrix letterhead. This is dated September 7th, 1999. This is some months after the reasonable potential analysis, isn't it?
A It's some months after the meeting that was held to

evaluate the removal of deficiencies in the BMPs.

Q And this is a memorandum to you?

A Yes.

Q From Jim Dexter?

A That's correct.

Q He's someone on your staff?

A He was, yes.

Q He was.

And he states here: I used a spreadsheet to calculate the reasonable potential to exceed WQC, water quality criteria, in an approach that can be classified as a dynamic modeling technique. The calculations, later in the paragraph, the calculations applied to the Des Moines Creek point of compliance, which is assumed to be the outlet of the Northwest Ponds. The effluent is assumed to be from the SDS 3 outfall.

Now, was that work that Mr. Dexter performed on a voluntary basis, or was he asked to do that as part of his job?

A Dr. Dexter was asked to do this as part of his work.

Q And if you turn to page 5, after a considerable amount of discussion and analysis, that I think only a scientist would love, under the table labeled, "Reasonable Potential Analysis for Des Moines Creek," this memo states: The previous figure shows that only

Case No. 10 resulted in all the predicted exceedance values being negative; that is, the WQC was achieved. The assumptions in this case were a WER value of four; second, utilization of the full volume in the Northwest Ponds for mixing and additional flow control of 10 cfs.

And skipping a sentence, Dr. Dexter states: The conclusion I have from these simulation results is that the WER is more important than either the volume for mixing or the flow detention amount in terms of achieving WQC compliance. A WER value of 3 or greater is needed for WQC compliance.

And do you still not recall this work taking place under your watch?

A I know that we were, at some point, looking at addressing the standards as you are talking about. I really don't recall this memo.

Q Do you recall the conclusion stated on pages 6 that using this magnitude for the WER in combination with a greater amount of allowable mixing volume in the Northwest Ponds will allow the Port to achieve WQC compliance in Des Moines Creek?

A I said I don't recall this memo.

Q Let's see if you recall Exhibit 640. This is dated August 20th, 1999, again, from Jim Dexter to you on Parametrix letterhead.

If we skip to the chase, we'll see that on page 2, under findings, Dr. Dexter reports that the ambient values of total dissolved copper concentration exceed the water quality criteria in about 37 percent of the samples based on the associated water hardness value.

Skipping a sentence, however compared to the standard based on the minimum reported hardness value in the dataset, about 65 percent of the ambient values exceed the standard.

And again under conclusions, he states, the simulation results indicate that the water quality criteria is exceeded regardless of the magnitude of the streamflow. You don't recall that?

A No, I don't. I know that was there analysis that was going on at the time, and usually those analyses if there's issues or problems that are related to the other work, then I'm informed of them.

Q Well, let's look at Exhibit 647. Perhaps you can help me with this.

This appears to be some kind of project time line?

A That's correct.

Q And it has Parametrix, Inc. stamped in the lower left corner?

A That's correct.

Q And it appears to indicate the steps of, it looks like,

a 59-step process entitled, "Water Resources Analysis Schedule."

A Yes.

Q And you see up here that step 23 is reasonable potential analysis?

A Yes.

Q And there's a step 25, water effects ratio; step 28 negotiations.

A Yes.

Q Is this the first time you've seen this exhibit?

A I don't recall seeing this before.

Q Okay. One other question. You stated that you had the low-flow modeling peer reviewed by Norm Crawford?

A That's correct.

Q But you did not follow all of Mr. Crawford's recommendations; is that correct?

A There were two different reviews that Dr. Crawford provided, and in the first review, we did all but one of his written comments, and we had a discussion with him about that with the low-flow team. We did not, we agreed not to do that other element, and later he did a peer review of the work that followed the work for the December 2001 low-flow plan.

MR. LYNCH: Excuse me. Can you speak a little louder, please.

Q You said you did not follow all his recommendations?
A What I said is that on the first -- he did two reviews. He did a review of the July report, and in the July report he made some recommendations, and one of the recommendations we did not follow. We had a discussion with him with the project team about the recommendation, and he was ambivalent about the comment. He felt there were arguments that were pro and con on his comment.
Q That answers my question.

Has that second peer-reviewed report been produced to Appellants?

A I don't recall if he wrote a report, a peer-review report about it. A lot of the work was kind of real-time review. He would review work as we were doing it, and then he may have written us an e-mail, but I just don't recall right now.
Q Was the e-mail produced?

MR. REAVIS: I think he testified he wasn't sure there was one, so lack of foundation.

MR. POULIN: Okay. No further questions.

MS. COTTINGHAM: Any redirect?

MR. REAVIS: A little bit.

EXAMINATION

BY MR. REAVIS:

Q Let me ask you about this Tyee Golf Course gage, and if I could ask you to refer to your prefiled direct.

Paragraph 58, third sentence, says the model would not have been calibrated completely to gage 11f because of lack of any record before 1995.

Can you explain that statement for us, please.

A The calibration that was done was done from the time period of 1991 through 1996, and the gage 11f only had records for two years, 1995 and 1996, so there wasn't a an ability to make a comparable calibration comparison with 11f as compared to 11c and 11e.

Q Did you consider 11f at all?

A 11f was considered by the modelers. I recall a conversation with them about it.

Q And who would those modelers be?

A The modeler on the Des Moines Creek plan would be Dr. Felix Kristanovich.

Q Now, you were asked some questions about the IWS system lagoons and so forth, and to your knowledge, are those master plan update projects?

A The IWSS lagoon plan is not a master plan project.

Q Do you know what the Port is doing in terms of lining lagoons and what the impetus is for doing that?

A The purpose of lining the lagoons is to prevent leakage and stormwater from the industrial areas at the airport from leaking into the groundwater.
Q Is that required by some sort of regulatory authority?
A My understanding is it's an element of, an outcome of work that was done in response to the NPDES permit.
Q Do you know if the Port has to do that work regardless of whether or not the master plan update project proceeds?
A My understanding is they have to, they would do it, and they are doing it whether there's a master plan update or not.
Q I was going to ask you about Exhibit 662, which was the memo that was faxed from you to Barbara Hinkle in October of 1998, and over on the first full page of that memo, Mr. Poulin asked you some questions about this, what you described as reasonable potential analysis, in quotes.

Could you just read for us that full paragraph there under the word background.
A A four-hour reasonable potential analysis was completed during the 401 negotiations last summer to determine the effectiveness of BMPs to remove metals from stormwater. The analysis was extremely conservative and used the methodology that has not been adopted or

recognized to answer questions regarding the quality of stormwater.

Q Now, he also asked you some questions about Exhibit 645 relative to some calculations that were going on, and if I can find the paragraph here, there was a discussion of an assumed WER value.

Do you remember that?

A I remember Mr. Poulin reading that.

Q And is the Port in the process of conducting that type of study currently?

A Yes, they are.

Q And when do you expect that will be completed, if you know?

A I don't know when it will be completed.

Q You were also asked some questions about BMPs in the stormwater drainage system. Do you remember those questions?

A Yes, I do.

Q Are there treatment BMPs as a part of the Port's stormwater management system?

A There are stormwater treatment BMPs as part of the stormwater drainage system, yes.

Q Are you aware of any changes that occurred in the BMPs since the dates of these various memos, '98 and '99?

A I know there have been some BMPs applied to redirect

stormwater from areas that were originally draining to the storm drain system and redirecting them to the IBS system, so it would be a source controlled by a BMP.

MR. REAVIS: That's all I have for now. Thanks.

MS. COTTINGHAM: Mr. Young, do you have any?

MR. YOUNG: No.

MS. COTTINGHAM: I have a couple of questions for you. I want to make sure it's for you.

EXAMINATION

BY MS. COTTINGHAM:

Q You had talked about the allowance for new and experimental BMPs to be developed. Did you say that was allowed in the NPDES, or is that from the manual of regulations?

What was the source of that allowance?

A What I said is the allowance is typically in the stormwater management manuals.

Q In the manuals?

A Yes.

Q You also said that through the process of adaptive management, the Port can create more low-flow facilities. I think actually I meant vaults.

Is there anything that directs this in the current

401?

A I don't recall specifically being directed. I know that the monitoring describes things that we would monitor and allows for making adjustments as a result of the monitoring.

MS. COTTINGHAM: Thank you. Any other questions from the Board Members?

MR. JENSEN: Yes.

EXAMINATION

BY MR. JENSEN:

Q Mr. Fendt, do you have knowledge of any studies which would show the relative contribution to lowering base flows of impervious surfaces versus forested conditions in this project area?

A I know of no specific studies that makes a comparison between impervious surfaces and forested areas. I do know that in general, in having discussions with hydrologists, that true forested areas, when compared with impervious surfaces actually have a lower amount of water that's available to provide a base flow, because evapotranspiration is so high in true forested conditions.

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

MR. LYNCH: No questions.

MS. COTTINGHAM: Are there any questions as a result of Board questions?

MR. POULIN: Yes, I have one, Your Honor.

EXAMINATION

BY MR. POULIN:

Q Regarding BMP vaults, would you please turn to Exhibit 1213. This is the technical appendices, volume 4 to the comprehensive stormwater management plan.

MS. COTTINGHAM: We don't have it, just so you know.

MR. POULIN: You may have a single volume of it. I'm not sure.

MS. COTTINGHAM: I believe we do.

MR. LYNCH: Could you give us the cite again, please.

MR. POULIN: It is volume 4, the technical appendices to the CSMP, Exhibit 1213.

Q (By Mr. Poulin) Appendix M, Mr. Fendt, is identified as water quality BMP cost estimates for areas determined to be nonpracticable for retrofitting.

A I'm sorry. I haven't found appendix M yet.

Q It's behind a blue tab.

A I don't have any tabs.

Q Well, why don't you look at mine, and let me pose my

question before I lose my copy.

Doesn't this appendix M indicate that among those water quality BMPs for areas determined to be nonpracticable for retrofitting are four vaults for SDS 3. Those are vault numbers 1, 2, 3 and 4 and also two storm drainpipes for SDS 3 vaults?

MR. REAVIS: I'm going to object. I'm not sure this is responsive to any Board questions.

MR. POULIN: The presiding officer asked a question about the ability to use vaults for BMPs and to add them, and I think it's appropriate to point out --

MS. COTTINGHAM: I'll allow the question.

A So the question is? I'm sorry. Could you repeat the question.

Q Yes. Hasn't the CMP identified four vaults at SDS 3 as impracticable for retrofitting due to cost issues?

A What appendix M is are water quality BMP cost estimates for likely or possible or conceptual water quality facilities that could occur, and they happen to be four vaults from the SDS 3 area.

Q Could you please read the title page to that appendix.

A It says, water quality BMP cost estimates for areas determined to be nonpracticable for retrofitting.

Q Determined to be nonpracticable for retrofitting?

A That's right.

MR. POULIN: Thank you. No further questions.

MS. OSBORN: I have a question, if I might.

EXAMINATION

BY MS. OSBORN:

Q Mr. Fendt, you indicated in the response to Mr. Jensen's question that at least mature forests might be infiltrating less water because of evapotranspiration; is that right?

Isn't evapotranspiration -- that occurs during the summer season; right?

A Evapotranspiration in a confer forest, is my understanding, can occur year-round.

MS. OSBORN: That's all I have.

EXAMINATION

BY MR. REAVIS:

Q Let me ask you a question relative to Ms. Cottingham's question about adaptive management.

Is there a provision in the low-flow plan that talks about contingency measures?

A Yes, there is.

Q Could you explain for us just a little bit more this

concept of these forested areas versus impervious cover and evapotranspiration. I just want to make sure that's understood.

A I think the best thing to do is to provide a little bit of background and to understand when we're doing hydrologic modeling -- I guess you've heard about what a mass balance is. I think Mr. Whiting talked about mass balance.

So what happens is a certain amount of rain falls on the ground, and once it falls on the ground there's certain things that happen to it. One thing that happens is it infiltrates. Another thing that happens is it runs off, and another thing that happens is some of it evaporates back into the ground where it is used by the vegetation and transpires.

So when we're looking at low-flow impacts, that component that can infiltrate into the ground, that becomes the part of the water that goes to the ground and comes out later as base flow, and what's been found in some studies is that rainfall that falls in mature forests or good forests can be either intercepted by the leaves and the needles of the trees and then evaporated from there or be used by them, and that amount of water can actually be greater than the amount of water that infiltrates into the ground at the same

time.

So by removing the forest, in this case, and replacing it with impervious surface, you may actually not be reducing -- you actually could be reducing the amount of -- increasing the amount of water that's available to infiltrate.

Q Let me ask you, does the HSPF model deal with evapotranspiration?

A Evaporation and transpiration and evapotranspiration is a modeling parameter.

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

MS. COTTINGHAM: Do you have any questions?

MR. POULIN: No. Thank you.

MS. COTTINGHAM: Thank you. You are excused.

MS. OSBORN: Ms. Cottingham, before the witness is excused, he has testified to a peer review that was apparently done by Mr. Crawford that is not contained in his prefiled direct testimony. Mr. Fendt was deposed on February 8th, no mention of it in the deposition on February 8th, and we are wondering while he's here and under oath whether we might voir dire about when this peer review took place.

MR. REAVIS: I don't have an objection to that.

MS. COTTINGHAM: Go ahead.

EXAMINATION

BY MS. OSBORN:

Q That's the question, Mr. Fendt.

A There were two peer reviews that occurred. One was immediately following what I call immediately following the July 2001 report.

Q And, actually, just -- excuse me. We're familiar with that one. I've seen the documents relating to that. You referred to a peer review of the December 2001 low-flow plan.

A Yes. He reviewed the work we were doing in the December low-flow plan.

Q And when did he do that?

A He was doing it at, basically, at the same time we were preparing the report.

Q So it was in advance of the publication of the report?

A It was in advance of the publication of the report.

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

MS. COTTINGHAM: You are excused now.

MR. REAVIS: Ms. Cottingham, can we stop the clock for minute and move all this stuff out of the way before we get our next witness?

MS. COTTINGHAM: Okay. Stop the clock.

One of the things as you all recall, tomorrow

morning when we have our conference, is I'm going to want a pretty tight budget for the remaining few hours that will be done, just to give you a sense that we're running out of time, and we still have some witnesses.

MR. STOCK: Ms. Cottingham, I'm not sure why the clock is stopped during the transition of their witnesses when it was running during the transition of ours.

MS. COTTINGHAM: We all had a bunch of documents up here that we all needed to move so.

MR. STOCK: Time is getting tight; that's why I'm raising it.

MS. COTTINGHAM: Right. Start the clock.

MR. REAVIS: The Port calls Steve Swenson.

STEVEN J. SWENSON, having been first duly sworn upon oath or affirmed to tell the truth, the whole truth and nothing but the truth, testified as follows:

EXAMINATION

BY MR. REAVIS:

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

A Steven J. Swenson, and my last name is spelled

S-w-e-n-s-o-n.

Q Mr. Swenson, how are you employed?

A I am employed by an engineering consulting firm, R.W. Beck.

Q And how long have you been employed by R.W. Beck?

A Since 1977.

Q Can you describe for us the nature of your duties.

First, let me ask you, are you professional engineer?

A Yes.

Q Are you licensed in the state of Washington?

A Yes, I am.

Q Can you describe for us the primary or the types of work that you do at R.W. Beck?

A I've been working on urban stormwater management design planning, regulatory types of issues since about 1980.

Q And is a copy of your CV attached to your prefiled testimony?

A Yes.

Q Does that describe the types of projects that you have worked on in the course of your work for R.W. Beck?

A That's correct.

Q Can you give us a brief summary of your educational background.

A I have a bachelor of science in civil engineering from

the University of Washington, specializing in hydrology, hydraulics, water quality, issues related to the water, wastewater, stormwater.

Q Have you worked in the field of stormwater management?

A Correct.

Q How long have you worked in that field?

A Since 1980.

Q In your prefiled testimony, paragraph 5, you describe what I think you call environmental impacts of uncontrolled stormwater; is that correct?

A Correct.

Q Can you tell us what those are, briefly.

A The primary impacts from uncontrolled stormwater are increases in peak flows, increases in pollutant concentrations from stormwater runoff picking up those pollutants, and reductions in streamflows during dry weather periods.

Q As part of your work, have you addressed those three issues as related to stormwater?

A Absolutely.

Q Now, are you generally familiar with the stormwater management plan developed by the Port of Seattle for the third runway project?

A Generally.

Q Can you tell us, generally, how it addresses those

environmental impacts, and again, I know we've heard a lot from Mr. Fendt, so if it's in your prefiled and you just prefer to rely on that, that's fine, but if you can just describe for us briefly what your understanding is.

A Generally, the impacts from stormwater runoff from the site are mitigated for with a number of facilities, detention facilities, water quality treatment facilities, the ponds and the vaults, infiltration, and those types of things to mitigate the three things I talked about previously.

Q In the course of your work, have you seen facilities like that before?

A Absolutely. We work on those things all the time.

Q Do you have any estimate about how many operating stormwater management systems there are in the state?

A Thousands.

Q And in your experience, has a water right ever been required relative to that type of stormwater management system?

A No.

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

MS. MARCHIORO: I have no questions.

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EXAMINATION

BY MS. OSBORN:

Q Good afternoon, Mr. Swenson.

A Good afternoon.

Q You spent quite a bit of ink in your declaration here talking about benefits of infiltration for purposes of maintaining base flows in streams; is that right?

A Sure.

Q Are you aware that the Port will not be using enhanced infiltration facilities on the embankment that it's constructing for the third runway?

A What do you mean by enhanced infiltration?

Q Infiltration facilities.

A I'm not familiar with the detailed location of different infiltration systems proposed on the site.

Q Now, looking at your prefiled testimony, page 7, paragraph 16, at the bottom of that paragraph you are referring to, you say, likewise the vaults and ponds being used to detain collected stormwater, are you referring to the Port's vaults and ponds? Is that right?

A I'm sorry. Where is it you are referring to?

Q I'm sorry. It's page 7, line 12, line 11 and 12.

A Okay. And what's the question. I'm sorry.

Q The question is, first of all, the first clause of this

is referring to the Port's vaults and ponds; is that right?

A Yes.

Q And you indicate here that they are large; is that right?

A Let's see.

Q The clause while large is modifying the clause vaults and ponds; is that right?

MS. COTTINGHAM: We're not on the same page that you are on.

MR. REAVIS: Are we on paragraph 16? That is on page 6 of mine.

MS. OSBORN: Oh, my God. I'm using Mr. Swenson's declaration, not his prefiled testimony.

No. Your testimony is dated 14th of January, 2002?

MS. MARCHIORO: No, it's March 7th.

MR. REAVIS: I think that is the declaration.

MS. OSBORN: Well, I'm looking at the wrong --

MS. MARCHIORO: Do you want to borrow mine?

MS. COTTINGHAM: I think we all found where you were at. You are in paragraph 16 of his prefiled testimony.

MS. OSBORN: Right.

THE WITNESS: On page 6.

MS. OSBORN: Right. What I'm missing is Mr. Swenson's direct testimony. I apologize.

MS. MARCHIORO: I didn't mark on it.

MS. OSBORN: I know I had it last night.

Q (By Ms. Osborn) Okay. So on page 6, you indicated, at line 19, you indicate that the Port's vaults and ponds are large; is that right?

A Yes.

Q Now, in paragraph 17, you state that, you're responding to ACC's contention that the stormwater management system requires a water right because it is not a typical stormwater detention project; is that right?

A I'm not understanding your question.

Q I'm just asking, with respect to paragraph 17, my question is, what prefiled testimony are you responding to here?

A There's -- you mean where the quote is coming from?

Q Right.

A My understanding is that -- I mean, I don't know the exact reference to where that is coming from. My understanding is that it is one of the contentions that the STIA requires a water right permit because it's not a typical stormwater detention project.

Q And which witness said that?

A I don't recall.

Q Did you draft this prefiled testimony?
A I work on this, yes.
Q And when did you work on it?
A It's dated here in March. Just recently.
Q And actually, this similar paragraph appears in your January declaration; right?
A It does.
Q And it also appears in your October declaration; right?
A I believe it does.
Q In fact, the testimony generally is the same for March or October and January and March?
A It's similar.
Q Okay. Are you aware that low-flow augmentation is a beneficial use under the water code?

MR. REAVIS: Objection. The question assumes the disputed issue.

MS. OSBORN: I'm asking him what he's aware of. He's asserting here that no water right is required, and so I'm exploring the limits of his knowledge with respect to when a water right is required.

MS. COTTINGHAM: Why don't you ask the question rather than asking him for a legal determination.

Q (By Ms. Osborn) You've asserted that the use of water

for stormwater detention does not typically require a water right; is that right?

A I answered the question of do I know of any stormwater facilities that have required a water right, and I said no.

Q Are you familiar with the requirements for a water right under the state water code?

A I'm not. I'm not an attorney.

Q Are you aware or familiar with the concept of capturing public waters for beneficial use?

A Again, I'm not an attorney in terms of interpreting the statutes as it relates to water rights.

Q Have you ever encountered a low-flow mitigation plan that detains stormwater for several months at a time and then releases it in the summer months to fulfill target rates in the streams?

A Oftentimes.

Q Is that correct?

A Um-hmm.

Q That are used for low-flow augmentation in the late summer?

A Yes.

Q Could you give us an example.

A There's hundreds of infiltration systems that are designed specifically to do that.

Q No. I didn't ask about infiltration systems. I asked about detaining stormwater in a vault.
A You didn't mention the vault when you asked the question.
Q Well, infiltration -- my understanding is that infiltration and detention are two different things.
A You can have -- they are -- you can have a detention system that's also an infiltration system.
Q So you are aware of using infiltration to achieve target rates in streams during low-flow periods?
A Absolutely.
Q To achieve target rates?
A Target rates -- well, to achieve predevelopment conditions.
Q But if you want to put water in the stream, say, at the rate of .1 cfs, do the infiltration facilities achieve that level of accuracy?
A You wouldn't be able to achieve that level of accuracy unless you were actually measuring it.
Q So going back to my question, have you encountered a low-flow mitigation plan that detains stormwater in a vault for several months at a time and then releases it in the summer months to fulfill a specific rate of flow in a stream?
A So do you mean generically or do you mean like these

vaults that are being proposed?

Q No, I mean generically.

A Generically, I've seen, like I said, a number of facilities that have been designed to augment low flow such as infiltration facilities, but using the --

Q That's not the question I asked you, Mr. Swenson. I'm asking about vaults.

A But to use just a vault to do that, I do not. I'm not aware.

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

MR. POULIN: No questions for CASE.

MR. REAVIS: I don't have any more.

MS. MARCHIORO: I have no questions.

MS. COTTINGHAM: Any Board questions?

Thank you, Mr. Swenson. You are excused.

MR. REAVIS: Ms. Cottingham, should we go ahead and call our next witness?

MS. COTTINGHAM: Yes.

MR. REAVIS: The Port calls Joe Brascher.

I do have some handouts, some excerpts from the low-flow plan. I think these are also attached to Mr. Fendt's prefiled.

I think there's two pages here. Maybe there's three.

JOSEPH T. BRASCHER, having been first duly sworn upon 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 and spell your last name for the record, please.

A Joseph T. Brascher; last name is B-r-a-s-c-h-e-r.

Q Mr. Brascher, how are you currently employed?

A I'm employed by Aqua Terra Consultants as a hydrologist.

Q How long have you been employed by Aqua Terra?

A Nine years.

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

A Yes, it is.

Q Could you please provide us a brief summary of your experience in hydrologic modeling.

A I've been involved in applying many models, including HSPF, to calibrate watersheds throughout the country, but in particular in Western Washington. I've calibrated upwards of 30 watersheds in Western Washington, about 20 of which are major urban streams.

Q Now, does your HSPF experience include both modeling and calibration?
A Yes, it does.
Q Is experience in a particular geographic region important with regard to hydrologic modeling and calibration?
MS. OSBORN: Objection. It's a leading question.
MS. COTTINGHAM: Sustained.
Q (By Mr. Reavis) You mentioned that you had experience in Western Washington in doing modeling and calibration. Is that important?
A Yes, it is.
Q And why?
A Familiarity with soil types, precipitation patterns, available information, types of climates, all that information is very important when trying to achieve the best calibration you can achieve.
Q Now, when were you first retained with regard to the Port's third runway project?
A In 1999.
Q And what was the scope of work that you were given at that time?
A I had been asked to review the calibrations of the Walker and Miller Creek model and the Des Moines Creek

model.

Q And did that scope of work change over time?

A That scope of work was completed and then subsequent to that, I was retained by King County to be a part of the calibration team and to be there on their behalf, to be a part of the calibration and make sure that the calibration was as good as it could be.

Q Are there documents that summarize the results of your modeling and calibration efforts?

A Yeah. The December 2000 stormwater management plan and the December 2001 low-flow plan.

Q I want to ask you some questions about the modeling that you performed for this project. Can you just describe for us what you actually did?

A In the case of the calibration team's efforts, what we did was review, as thoroughly as possible, all the information, assumptions and data that went into the Miller and Walker Creek model, and based on our review, we made changes, updated, upgraded and improved the model in every way we could. Subsequent to that, we then used the model, the model was then used by the Port.

Q And when did you start that particular process that you talked about?

A That was in July of 2000.

Q After that time, did you actually make changes to the model as a result of the calibration or were you just calibrating.
A That effort was specifically to calibrate.
Q How long did that effort continue?
A That effort was, the calibration effort itself was resolved in August.
Q Of?
A Of 2000.

After that, there were a couple of occasions where further enhancements to the calibration models themselves were made.

Q Now, you mentioned, I think, in that last topic, Miller and Walker creeks. After that first scope of work that we discussed, did you do any more work with regard to Des Moines Creek?
A I did not.
Q Can you describe for us, briefly, what the calibration process generally entailed.
A The process of calibration is to get, to collect all the information you can on the watershed you are calibrating, to get the information to be as accurate as you can, achieve understanding that you are modeling a large area and generalized assumptions need to be made in order to actually complete the work.

So you collect the soils information. You collect land use, land cover, vegetative cover information. You break it up into various drainages, subbasins and the like, and then during your process, you compared it to observed or measured data to get an idea of how well you are doing.

Q And what exactly are you comparing?

A In general, you would compare any information related to your watershed. It could be a stream gage, streamflow information. It would be lake level information. It could be level information for wetlands or other features out there, but in general you are looking for any measured information of the actual physical features in the watershed.

Q We've seen with regard to some other witnesses, what are called hydrographs.

A Correct.

Q Is that something you use in model calibration?

A It's a very good tool for calibration, because the picture tells a thousand words and it's a very good way to take in a lot of information.

(Off the record.)

MS. COTTINGHAM: Sorry for the disruption.

MR. REAVIS: I can't remember if we were in the middle of a question or an answer.

MS. COTTINGHAM: You were in middle of an answer.

MR. REAVIS: Could we read back the last question?

THE COURT REPORTER: "Is that something you use in model calibration?"

MS. COTTINGHAM: It was a hydrograph, was your question.

MR. REAVIS: Let me just ask it again, and we can start the answer over again.

Q (By Mr. Reavis) Is that hydrograph something you use in your practice or profession?

A Yeah. The hydrograph is an important tool in calibration. It's a good way to get a look at a large amount of data in just one eyeshot, so it's very useful.

Q Are you trying to match up hydrographs and calibration?

A You are trying to bring your simulated hydrograph close to the observed or measured hydrograph, yes.

Q Can you get a perfect match ever?

A I've never achieved a perfect match. In my book, that's impossible.

Q So what is the goal, then, for an acceptable calibration?

A There's really a couple of goals. The first is to do

as good a job as you can representing the measured data. Also, understanding the measured data and inherent errors that there are in measured data, you want to be able to investigate those and make sure you are not trying to match something that's not real.

And finally, you want to make sure that the information that goes into your model is defendable, that it's something you can support with data, and it's something that you know is real and is occurring in the watershed.

Q Now, if you have something that's not a, for lack of a better term, a perfect match, what are the possible explanations for that?

A You couldn't match measured data for great number of reasons. It could be that there's something that you don't know about the information you are trying to match. The data that you are trying to match to, there could be something wrong with it.

There could be some circumstances that occur in the watershed temporarily and no longer take place or only happened for a short period of time and no one was really aware of it, so you can't reflect that in your model. You could have problems with precipitation data itself. You could have information that you aren't aware of that you need to include in your model. It

could be -- groundwater conditions oftentimes cause problems because it's very difficult to know what's under the ground. It's hard to know how much water may be contributing to your watershed from outside your watershed or how much you may be losing to a deeper aquifer. Primarily, that's what ends up being your toughest hurdle when you have groundwater issues.

Q How do you, then, determine when a good match is good enough?

A For me, it's when you have reflected in the opinion of the judgment of the modeler, you've reflected the general behavior of the watershed as closely as adjusting the parameters will allow you to do, and you are confident that the data you have in the model is as good as you can get. You've done the research to understand that your information is about as good as you are going to get it. At that point, there's really nothing more for you to do, so the model is calibrated.

Q Now, let's talk about Miller Creek calibration first.

Did you calibrate the Miller Creek model on your own, or did you work with other people?

A No. I was part of a calibration team.

Q And who was on that team?

A Kelly Whiting from King County and Dave Harms from Parametrix.

Q Now, do you remember what sort of data you used for the Miller Creek calibration?
A Yeah. We used two gages for Miller Creek 42b up here at the regional detention facility and 42a down near the mouth.
Q Can you tell us where this figure 2-1 comes from?
A 2-1 comes from the December 2000 stormwater management plan.
Q I'm sorry. Which gages again?
A 42b and 42a.
Q Which are?
A Up here near the regional detention facility and down near the mouth.
Q Now, what were the results of your calibration at Miller Creek?
A The results were, in general, a pretty good mass balance. You've heard that discussed earlier today. We did a fairly good job of matching the volumes of the measured data. The peaks, I think, I believe were good. They showed a good range, and the low flow was fairly consistent as well.
Q Now, are the results of that calibration represented in documents somewhere?
A In many different forms. The results are in a number of the different documents. I believe they are

summarized in table 2-1 of the December 2001 low-flow plan.

Q And that's part of the handout that I had handed out just a minute ago.

And that's the first table on page 2-3; is that correct?

A Yes, it is.

MS. COTTINGHAM: Can you remind me again what exhibit number this is.

MR. REAVIS: The low flow, 1308.

MS. OSBORN: I would make an objection on foundation here. During Mr. Brascher's deposition, he didn't know who had done these tables or where they come from.

MR. REAVIS: Let me just ask him about that.

Q (By Ms. Reavis) Do you remember being asked questions at your deposition about these tables?

A Yes, I do.

Q And what was your answer at that time?

A The question was erroneous that was asked me during my deposition. It was phrased to me that these numbers were used to determine the low-flow mitigation, in which case I looked at them and determined that there was no way they were used to determine low-flow mitigation and then became confused about the origin of

the table at that time based on the assumptions that weren't here in the question.

Subsequent to that, I went back and looked at it. In fact, I did generate these tables for the low-flow plan, and they have nothing to do with the mitigation of the low flow.

Q Do you have an opinion as to whether or not the information represented in these tables is an acceptable calibration?

A I have an opinion, because --

MS. OSBORN: I still have an objection as to foundation.

MR. REAVIS: I think he said he went back and looked at it and he refreshed his memory or determined these were in fact the tables that he prepared.

MS. COTTINGHAM: I'm going to overrule the objection.

Q (By Mr. Reavis) Do you have an opinion about whether or not this is an acceptable calibration?

A I can make an opinion based on what else I know about Miller Creek. I would not say that a calibration is acceptable or not based on one or two tables.

Knowing what I know about Miller Creek and then also looking at this information here, I would definitely say that there's a fairly good low-flow

calibration involved here.

Q Let's move on, then, to Walker Creek. Did you use a similar procedure to calibrate Walker Creek?

A It was similar, except in the original calibration process, we used only gage 42e down near the mouth of Walker Creek, and the calibration team was not aware of the upper gage at that time.

Q Have you since learned anything about the upper gage?

A Yeah. We were made aware of the upper gage by comments by ACC, so subsequent to that, we went back and included the upper gage information and compared it with our simulation results.

Q Now, let me ask you, then, about the next page of this handout, table 2-3 and table 2-4, which refer to Walker Creek.

Do those include consideration of this second gage?

A Yes, they do.

Q Can you tell us what the results are, just summarize the results of the calibration of Walker Creek?

A As pertains to these overall or as it pertains to these tables?

Q Just overall, if you would start there.

A The Walker Creek calibration was -- the results of which are a fairly good mass balance once again -- an undersimulation of the peak events and a fairly

representative low-flow calibration.

Q Have you been made aware of any concerns raised by Kelly Whiting regarding potential impacts of 1994 land conditions on the calibrations?

A Yes, I have.

Q And did Mr. Whiting request some sort of report be prepared relating to that?

A Yes, he did.

Q I don't want to ask you about any communication you had with Mr. Whiting or documents that may have been transmitted, but have you considered Mr. Whiting's concerns yourself?

A Yes, I have.

Q Do you have an opinion about whether or not those concerns will affect your calibration?

MS. OSBORN: We'll object both on the basis of the prehearing order, the order excluding Mr. Brascher's testimony, striking testimony, and also on the basis that this information was never produced to ACC pursuant to Civil Rule 26B requiring supplementation of expert witness testimony.

We're substantially prejudiced by his ability to testify about his opinions and what he's done without them providing us that information.

MR. REAVIS: Well, I guess with regard to --

let me start first with the Board's order on that.

It was in paragraph 13, I think, is what I'm referring to of his prefiled.

MS. COTTINGHAM: Line 13?

MR. REAVIS: Paragraph 13, starting with line 13, correct, of the prefiled. This is on page 5.

MR. POULIN: Which Board order are you referring to?

MR. REAVIS: This is his prefiled testimony. I guess I'm referring to the order that related to low-flow issues and Kelly Whiting's comments, and really what I'm trying to do is just ask him to testify about that second sentence there. I'm not going into the third sentence, which is the sentence that was struck.

So it's really his own evaluation, which I understood to be a matter that could come into evidence not withstanding the Board's order. That was sort of where the line was drawn between his own evaluation and what he intends to do to modify the low-flow plan.

MS. COTTINGHAM: Let me restate what the order says.

The Board will allow counsel to use the prefiled testimony and direct and cross-examination to elicit how Ecology or the Port felt about or evaluated the

comments of Kelly Whiting produced on or before the deadline, but those witnesses may not indicate either in the prefiled or in oral what the Port or Ecology has done since February 28th.

So you may elicit how Ecology or the Port felt about it, or their consultants in this case.

MS. OSBORN: And, Ms. Cottingham, just to clarify here, I assume that the idea here is to make, for this order to be consistent with the prehearing order of October 30th, is that right, that both still stand?

MS. COTTINGHAM: Yes.

MS. OSBORN: The October 30th order prohibits the use of -- at page 4 that states that Ecology and the Port are prohibited from relying at the hearing on any plan or report prepared after February 1st, 2002.

And so we assume that when we talk about information in the order that you just quoted from, the March 22nd order, that the information that is discussed in there is not information that would be directly, work that was directly done on the plans or reports after February 1st.

MS. COTTINGHAM: It's not work done on, but the actual plan themselves, as the earlier deadline, but information created after that earlier deadline,

but before the discovery cutoff, is what we're talking about here.

MS. OSBORN: Well, I think the Port interpreted the prehearing order as we did, because they certainly didn't produce any such information to us between February 1st and February 28th.

MR. REAVIS: I have a couple of responses, but if this is going to go on for a while could we stop the clock?

MS. COTTINGHAM: We can.

MR. REAVIS: I mean, regardless of the prior prehearing order, this was the issue that was specifically addressed with regard to all of these Kelly Whiting comments. It seems to me we need to refer to March 4, entered later, to deal with this particular question. So I guess I would like to be able to ask Mr. Whiting exactly what the Board's order says: How did you feel about Mr. -- I mean ask Mr. Brascher; how did you feel about Mr. Whiting's comment?

MS. OSBORN: And we would argue that information should have been produced to us. It was a new opinion of an expert witness and I don't have my rule book in front of me, but...

MR. REAVIS: Well, it's in the prefiled

testimony, so to the extent there's a disclosure, it was clearly done before the hearing started.

MS. OSBORN: It's was not done before our witnesses looked at it, before we prepared our case. February 28th is the cutoff, and that's when it should have been produced.

MR. REAVIS: I think we're retreading the same ground that the Board has already ruled on.

MS. COTTINGHAM: Right. So I'm going to allow the questioning to continue. If there's a particular answer that you believe violates this prehearing order, or not prehearing, but this order on testimony, you may raise it.

MR. REAVIS: Thank you.

Q (By Mr. Reavis) How did you feel about Mr. Whiting's comments regarding those 1994 land use conditions and the Miller and Walker Creek calibrations?

A The comments were pointed at some issues in the models, and my opinion was that they would have very little impact on the results.

Q Were you present when Dr. Malcom Leytham testified?

A Yes, I was.

Q Do you recall a discussion about whether modeling is an iterative process?

A I do.

Q Is it, in your opinion, an iterative process?
A Very much so, yes.
Q Are there any particular published standards or guidelines about how to exercise this judgment that you've been referring to?
A No, there are not.
MR. REAVIS: That's all I have. Thanks.
MS. COTTINGHAM: Mr. Young, do you have any questions?
MR. YOUNG: No.
MS. COTTINGHAM: Cross-examination.
MS. OSBORN: Thank you.

EXAMINATION

BY MS. OSBORN:
Q Good afternoon, Mr. Brascher.
In your prefiled testimony, you discussed some testimony that was provided by Mr. Rozeboom, and you suggest that he has been asking for use of a single model for modeling of the embankment; is that right?
A Can you point me to that.
Q Page 3, paragraph 9.
MS. COTTINGHAM: Of?
MS. OSBORN: Prefiled testimony.
MS. COTTINGHAM: His? Of Mr. Brascher's

prefiled?

MS. OSBORN: That's correct.

A Page what?

Q Page 3, paragraph 9. It's the apples-to-oranges discussion.

You are familiar with what I'm talking about?

A Yes.

Q So are you aware that what Mr. Rozeboom was actually talking about was not the use of a single model, but the problem of using one model to model existing conditions and then use of another model or suite of models to model future conditions?

A I'm not aware of that.

Q Now, you were just testifying about calibration of the models at the Miller and Walker creeks and that calibration was done with data from both gages at the mouth of the creeks and also at the upper gages; is that right?

A I don't believe that's what I said.

Q I'm sorry. You were discussing the use of gaging data at the mouth of Miller Creek and then at an upper gage; is that right?

A Correct.

Q And are you familiar with the point of compliance for low flow in Miller Creek?

A In general, yes.
Q Can you point out where it is on the map?
A The point of compliance is, in general, in this area.
Q That's for Miller Creek?
A Yes.
Q Could you show it for Walker Creek also.
A Point of compliance for Walker Creek is roughly identical to the gage.
Q And how about with the Des Moines Creek; do you know where the points of compliance are there?
A I have no idea.
Q Now, regarding the use of hourly versus 15-minute time steps, are you aware that the King County manual requires use of 15-minute time steps for water quality facilities?
A I'm not sure what the King County manual requires as it refers to water quality facilities.
Q Now, you agreed, didn't you, in your prefiled testimony that the use of 15-minute time steps would show greater runoff and less infiltration; is that right?
A It's slightly greater. I'm not sure.
Q You also stated in your prefiled testimony, page 11, paragraph 32, lines 15 and 16, that the key concern as it relates to time steps selected and applied is consistency, so accuracy is not the key concern?

A Consistency and accuracy are brothers.
Q Your testimony here is that consistency is the key concern?
A That's what I said.
Q And the use of 15-minute time steps would probably provide more accurate --
A I wouldn't reach that conclusion.
Q Did you model the 15-minute time steps?
A In this case, no.

MS. OSBORN: That's all I have.

MS. COTTINGHAM: Mr. Poulin?

MR. POULIN: No questions for CASE.

MS. COTTINGHAM: Any redirect?

MR. REAVIS: I have just a couple.

EXAMINATION

BY MR. REAVIS:
Q The 15-minute time step issue, can you explain for us what data is used if you are going to use a 15-minute time step.
A The data provided for King County use right now is one that has been disaggregated or generated from measured, observed hourly data. So the data itself is not real 15-minute data. It's what's considered stochastically generated 15-minute data such that it involves

probabilities that are likely to have precipitation that reflects typical patterns of hourly precipitation in the area, but it is not real data.

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

MS. COTTINGHAM: Any Board questions?

MR. LYNCH: No.

MS. COTTINGHAM: Thank you.

MR. REAVIS: Mr. Ellingson is here. I don't know if it makes any sense to start him right now.

We can start. I may be able to finish his direct or it may run a little bit after five.

MS. COTTINGHAM: Tell me about the remaining people. Is there anybody after Kelley?

MR. REAVIS: Yes, there is.

MS. COTTINGHAM: Stop the clock, please.

MR. REAVIS: The lineup after Kelley, there's one, two, three, four witnesses after Kelley.

MS. COTTINGHAM: Ten witnesses. Can we fit them all in tomorrow?

MR. REAVIS: Probably not, but we can get pretty close, I think, because of the time limits, our directs are going to be pretty short, but I'm not sure if we can finish all of them tomorrow. I guess we'll have to see.

MS. COTTINGHAM: Why don't we adjourn for the

evening today. Why don't you say what you need to first.

MR. POULIN: I would be happy to give you the clock time. I have another concern before we go off the record.

MS. COTTINGHAM: Okay.

MR. POULIN: The clock time, Appellants have used two hours, 15 minutes, 40 seconds.

And Respondents have used two hours, 15 minutes, and 27 seconds.

MS. COTTINGHAM: We have ten hours left, close to it. Less than that, a little bit.

Let me do the math. Never do math in public without a calculator.

We have, approximately, six hours tomorrow, and approximately two and a half hours in the morning on Friday, so we're getting close. I still want us to be done at or about noon.

Would you want -- I know we're going to do a conference in the morning tomorrow. What's the wishes of the parties?

MR. REAVIS: I guess I would like -- I think we can sit down this evening and go over our witnesses and see if we can trim things down and be able to report tomorrow on that.

MS. COTTINGHAM: Can you do a budget on your, both parties, on your cross-examination and your rebuttal witnesses.

MR. POULIN: I'm not sure what you mean, but we've been tracking our time pretty closely and using it accordingly.

MS. COTTINGHAM: Okay.

MR. POULIN: Is it appropriate to bring up the matter?

MS. COTTINGHAM: Go ahead.

MR. POULIN: It has come to my attention and our attention that yesterday during the lunch break when there was virtually no one in the room, a Port employee was observed accessing the exhibit files, not only our files, but also files behind the Board's counter, and I would be happy to give you not only the name of the witness, but the name of the Port employee, and we'd like some explanation as to what was going on and why.

We don't have any information to suggest an impropriety, but it's a matter of some concern since we don't have an idea why this individual, who is not a witness, or ordinarily authorized to --

MS. COTTINGHAM: Was it one of the paralegals? They've been doing that.

MR. POULIN: No. It was Mr. Scott Tobiason, who was considered as a Port witness. He's a stormwater manager up here with Mr. Smith who testified earlier today.

MR. REAVIS: He's a client representative. I don't know why he was looking through the exhibits. I would be happy to ask him. I suspect he doesn't know necessarily whose are whose.

MR. POULIN: I think it's pretty clear whose are whose based on their location in the room, and we would like some explanation as to why he felt it necessary to access the files that don't belong to the Port.

MR. REAVIS: We would be happy to talk to him.

MS. COTTINGHAM: Why don't we report back tomorrow morning on that.

With that we will stand adjourned.

MR. PEARCE: One thing, Ms. Cottingham, I don't know if it needs to be on the record, but in terms of our order of witnesses, we're going to -- and we've already talked to ACC about this at the lunch, because of Mr. Cheyne's and Mr. Stubblefield's schedules, we would like to put them on in the morning tomorrow. We'll insert them in either before or after

Mr. Ellingson, whatever works best.

MS. COTTINGHAM: Cheyne?

MR. PEARCE: Yes. After Mr. Brascher, probably Michael Cheyne and then Bill Stubblefield.

MR. STOCK: And ACC has no objection.

MR. POULIN: No objection from CASE.

MS. COTTINGHAM: And who are other two that are not on the list?

MR. PEARCE: That would be Jan Cassin, C-a-s-s-i-n. She'll come before Mr. Kelley.

MR. REAVIS: And Mike Bailey, who may be the last witness.

MR. STOCK: Who did you say is going to be before Ellingson?

MS. COTTINGHAM: Cheyne and Stubblefield.

MR. REAVIS: He's pretty short, so we can do him before Ellingson and he can get out of here. I don't have a strong preference.

MR. PEARCE: Neither do I.

MS. COTTINGHAM: Can you go out and use the flip chart to recreate this so everyone can read it.

Thank you. And with that, we will actually go off the record and adjourn for the evening.

(Day 8 of the hearing adjourned.)

CERTIFICATE

STATE OF WASHINGTON)
)
COUNTY OF THURSTON)

I, CINDY L. IDE, a Certified Court Reporter and Notary Public in and for Thurston County, Washington, do hereby certify that I reported in machine shorthand the above-captioned matter before the Pollution Control Hearings Board of the State of Washington, on March 27, 2002; that the foregoing transcript was prepared under my personal supervision and control and constitutes a true record of the proceedings.

I further certify that I am not an attorney or counsel of any parties, nor a relative or employee of any attorney or counsel connected with the action, nor financially interested in the action.

WITNESS my hand and seal in Olympia, County of Thurston, State of Washington, this 10th day of May, 2002.

CINDY L. IDE
Notary Public in and for the State of Washington, residing at Olympia.

My Commission expires 6-30-03.