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BEFORE THE POLLUTION CONTROL

ENVIRONMENTAL
HEARINGS BOARD
HEARINGS OFFICE

STATE OF WASHINGTON

AIRPORT COMMUNITIES COALITION,)
)
 Appellant,)
)
 CITIZENS AGAINST SEA-TAC)
 EXPANSION,)
)
 Intervenor/Appellant,)
)
 vs.)
)
 STATE OF WASHINGTON,)
 DEPARTMENT OF ECOLOGY, and)
 PORT OF SEATTLE,)
)
 Respondents.)

PCHB No. 01-160

TRANSCRIPT OF PROCEEDINGS

DAY THREE

March 20, 2002
Lacey, Washington

ORIGINAL

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BE IT REMEMBERED that the above-entitled matter came on for hearing before the Pollution Control Hearings Board, Day Three commencing on the 20th day of March, 2002, and continuing through Day Ten, the 29th day of March, 2002. The hearing was conducted at the Environmental Hearings Office, 4224 6th Avenue SE, Rowe Six, Building, Lacey, Washington.

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

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I N D E X

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E X H I B I T S

<u>NUMBER</u>	<u>DESCRIPTION</u>	<u>IDENTIFIED</u>	<u>ADMITTED</u>
1178	Pacific Groundwater Group SeaTac Runway Fill Hydrologic Studies	3-0037	
0705	Photograph of Failure in the Fill Embankment	3-0049	
0578	Application for Change/ Transfer of Water Right	3-0129	
0758	WRATS Report	3-0135	
2132	Public Notice of Application for Permit	3-0136	
0757	Guide to Instream Flow Setting in Washington State	3-0208	
0426	Storm Water Receiving Environment Monitoring Report	3-0221	
0006	Annual Stormwater Monitoring Report for Seattle-Tacoma International airport	3-0222	
1128	Cosmopolitan Engineering Group Dissolved Oxygen Deicing Study	3-0223	

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March 20, 2002

MS. COTTINGHAM: Back on the record. We're going to start this morning without Mr. Jensen for just a little while, he's in a conference that could take some time, so we will tape the first part of the hearing so he can listen to it.

And to start out, Mr. Stock, you had some comment about the list of witnesses.

MR. STOCK: Well, I am concerned about the afternoon, given the snow north and east of where we are. I understand some of the Ecology witnesses are having trouble getting over the pass, and also Dr. Willing, who lives in Bellingham - Bellingham got hit by quite a bit of snow - and he's tried to get down here, but I'm worried about the afternoon, so I just want to alert the board in advance, there may be some witness availability problems this afternoon.

MS. COTTINGHAM: Are there other people who were planned to be here for tomorrow that are closer?

MR. STOCK: No, there is not. Dr. Willing is in Bellingham and Dr. Strand is in Yakima, so both routes right now are blocked by snow. And Dr. Kavazanjian, who is scheduled to be here in the morning, is coming from California and is flying in tonight.

MS. COTTINGHAM: If we get to that situation

1 later this afternoon, I think what we'll do is we'll
2 adjourn for the day, but I'd like the attorneys to stay
3 because I have a matter I'd like to talk with you about
4 and we might as well plug it in there rather than using
5 other time. So we'll just play that by ear.

6 MR. STOCK: Great.

7 MS. COTTINGHAM: So with that, you may call
8 your witness.

9 MS. OSBORN: ACC calls Dr. Malcom Leytham.

10

11 KEITH MALCOM LEYTHAM, Ph.D., having been first duly sworn
12 on oath or affirmed to tell the truth, the whole truth
13 and nothing but the truth, testified as follows:

14

15

EXAMINATION

16

BY MS. OSBORN:

17

Q. Good morning, Dr. Leytham. Could you state and spell
18 your name for the record.

19

A. Keith Malcom Leytham. Last name is L-E-Y-T-H-A-M.

20

Q. And could you tell us where you work?

21

A. I work at Northwest Hydraulic Consultants.

22

Q. And what is your job with Northwest Hydraulic
23 Consultants?

24

A. I am a principal of the company and I'm a principal
25 hydrologist in our Seattle office.

AR 055318

1 Q. Could you describe briefly your educational background?

2 A. I have a bachelor's degree in civil engineering from
3 University of Birmingham in the U.K.; a master's degree
4 from MIT in water resources; and a doctorate in hydrology
5 from the University of Washington, which I received in
6 1982.

7 Q. This is not a broadcast microphone, it's for taping, so
8 be sure to speak up.

9 Can you tell us a little bit about your experience
10 in your position with NHC relative to modelling surface
11 water?

12 A. Well, I've been -- I don't remember when I started
13 actually, but I think it was probably in about 1986, I've
14 been responsible for hydrology modelling work in that
15 office since that time, and I conducted hydrology
16 modelling before that time, so I've got basically 20
17 years of experience in surface water hydrology modelling
18 and analysis.

19 Q. And are you familiar with the HSPF model?

20 A. Yes, I've used HSPF on a more or less continuous basis
21 since about 1985.

22 Q. Before we go on to the substance of your testimony, have
23 you identified errors in the prefiled testimony that was
24 submitted in this matter?

25 A. Yes, I regret there are several errors in my prefiled

AR 055319

1 testimony.

2 Q. Could you identify for the board what the errors are.

3 A. First of all, paragraph 33 page 17, fourth line down,
4 there's a reference to paragraph 26. That should be
5 reference to paragraph 25.

6 Paragraph 40 on page 21, fourth line down, there's a
7 reference to paragraph 28. That should be reference to
8 paragraph 27.

9 Exhibit F, we inversely put in figure B2-9, it
10 should be table B2-9.

11 MS. OSBORN: And for the benefit of the
12 board, I have provided you with some materials that are
13 on the desk directly before you there. The proper
14 table is the top item on that stack directly in front of
15 you.

16 MS. COTTINGHAM: One copy is all you provided?

17 MS. OSBORN: For each of you. Those are
18 demonstrative exhibits we intend to use in a few minutes.

19 MS. COTTINGHAM: Can I ask you a question
20 while you're on this. This chart here does not match the
21 chart in his. It's not meant to match?

22 MS. OSBORN: That's correct. It's the
23 substitute. That's exactly the point, we put the figure
24 in rather than the table.

25 MS. COTTINGHAM: Okay.

AR 055320

1 A. So the correct exhibit should be table B2-9 not figure
2 B2-9.

3 And, finally, Exhibit H we intended to include just
4 the first page of that exhibit, not the subsequent page
5 under Exhibit H, so everything on the first page should
6 be discarded.

7 Q. Thank you. Dr. Leytham, in your prefiled testimony you
8 discuss the concerns that you have with the low-flow
9 calibration of the port's -- calibration of the low-flow
10 modelling done by the port at paragraph 7 through 16 and
11 paragraphs 21 through 24 addressing Walker Creek and Des
12 Moines Creek. Could you explain briefly what the problem
13 is with respect to the low-flow calibration?

14 A. Well, if we look at Exhibit E, first of all, the red
15 lines are the model-simulated version, the blue lines are
16 the recorded version. And you can see in Exhibit E,
17 which is an example of flows on Walker Creek for 1991 and
18 1992, two separate sheets, that the simulated flows are
19 substantially lower than the recorded or observed flows.

20 Q. And you're referring to Exhibit E to your prefiled
21 testimony; is that right?

22 A. Yes, that's correct.

23 Q. And from where did these exhibits come?

24 A. These are taken from the low-flow plan, from the December
25 low-flow plan.

AR 055321

1 And Exhibit E shows the simulation results on Walker
2 Creek near the headwaters just downstream from Des Moines
3 Memorial Highway.

4 Exhibit G shows a similar but perhaps more extreme
5 problem on Des Moines Creek at gage 11c. And, again,
6 this is figure 4-11 from the low-flow plan. Des Moines
7 Creek we see under simulation of, well, the simulated
8 flows are less than half of the observed flows. So, in
9 my estimation, there is a significant problem in the low-
10 flow calibrations for both Walker Creek and Des Moines
11 Creek.

12 Q. Can you explain for us why calibration is important for
13 low-flow modelling?

14 A. Well, the whole purpose of calibration is to establish a
15 model that you have some confidence in what you'll be
16 doing. What is coming later in the model is that you
17 change the basic model parameters to assess the impacts
18 of a development or change in the contributing watershed.
19 And if you don't have a good representation of what's
20 happening in the existing condition, which is something
21 that you want to achieve through calibration, then you
22 don't stand a very good chance of having confidence in
23 the results of your impact assessments. So the
24 calibration is quite crucial.

25 Q. And what do you conclude about the low-flow calibration

AR 055322

1 for Des Moines and Walker Creek based on your analysis?

2 A. Well, the calibrations in my opinion are so poor that it
3 can be that there's just a poor understanding or lack of
4 understanding of the low-flow hydrology in these two
5 basins.

6 A second consideration is that if we're under
7 simulating flows by 50 percent, then it's quite possible
8 that the project's impacts on low flows are
9 underestimated by a similar amount.

10 And final implication comes back to the water
11 quality certification condition I(e)(i) on page 25.

12 MS. COTTINGHAM: In what document?

13 A. This is in the water quality certification.

14 MS. OSBORN: That would be Exhibit 1.

15 A. So this would be on page 25 of that document. So (e)(i)
16 right almost to the top of the page there, this is
17 referring to monitoring and reporting requirements post
18 construction, "Collection of stream gage data and an
19 evaluation/correlation to expected flow rates established
20 by the model." So, in other words, evaluations of the
21 effects of the project are going to be, according to this
22 clause, based on the simulated flow rates. And, as we
23 see here, the simulated flow rates for low flows are
24 substantially understating the observed flow rates. And
25 so it seems to me that that's a very poor basis for

AR 055323

1 monitoring protocol.

2 Q. Moving on to the discussion of the peak flow calibration
3 for Walker Creek, which is discussed in paragraphs 8
4 through 10 of your prefiled testimony, can you describe
5 briefly the problem that is set forth here?

6 A. Yes. Looking at Exhibit B of my prefiled testimony, it's
7 a sample of the simulation results for Walker Creek at
8 the upper gage, which is just below Des Moines Memorial
9 Highway. Again, red is simulated and blue is the
10 observed flows. And you can see that there's very
11 significant under simulation of the actual flows, and
12 this is consistent throughout the calibration period for
13 this particular gage site. Clearly the results are quite
14 poor.

15 Q. And, again, where does this gage or, excuse me, where
16 does this information come from?

17 A. This comes from the calibration report which is part of
18 the SMP.

19 Q. Part of the --

20 A. Storm water management plan. So this is figure B2-41
21 from that document.

22 Q. And what do you conclude about the peak flow calibration
23 for Walker Creek?

24 A. Well, I look at this in terms of both peak flow and the
25 apparent volumes in the peaks. First of all, it seems

AR 055324

1 that the results are, despite the report's best efforts,
2 the results are so poor that it's clear that we don't
3 really understand the hydrology of the upper Walker Creek
4 catchment, so I suspect there are some fundamental
5 problems in the configuration of the hydrologic model for
6 this basin.

7 Q. Moving on, you discuss problems with the modelling of
8 infiltration to the embankment at paragraphs 25 and
9 paragraphs 32 to 41 in your prefiled testimony. Can you
10 tell us what the problems are here?

11 And for the board's information, I have provided you
12 with three demonstrative exhibits that are relevant to
13 Dr. Leytham's testimony on this point.

14 A. The fundamental problem is uncertainty in characterizing
15 the infiltration capacity of the embankment, and that, of
16 course, has an effect on the amount of water that gets
17 into the embankment and that can subsequently be released
18 to maintain low flows.

19 What I'd like to do is, first of all, spend a couple
20 of minutes talking about how the embankment situation is
21 being modeled by the port. The first of these
22 illustrative exhibits, which is what we've labeled an
23 embankment modelling schematic, shows how the various
24 models that are being used to assess embankment impacts
25 are linked together.

AR 055325

1 There are three models being used here. The HSPF
2 model is being used to model surface processes, the
3 rainfall on the embankment, solid moisture storage
4 processes and direct runoff from the embankment. HSPF
5 then produces inflow to the groundwater system. That
6 inflow to the groundwater system is taken up by the
7 Hydrus groundwater model and the groundwater routing is
8 then handled by Hydrus. Finally, the output from Hydrus
9 is fed into Slice, which is another groundwater model,
10 and the output from Slice goes back into HSPF to look at
11 the stream impacts.

12 So there's a cascade of models, if you like, and we
13 have to be somewhat concerned about the way in which
14 those various models are linked. My focus has really
15 been on the way in which HSPF and Hydrus is linked, so
16 I'm looking at the top part of the embankment.

17 The way the port handled this was to, in HSPF, they
18 characterized the soils for the HSPF modelling for that
19 top layer in the model, that's down to this separation
20 from Slice, they characterized them as outwash soils with
21 a grass cover. Now, outwash soils are coarse soils that
22 are generally underlain by sands and gravels and they
23 have a very high infiltration capacity; in this case,
24 capacity of .8 inches per hour in using HSPF's
25 infiltration parameter.

AR 055326

1 Just to give you a sense as to what that means in
2 reality, the two-year 24-hour rate for SeaTac is only 2
3 inches, so that, by and large, except in the most intense
4 storms, if you have an outwash soil with grass cover, you
5 could expect there to be essentially no surface runoff
6 and virtually all the water would infiltrate.

7 The situation here is complicated, though, because
8 of the connection with Hydrus. After the outwash soils
9 have infiltrated essentially all the water and gone
10 through the soil moisture storage processes in the model,
11 it becomes a groundwater inflow to the Hydrus model. And
12 the Hydrus model has its own limit on the amount of water
13 that it can accept. It has its own infiltration
14 capacity, if you like, through a hydraulic conductivity
15 parameter which caps the inflow to the Hydrus model at
16 .08 inches per hour.

17 So we have a couple of conflicting model parameters,
18 if you like. We have a very high infiltration capacity
19 in the HSPF model, and we have a different parameter,
20 which has a different effect, with a lower rate in the
21 Hydrus model.

22 So one of the things I've tried to do is to explore
23 what that really implies from the point of view of the
24 overall ability of the embankment to infiltrate water.

25 Q. Is this represented in the demonstrative exhibit,

AR 055327

1 "Surface and Shallow Subsurface Flow"?

2 A. Yes. So the second of the demonstrative exhibits, which
3 is labeled at the bottom, "Surface and Shallow Subsurface
4 Flow from 19.4-Acre Area" -- just a digression here.
5 We'll get to the reason for the 19.4 acres in a minute.
6 But there was a section of test embankment, I think it's
7 called the 1998 fill, which was monitored in 1999 and
8 that was an area of 19.4 acres, so we'll come to that in
9 a minute.

10 MR. REAVIS: Ms. Cottingham, could I just
11 either make an objection or ask a question here. Maybe
12 I'm just not following exactly where this fits into the
13 direct testimony. I just want to make sure that we're
14 not getting beyond the scope of what the prefiled was.

15 MS. OSBORN: There is discussion of this in
16 Dr. Leytham's testimony between paragraphs 32 and 41.

17 MR. REAVIS: Thank you.

18 MS. COTTINGHAM: Continue.

19 A. So referring to this particular diagram, the tall black
20 line or, sorry, let me start off with the red line right
21 at the bottom of the chart, looks like a very boring
22 line, it doesn't do much. That's the surface response
23 from these outwash soils modeled with HSPF for data from
24 February 1999. So it shows the discharge rate, surface
25 discharge rate as modeled by HSPF for outwash soils. As

AR 055328

1 you can see, there is essentially no response.

2 The water that is not appearing as surface runoff in
3 HSPF infiltrates into the surface soils and gets down to
4 the point at which Hydrus receives it as input. Hydrus
5 then limits the amount of water it will accept to .08
6 inches per hour, and anything above that rate is rejected
7 and appears as surface runoff.

8 So the blue line, the blue dash line on this chart,
9 which is a little higher than the red line, shows the
10 total surface or direct runoff that the port's modelling
11 procedure would have produced for this February 1999
12 period.

13 The full black line, which is much higher on this
14 chart, is for a different parameter set. In 1999, the
15 port monitored runoff from a 19.4-acre section of
16 embankment, and they calibrated HSPF to that particular
17 runoff time series. If we look at Exhibit - sorry for
18 having to jump around here - Exhibit H of my testimony,
19 this is from appendix A of the SMP. This is a plot that
20 shows simulated and recorded flows with HSPF for runoff
21 from this 1998 embankment section.

22 The HSPF was calibrated and set model parameters
23 developed. As you can see from Exhibit H, the simulated
24 rates are actually fairly good, suggesting the model does
25 a decent job of reflecting what actually happened in

AR 055329

1 February of 1999. What I've done on the illustrative
2 exhibit here is to take those same model parameters and
3 produce the plot showing the combined direct surface and
4 shallow subsurface runoff using those HSPF parameters
5 developed from the test embankment.

6 So, in other words, this black line is what was
7 actually seen or close to what was actually seen in
8 February of 1999 from the test embankment. As you can
9 see, there's very much greater direct runoff from the
10 embankment than is being currently modeled by the port.

11 Q. And there is next to you a blowup of a photograph. Is
12 that photograph contained in your prefiled testimony?

13 A. Yes, this is Exhibit I.

14 MS. COTTINGHAM: Why don't you put it up on
15 the stand.

16 Q. Did you take this photograph?

17 A. Yes. This was taken on the 28th of January of this year.
18 It was a bright sunny day. The previous day there had
19 been a couple of inches of snow and the snow had melted
20 on the morning or early afternoon of this day. And this
21 is a photograph taken on the top of the embankment near
22 South 160th.

23 As you can see, there's a considerable amount of
24 standing water, there's water flowing across the top of
25 the embankment. And this, in my view, is quite

AR 055330

1 inconsistent with the notion that the soils of the top of
2 the embankment are outwash soils, which is how the port
3 has characterized them, and it's much more similar to the
4 sort of response one would expect to see from -- it's
5 much more consistent with the data from the 1998
6 embankment section.

7 So what we're seeing is a large amount of surface
8 runoff with quite -- with an extremely low infiltration
9 rate.

10 Q. So what do you conclude with respect to the impact of
11 this infiltration modelling on low-flow modelling for the
12 embankment?

13 A. We go to the last of my illustrative exhibits, it's
14 labeled, "Groundwater Inflow for 19.4-Acre Area." This
15 shows the net groundwater inflow to the embankment under
16 two scenarios. One, which is the blue dashed line, the
17 higher of the two lines, this is the amount of water that
18 would get into, infiltrate into the embankment and go
19 into groundwater storage from the port's model after
20 accounting for the limits on infiltration imposed by the
21 Hydrus model. And compared with that, the full black
22 line on that exhibit is the amount that would go into the
23 embankment into the groundwater storage using the
24 parameters from the 1998 fill.

25 As you can see, there's maybe as much as four or

AR 055331

1 five times as much water going into the embankment with
2 the outwash grass set. So what this is strongly
3 suggesting is that the port is overstating the amount of
4 water that gets into the embankment, overstating the
5 amount of water that gets into the groundwater storage,
6 then there's less water available to mitigate for low-
7 flow impacts in the summer months. So the overall value
8 of the embankment in terms of offsetting low-flow impacts
9 is in my opinion in question.

10 Q. Okay. Moving on in your prefiled testimony, you discuss
11 problems with inconsistent values in the HSPF parameters
12 at paragraphs I think it's 26 and 27. Can you explain,
13 perhaps give an example of what you mean by this problem.

14 A. Yes. Just one example. If we look at Exhibit C first of
15 all, this is an 11-by-17 color chart, one of the things
16 that you will notice in there, there's an area identified
17 as the non-contiguous Walker Creek groundwater area.

18 MS. COTTINGHAM: What color is it?

19 THE WITNESS: Do you have a color copy?

20 MS. COTTINGHAM: I see it.

21 THE WITNESS: It's a light purple color.

22 MR. REAVIS: Is there another color copy
23 around somewhere? Ours are not.

24 MS. OSBORN: You were not provided color
25 copies?

AR 055332

1 MR. REAVIS: Well, the one that I have here is
2 not colored.

3 MS. OSBORN: Yes, we do have.

4 MR. STOCK: I think that was per agreement of
5 the parties that we wouldn't exchange color copies.

6 MS. OSBORN: Does the board have color copies?

7 MR. LYNCH: Yes.

8 A. The light purple area, which is the non-contiguous Walker
9 Creek groundwater area, provides groundwater to the
10 headwaters of Walker Creek. However, that same area, the
11 surface of it, provides surface runoff and inflow runoff
12 to Des Moines Creek. So the surficial process is in that
13 catchment of providing water to Des Moines Creek but the
14 groundwater is going to Walker Creek.

15 If you look at paragraph 27 of my prefiled
16 testimony, there's a table of calibrated values. And
17 what you will see is if we key in on what is perhaps the
18 most important parameter, the infiltration parameter, the
19 Walker Creek groundwater area has an infiltration rate of
20 .12 inches an hour and Des Moines Creek has a value
21 that's a little more than half of that, .075 inches per
22 hour. So we have parameter differences for areas that
23 are physically the same piece of land. You would expect
24 them to be the same.

25 Q. And what do you conclude about this problem with

AR 055333

1 inconsistent values and these parameters?

2 A. Well, in this particular case, it can only be or it
3 demonstrates a lack of coordination on the part of the
4 modelling teams, I think.

5 Q. It's been stated by port witnesses that the modelling for
6 the low-flow embankment involves a high degree of
7 reliability. Do you agree with that statement?

8 A. I'm not sure whether that particular quote refers to just
9 the embankment or modelling in general, but it's pretty
10 clear from the problems in the low-flow calibrations and
11 the problems in the modelling for upper Walker Creek,
12 which we talked about a few minutes ago, and the problems
13 in characterizing the embankment infiltration, that
14 there's a great deal of uncertainty remaining in our
15 ability to characterize the hydrology of this area.

16 MS. OSBORN: Thank you. That's all the
17 questions that I have.

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

20 MR. POULIN: No questions for CASE, Your
21 Honor.

22 MS. COTTINGHAM: Okay.

23 ////

24 ////

25 ////

AR 055334

1 EXAMINATION

2 BY MR. REAVIS:

3 Q. My name is Gil Reavis. I think we just met this morning.

4 Let me just go over some of these models and make
5 sure I understand. The primary model for surface water
6 is HSPF; is that correct?

7 A. Yes.

8 Q. And that's an appropriate model to use here?

9 A. Yes.

10 Q. Do you know a gentleman by the name of Norm Crawford?

11 A. Yes.

12 Q. And do you know him to be a person who is involved in the
13 development of the HSPF model?

14 A. Yes.

15 Q. Is he a respected authority or expert in the field of
16 hydrology?

17 A. Yes.

18 Q. Now, as I understand it, HSPF is the only model with
19 regard to hydrology that was used in Des Moines and
20 Walker Creeks; is that correct?

21 A. I don't know. It's the only one I've looked at.

22 Q. Okay. But with regard to Miller Creek, that's where you
23 get into the Hydrus and Slice in addition to HSPF?

24 A. Well, I think that also affects Walker Creek, does it
25 not.

AR 055335

1 Q. Now, it's true, isn't it, that you don't see any
2 intrinsic problem with using Hydrus and Slice?
3 A. No, that's correct, I don't see a problem with that at
4 all.
5 Q. And that you're satisfied that the inconsistencies
6 between HSPF and Hydrus/Slice modelling should not affect
7 the HSPF low-flow calibration?
8 A. They shouldn't affect HSPF low-flow calibration, no, I
9 don't believe so.
10 Q. I want to just talk a little bit about the process of
11 calibrating the model. As I understand it, you get a
12 couple of hydrographs, one is a hydrograph produced for
13 actual conditions; is that correct?
14 A. Yes.
15 Q. And then you have a hydrograph that's produced by the
16 model?
17 A. Yes.
18 Q. And you've got some hydrographs attached to your
19 testimony, do you not? Let me just ask you about Exhibit
20 B which you referred to earlier. Is that an example of a
21 hydrograph?
22 A. Yes.
23 Q. If I understand the calibration process, you create these
24 two hydrographs and then the modeler, or the person who
25 is calibrating, tries to look to see where all these

AR 055336

1 peaks and valleys are and to see how they line up; is
2 that correct?

3 A. More or less, yes.

4 Q. So the closer a match between the observed flows and the
5 modeled flows means the better your calibration is?

6 A. Yes.

7 Q. So you are essentially looking at these two graphs and
8 trying to get them to match as closely as possible; is
9 that correct?

10 A. That's one part of it, yes.

11 Q. And, say, you have an area where it doesn't match, the
12 way that you calibrate the model is by looking at your
13 input parameters and making sure they match what's
14 actually out there on the ground; is that correct?

15 A. More or less, yes.

16 Q. Now, if you see something that's inconsistent, then you
17 might, for example, look at, you know, a groundwater flow
18 or the type of soil you have to make sure that the model
19 is representing that particular component correctly; is
20 that right?

21 A. Yes.

22 Q. So doesn't that actually require a fair bit of
23 information in order to calibrate a model about what the
24 conditions are actually like on the site?

25 A. Yes, it does.

AR 055337

1 Q. And so isn't it true that a person who has a great deal
2 of experience with regard to a particular site is better
3 able to perform that calibration because that person
4 knows the details of the site itself?
5 A. You would expect that to be the case, yes.
6 Q. And, more broadly, isn't it true that someone who has a
7 lot of experience calibrating hydrologic models in a
8 particular geographic region is probably going to
9 understand better these specific conditions that could be
10 helpful in model calibration?
11 A. Yes, that's true.
12 Q. So, for example, someone who has calibrated a lot of
13 different watersheds in western Washington is going to
14 have a better ability to calibrate models in western
15 Washington than someone who doesn't have that experience?
16 A. Yes.
17 Q. Can you tell us how many watersheds in western Washington
18 you have personally calibrated?
19 A. Well, for different scales, probably 20 or so.
20 Q. Would you agree with me that this whole process of model
21 calibration is a matter of judgment?
22 A. No.
23 Q. Well, let me ask you this: Isn't it true that
24 Mr. Rozeboom -- who is your colleague at NHC, correct?
25 A. Yes.

AR 055338

1 Q. -- has concluded and filed a declaration in this case
2 saying that he believes that peak flow calibrations for
3 Miller, Walker and Des Moines Creek are all acceptable?

4 A. Yes, that's correct.

5 Q. And you don't agree with him on that, do you?

6 A. Well, I think your statement just a minute ago was that
7 the whole thing boils down to a matter of judgment, and
8 there's a lot more than just judgment that goes into
9 this.

10 Q. I understand that there's a lot of science here, too.

11 A. I acknowledge that judgment plays an important role in
12 this, and with regard to comments, apparent difference of
13 opinion on peak flow calibrations for Des Moines and
14 Miller, I think perhaps in thinking about this, I was
15 perhaps too hard-nosed in that regard and I'm now willing
16 to accept that there is judgment involved and differences
17 of opinion. And given the fact that there's been
18 considerable improvements over the last couple of years
19 in the way these models are being developed, I guess I
20 would be inclined to accept at this point that the peak
21 flow calibrations for Des Moines and Miller are okay.

22 Q. Well, at the time that your deposition was taken, you did
23 not hold that view, did you?

24 A. No, I did not.

25 Q. And prior to your deposition, you had actually sat down

AR 055339

1 with Mr. Rozeboom to see whether the two of you could
2 come to agreement on these calibrations for peak flows,
3 hadn't you?
4 A. I don't believe we had, no.
5 Q. I thought that you had discussed that calibration with
6 him prior to your deposition and that the two of you were
7 unable to agree that the models were properly calibrated.
8 A. I'm sure we had some discussion. We had discussions on
9 this, certainly, yes.
10 Q. And at least prior to your deposition, you did not agree
11 on all of these calibrations with Mr. Rozeboom?
12 A. That's correct.
13 Q. And he is a principal also at NHC?
14 A. No, he is not.
15 Q. Oh, he is not a principal, but he at least is a
16 hydrologist who works for NHC?
17 A. Yes, he's a senior and valued employee of the company.
18 Q. And he is a qualified hydrologist?
19 A. He is.
20 Q. Now, is that an example of where two qualified
21 hydrologists have a different view about model
22 calibration that's acceptable because there's some
23 judgment involved?
24 A. Well, I think one of the problems that we have here is
25 that at this point we don't have a clear understanding of

AR 055340

1 exactly how and under what circumstances these models are
2 going to be used. We have a situation where there seems
3 to be, from our perspective, a continuously moving target
4 and continuing uncertainty as to just what changes will
5 be made next in the overall modelling process.

6 I guess there are certainly some deficiencies in the
7 ability to reproduce flows from Miller Creek and Des
8 Moines. Miller Creek, for example, the timing is
9 consistently poor, there is not much in the way of data
10 in the calibration report that you could look at from a
11 statistical point of view to assess whether the
12 calibrations are adequate or not.

13 The whole documentation is what I would regard as
14 being somewhat questionable. So it does come down to a
15 matter of judgment and it comes down more than that to a
16 judgment as to whether we believe that the people that
17 the port is using for this work do a good job at
18 calibration.

19 Q. Correct. So in order for this board to decide who is
20 correct about calibration, this board is going to have to
21 determine whose judgment they trust?

22 A. Well, if you look at the results for Miller, and the peak
23 flows for Miller and Des Moines, some flows are above and
24 some below, the calibration isn't great, but, you know,
25 maybe it's okay.

AR 055341

1 But if you look at the Walker Creek calibration,
2 it's consistently very poor, it's extremely poor. If you
3 look at the low-flow calibrations for Des Moines and
4 Walker, we're in a situation where the simulated low
5 flows are sometimes only a third of the recorded flows.
6 So I don't know under what standard you would say that
7 those low-flow calibrations are adequate. They're
8 obviously very poor and there's obviously a great deal of
9 uncertainty as to just how low flows are being generated
10 within this basin, which I think is more or less
11 acknowledged in some of the port's prefiled testimony.

12 Q. Well, getting back to my question, someone is going to
13 have to decide whose judgment they're going to rely on in
14 order to determine whether or not the model calibration
15 is correct; is that --

16 MS. OSBORN: Objection to the form of the
17 question.

18 Q. I thought your answer was a minute ago that someone was
19 going to have to determine.

20 MS. OSBORN: Objection to the form of the
21 question.

22 MS. COTTINGHAM: Why don't you restate your
23 question.

24 Q. (Continuing By Mr. Reavis): Isn't it true that in order
25 for this board to resolve this question, they're going to

AR 055342

1 have to evaluate your testimony, the testimony of the
2 port witnesses, and determine whose judgment on some of
3 these model calibration issues they believe?

4 MS. OSBORN: Objection. That's been asked and
5 answered.

6 MR. REAVIS: I don't know that I got an answer.
7 I think I got another critique of the model, but --

8 MS. COTTINGHAM: I will sustain the objection.

9 Q. (Continuing By Mr. Reavis): Dr. Leytham, have you had
10 your work on this case peer reviewed by anyone?

11 A. Well, some of it I've certainly discussed with
12 Mr. Rozeboom.

13 Q. But we have already established that on certain issues
14 you didn't agree with him?

15 MS. OSBORN: Objection. It's argumentative.

16 MS. COTTINGHAM: I did not hear the question.

17 MR. REAVIS: Well, the question was with regard
18 to peer review and he said that he had already discussed
19 it with Mr. Rozeboom. My next question was, we have
20 already established that he didn't agree on some issues
21 with Mr. Rozeboom.

22 MS. OSBORN: Objection. It's
23 mischaracterizing the testimony.

24 MS. COTTINGHAM: Let him testify rather than
25 you testifying on his behalf.

AR 055343

1 Q. (Continuing By Mr. Reavis): Now, there aren't any
2 published guidelines, are there, in your field about how
3 to exercise this judgment in model calibration, are
4 there?
5 A. Not to my knowledge, no.
6 Q. And your firm, NHC, doesn't have any in-house guidelines
7 about how to exercise that judgment?
8 A. No, we don't.
9 Q. Let me ask you about some of these observations you made
10 at the site visit. And as I understand your testimony,
11 what you're saying is the infiltration rates don't appear
12 to be as great as the models have assumed?
13 A. That's correct, yes.
14 Q. Now, the information that you gained at the site visit
15 was purely qualitative, was it not?
16 A. Yes.
17 Q. You didn't take any samples at that time?
18 A. No.
19 Q. You didn't run any tests on the hydraulic conductivity of
20 the soil?
21 A. No, we did not.
22 Q. So even assuming that the infiltration rate is less,
23 you're unable to quantify exactly how much less it is?
24 A. Well, I think it's absolutely clear that the infiltration
25 rate is a lot less than .8 inches per hour, which is the

AR 055344

1 outwash grass infiltration rate. We have on the top of
2 the embankment, in this photograph, standing water. We
3 were there for a half an hour or so, and if the
4 infiltration rate had been .8 inches an hour, all that
5 water would have disappeared in that time frame. It's
6 very clear that the infiltration rate on the top of the
7 embankment is significantly less than that .8 inches per
8 hour.

9 Q. But, again, that's a qualitative statement as opposed to
10 a quantitative statement?

11 A. Well, there are degrees, but in this case, it's so
12 obvious that it's not .8 inches per hour, that I hesitate
13 to call it just a purely qualitative assessment.

14 Q. On the day of the site visit, I think you said there was,
15 at least earlier on that day, snow on the ground?

16 A. Yes.

17 Q. And isn't it true that there had been a fairly long
18 period of below-freezing weather?

19 A. No.

20 Q. So did you check out the data to find out whether or not
21 there had been below-freezing weather?

22 A. It had been below freezing.

23 Q. Okay. So you would expect that frozen soil, for example,
24 would have less infiltration capacity?

25 A. You would, but the soil was not frozen.

AR 055345

1 Q. Did you dig down any beyond the surface?

2 A. There's another photograph somewhere where a portion of
3 the embankment had failed. This portion of it is a
4 little bit irrelevant to what I'm saying, but we were
5 walking up and down on the embankment and the soils were
6 not frozen.

7 Q. Is that snow I see in that picture on the hillside?

8 A. It could be, yes.

9 Q. Now, this particular area of the embankment where these
10 puddles were shown, was that what you described as the
11 1998 embankment?

12 A. No. I believe this is a different area.

13 Q. But that portion of the embankment is not completed yet,
14 correct?

15 A. Yes, that's my understanding, yes.

16 Q. And that there will be some additional work done on the
17 embankment that might assist in infiltration, is that
18 your understanding?

19 A. Well, I would assume that it would either be paved over,
20 which would eliminate the infiltration, or it would be
21 grassed, which would tend to, hopefully, increase
22 infiltration rate somewhat.

23 Q. Okay. Now, if it's paved over, the model deals with that
24 as an impervious surface?

25 A. Yes, it deals with that in a separate manner.

AR 055346

1 Q. So that's not going to affect what we are talking about
2 here in terms of infiltration rates because that's
3 already been taken care of?

4 A. Yes.

5 Q. If it's not paved, can you tell us how you might be able
6 to grade a surface in order to increase infiltration? Is
7 there something you can do with regard to the grading
8 that will assist infiltration?

9 A. Well, there are several things that could be done. I
10 don't know whether this particular problem is due to
11 sealing of the surface. If it is, it's doing a very good
12 job. But there are several things that could be done.
13 One is to scarify the surface, one is to import more soil
14 that's not compacted and then to grow grass on it. So
15 there are a couple of things that could be done to
16 increase infiltration.

17 Q. So scarifying means kind of going in and cutting it up,
18 is that what scarifying means?

19 A. Yes.

20 Q. You could go in and cut up the surface of the soil and
21 perhaps increase the infiltration?

22 A. Perhaps.

23 Q. You could also put in topsoil and grass, correct?

24 A. Yes.

25 Q. And that would increase the infiltration?

AR 055347

1 A. It would increase the ability to infiltrate, yes.

2 Q. So you can't really say, as you sit here today, that the
3 conditions that you see in this photograph will actually
4 be representative of the complete embankment?

5 A. That's correct.

6 MR. REAVIS: I don't have anything else. Thank
7 you.

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

10 MR. YOUNG: Yes, I do.

11

12

EXAMINATION

13

BY MR. YOUNG:

14

Q. Dr. Leytham, I wanted to refer to Exhibit H to your
15 prefiled testimony, which you made reference to earlier.
16 And I think you said that this is a hydrograph comparison
17 of a simulation with an observed hydrograph; is that
18 right?

19

A. Yes.

20

Q. And I think you said that this represented a fairly good
21 match between observed and simulated?

22

A. Given the fact that we've got 25 days of dates, it's not
23 a bad reproduction.

24

Q. Okay. In your testimony, when we actually look at the
25 written testimony, I think what you said is that it was

AR 055348

1 "Exhibit H model simulation results are adequate given
2 the short period of observed data but tend to understate
3 peak flows and overstate base flows."

4 So what I'm trying to get to is that you think,
5 given some limitations, that this is an adequate
6 simulation?

7 A. Well, for the purposes of assessing the ability or for
8 assessing the runoff characteristics of the embankment
9 within an approximate sense, yes.

10 Q. Okay. And I note that when I look at this graph, that,
11 for example, the simulated flow, if we look at like
12 February 10th, 11th and 12th, the observed -- I'm sorry,
13 the observed goes all the way to zero but the simulated
14 does not; is that right?

15 A. Yes.

16 Q. And, similarly, for the 14th, 15th and 16th; is that
17 right?

18 A. That's correct.

19 Q. And then if we go over to like the 17th, 18th and 19th,
20 the observed goes higher than the simulated?

21 A. Yes.

22 Q. And so we don't have an exact match here?

23 A. No.

24 Q. But you think this is adequate?

25 A. For the purposes to which I put it, yes.

AR 055349

1 Q. And then when we look at Exhibit G, for example, which is
2 the Des Moines Creek observed versus calibrated, you
3 think this is inadequate?

4 A. Yes.

5 Q. Now, the Des Moines Creek HSPF model that was used by the
6 port was a model that was originally developed for the
7 Des Moines Creek basin plan; is that correct, is that
8 your understanding?

9 A. My understanding is that it was based on that model, yes.

10 Q. And the Des Moines Creek basin plan was a plan that was
11 developed by, among others, the City of Des Moines; is
12 that your understanding?

13 A. I don't know.

14 Q. With regard to the modelling of the embankment, your
15 position is that the use of the parameter for outwash
16 grass is not the correct -- it does not represent the
17 correct infiltration rate; is that accurate?

18 A. Yes, that's correct.

19 Q. And I think you described outwash grass as being grass
20 growing on sort of rocky soil; is that right?

21 A. No, I don't think I said that.

22 Q. Okay. Outwash refers to glacial outwash; is that right?

23 A. Yes.

24 Q. And so what we have with glacial outwash is a rocky soil;
25 is that fair to say?

AR 055350

1 MS. OSBORN: Objection to the form of the
2 question.

3 MS. COTTINGHAM: Can you restate the question.

4 Q. (Continuing By Mr. Young): What is outwash grass?

5 A. Well, outwash grass is really a bit of jargon that's used
6 in HSPF. It refers to outwash soils, which would be
7 soils that occur above glacial outwash material with
8 grass growing on them.

9 Q. And those soils are what?

10 A. They would be --

11 Q. Gravelly?

12 A. -- fairly coarse soils underlain by sands and gravels.

13 Q. Just as an intuitive matter, it seems to me that that
14 would be an appropriate parameter to choose when we
15 consider a parameter for the fill, isn't that --

16 MS. OSBORN: Objection.

17 MR. POULIN: Objection to the form.

18 MS. COTTINGHAM: I'm going to overrule it.

19 A. Well, you know, this is the difference between perhaps
20 doing modelling in a box, in a vacuum, and actually going
21 out there and looking at what's happening. I agree that
22 some of the fill is certainly coarse sands and gravel
23 material, and you can see that in some of the slope-
24 failure faces. But the fact is you go out there, as we
25 did on the 28th of January, and you see standing water on

AR 055351

1 top of the embankment, large amounts of surface runoff,
2 and it simply doesn't behave in the way that it's being
3 modeled. It's as simple as that. You just need to go
4 out there and look at it. And you go back to the 1999
5 data in Exhibit H and you see these rapid responses,
6 which is indicative of large amounts of surface runoff.

7 So, you know, it's all very well saying that some of
8 the embankment is sands and gravels, but it certainly
9 doesn't behave in that fashion.

10 Q. Now, the embankment model was developed by Pacific
11 Groundwater Group and Aquaterra; is that correct?

12 A. That's my understanding, yes.

13 Q. And it was originally developed in approximately year
14 2000 pursuant to a study that Pacific Groundwater Group
15 did pursuant to some legislation that was passed; is that
16 right?

17 A. I have no idea.

18 Q. You don't know that?

19 A. No.

20 Q. Now, you've reviewed Pacific Groundwater Group's various
21 reports in this matter?

22 A. I have reviewed some of them, yes.

23 Q. Have you reviewed the June 19th, 2000 Pacific Groundwater
24 Group hydrologic studies report?

25 A. I'd have to look at it to tell you. I don't remember all

AR 055352

1 the reports I've looked at.

2 Q. Let's look at it. It's number 1178.

3 MS. COTTINGHAM: What color notebook?

4 MR. YOUNG: In a yellow notebook, Volume 13.

5 Q. Do you have 1178 in front of you?

6 A. Yes.

7 Q. Is this something you've looked at?

8 A. No. Oh, sorry, I take that back. Yes, I have looked at
9 portions of it.

10 Q. Now, this is the report that Pacific Groundwater Group
11 prepared as a result of the legislatively-mandated study;
12 isn't that fair to say?

13 MS. OSBORN: Objection. Asked and answered.

14 MS. COTTINGHAM: I have not heard that
15 question asked.

16 A. I don't know whether it was a legislatively-mandated
17 study or not.

18 Q. Let's look at page 1, executive summary, the very first
19 couple of sentences. In fact, if you can just read the
20 second sentence there.

21 A. "The study was conducted under the Washington State
22 Department of Ecology's oversight by a team of
23 consultants: Pacific Groundwater Group (PGG); Earth
24 Tech, Inc.; and Ecology and Environment, Inc."

25 Q. Okay. Read the sentence that starts, "In 1999..."

AR 055353

1 A. I'm sorry, I read the third sentence. "In 1999, public
2 concerns prompted the Washington State Legislature and
3 Governor Locke to approve this study, which focuses on
4 aquifers, wetlands and Des Moines, Miller and Walker
5 Creeks, which drain the area."

6 MS. OSBORN: We'd object on hearsay grounds as
7 to -- for what purpose are you offering this? Are you
8 offering it for the truth of the matter asserted?

9 MS. COTTINGHAM: Before you go any further,
10 what does the matrix say about this exhibit in terms of
11 objections?

12 MS. OSBORN: Hearsay objection is noted.

13 MR. YOUNG: This is a public document that was
14 produced as part of the public record. I believe it's --
15 it was on all the exhibit lists, I believe.

16 MS. COTTINGHAM: On the matrix, if the hearsay
17 objection was there, the burden is on them to raise it
18 and for you to say whether it was -- let me find my notes
19 here from yesterday -- indicate whether you're offering
20 it for background, or whether it fits within the board's
21 hearsay rule, or whether it meets an exception and then
22 lay the foundation.

23 MR. YOUNG: Well, at this point I think I'm
24 just using it for background purposes.

25 MS. COTTINGHAM: Then it's admitted for those

AR 055354

1 purposes.

2 Q. (Continuing By Mr. Young): I want you to go to the back
3 of the thing, there's an appendix B, it's way farther
4 back.

5 A. Okay.

6 Q. You got that, B-1? Do you see appendix B, "Pacific
7 Groundwater Group Recharge Model"?

8 A. Yes.

9 Q. Go to page B-2. You see the little chart there in the
10 middle that says, "Grass cover, mixed forest cover and
11 barren"?

12 A. Yes.

13 Q. Read the sentence that's immediately below that.

14 A. "The fill was modeled as grass on outwash."

15 Q. Okay. So when this legislatively-mandated study was
16 done, the fill was modeled as grass on outwash?

17 MS. OSBORN: Objection. Mr. Young is
18 testifying about where this study came from.

19 MR. YOUNG: No, it says that in the first
20 paragraph.

21 MS. OSBORN: It was admitted as background,
22 not for the truth of the matter asserted.

23 MS. COTTINGHAM: As background. If you want
24 to do it for the truth of the matter, you need to lay a
25 foundation.

AR 055355

1 MR. YOUNG: Well, I think it's a public
2 document and there is an exception for public documents
3 in the hearsay rule.

4 MS. COTTINGHAM: Do you have a response to
5 that?

6 MS. OSBORN: It does not indicate on the face
7 that it's a public document; it indicates it was prepared
8 by Pacific Groundwater. Also, there is no foundation.
9 This witness doesn't know whether this is a
10 legislatively-mandated document.

11 MR. YOUNG: It says in it that it is.

12 MS. OSBORN: But that's what we're objecting
13 to.

14 MS. COTTINGHAM: I think I'm still going to
15 let it in only for background purposes.

16 Q. (Continuing By Mr. Young): Now, in terms of the picture
17 here that you made reference to, was that taken at the
18 top of the embankment?

19 A. Yes.

20 Q. And is it possible that those puddles there are melted
21 snow?

22 A. Well, it's very likely where the water came from, yes. I
23 can't imagine it coming from anywhere else.

24 MR. YOUNG: I don't have any further questions.

25 MS. COTTINGHAM: Do you have any redirect?

AR 055356

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MS. OSBORN: Yes, thank you.

EXAMINATION

BY MS. OSBORN:

Q. Dr. Leytham, does the bulk of your testimony go to the question of the low-flow calibration in Des Moines and Walker Creeks?

A. I don't think I would say the bulk of my testimony goes to that, no.

Q. Are your concerns with -- you have concerns with low-flow calibration in Des Moines and Walker Creek?

A. Yes.

Q. And your concerns have to do with the accuracy of the calibration; is that right?

A. Yes.

Q. Mr. Reavis asked you about whether the persons who have the most experience at a watershed would be in the best position to exercise judgment about calibrating the model; is that right?

A. Yes.

Q. And what is your opinion of this model with respect to the calibration that's been done?

A. Well, it clearly does a very poor job of simulating low flows, and I don't know whether that's a reflection necessarily on the people who did the calibration, it's

AR 055357

1 more of a reflection of the fact that I think that
2 there's a very poor understanding of the low-flow
3 hydrology of this basin.

4 Q. Would you say that the model outcomes are divergent from
5 the recorded data, the observed data?

6 A. That's a nice way of putting it. Yes.

7 Q. And do you think this goes beyond a judgment issue?

8 A. In these particular examples, yes, when you get a
9 simulation that's only a third of the recorded low flows,
10 I think it's clearly a problem.

11 Q. Mr. Reavis asked you about techniques to increase
12 infiltration within the embankment. Do you recall that
13 question?

14 A. Yes.

15 Q. Are there limits to how much these techniques can
16 increase infiltration?

17 A. There probably are, but I don't know what they would be.

18 Q. Is the basis of your conclusion about infiltration to the
19 embankment based on the photograph that's shown here on
20 the easel and in your Exhibit I?

21 A. It's based on the photograph and on the data from the
22 1998 fill in Exhibit H.

23 Q. And when you say data from 1998 fill, the actual data?

24 A. Sorry, this is the runoff data from the 1998 fill.

25 MS. OSBORN: That's all I have.

AR 055358

1 MS. COTTINGHAM: Any board questions?

2 MR. LYNCH: I do have a question.

3

4

EXAMINATION

5

BY MR. LYNCH:

6 Q. Forgive me for the simple nature of this question. There
7 is a reason I changed majors in college. I'm just trying
8 to understand better about the modelling versus what was
9 observed. When you make observations at a particular
10 site and they're not matching up with what the model
11 projects, at what point do you go back and say I think we
12 need to change our calibrations? Are you looking at
13 standard deviations that are off from what you originally
14 projected or do you need a certain amount of time period
15 in order to say this is not matching up? If you could
16 help me understand that.

17 A. What would generally happen is you would be looking at a
18 fairly long period of record, so I think in this case
19 they were looking at data from 1993 through 1996, so
20 there are four years of data there. So what you would be
21 looking for is not a particular problem at a particular
22 point in time; what you would be looking for is a general
23 trend. So you would be looking, for example, for a
24 general trend to under simulate flows over, say, several
25 summers or, as in the case of the Walker Creek

AR 055359

1 calibration, you would be looking at multiple
2 hydrographs, and you'd notice that there was a tendency
3 to under simulate all the large flow events, for example.
4 And so you'd use that as the basis. It isn't very often
5 that calibration would be guided by statistical measures,
6 but in some places, that is certainly done.

7
8 EXAMINATION

9 BY MS. COTTINGHAM:

10 Q. I have a question for you and it kind of relates to the
11 same question that Mr. Lynch asked you. I, however,
12 didn't change majors. My experience in modelling is with
13 growth and yield modelling for forestland, and the
14 process there is very iterative; you go back and forth,
15 you check out your calibration and you continue to narrow
16 it, and because of the long periods of time, you may
17 never know whether you exactly hit the target.

18 Is the modelling for hydrology an iterative process
19 as well?

20 A. Well, it certainly should be an iterative process. What
21 one would expect to happen is that you, first of all,
22 configure the model as best you understand the physical
23 nature of the watershed, you then go and collect your
24 basic data, and then you run a calibration, and if you
25 had a problem, then you would go back, and if you didn't

AR 055360

1 have success in modifying the model parameters in a
2 reasonable fashion, then you have to go back and look at
3 the configuration of the model and try and find out
4 whether there's some physical reason, some aspect that is
5 totally missing from your model.

6 An example here, the port has recognized these
7 non-contiguous groundwater areas. So you try and develop
8 an understanding of what is happening in the real world
9 and bring that back into your model, redo the
10 calibrations.

11 So there is a certain amount of iteration involved
12 in there, or there should be.

13 MS. COTTINGHAM: Any other questions? Any
14 questions from the attorneys as a result of board
15 questions?

16 MS. OSBORN: None here.

17 MR. POULIN: None.

18 MR. REAVIS: No.

19 MR. YOUNG: No.

20 MS. COTTINGHAM: You're excused. I think we
21 would like to take about a 15-minute break. Why don't we
22 come back at eleven o'clock. And you can stop the clock
23 there.

24 (Whereupon, a recess was taken.)

25 MS. COTTINGHAM: I take it this is your next

1 witness.

2 MR. STOCK: It is. This is Dr. Patrick Lucia.

3 MS. COTTINGHAM: The court reporter will swear
4 you in.

5

6 PATRICK LUCIA, Ph.D., having been first duly sworn on
7 oath or affirmed to tell the truth, the whole truth and
8 nothing but the truth, testified as follows:

9

10

EXAMINATION

11

BY MR. STOCK:

12

Q. Dr. Lucia, please introduce yourself to the board.

13

A. My name is Patrick Lucia, L-U-C-I-A. You want me to go
14 through my whole --

15

Q. Let me ask this, is your CV attached to your prefiled
16 testimony as Exhibit A?

17

A. I believe it is.

18

Q. Why don't you summarize for us your qualifications and
19 your areas of expertise.

20

A. My degrees are a bachelor's, master's and Ph.D. in civil
21 engineering from the University of California at
22 Berkeley, having received my Ph.D. in 1980.

23

24

My professional history includes during the period
of 1984 to 1986, I was a faculty member in the civil
25 engineering department at University of California,

AR 055362

1 Berkeley. For a period of I believe '89 to '90, I was a
2 senior lecturer in the civil engineering department at
3 University of California at Davis, teaching environmental
4 courses in the civil engineering department. I have
5 taught groundwater remediation and soil remediation
6 courses for the National Groundwater Association and for
7 the University of Wisconsin.

8 I was invited to speak at a U.S. EPA technology
9 transfer conference in Korea in the late '80s. And I was
10 an invited speaker at a NATO conference in Turkey in 1995
11 on a technology transfer of environmental technology for
12 former Soviet Union countries.

13 Q. And what were those lectures on in Korea and Turkey?

14 A. In Korea, it was on disposal of soil; in Turkey, it was
15 on groundwater issues; and in the current practice in the
16 United States, in groundwater remediation.

17 Q. What is your current position?

18 A. Currently I'm a principal with a firm called GeoSyntec
19 Consultants out of Walnut Creek, California.

20 Q. And are you also chairman of the board of GeoSyntec?

21 A. I'm chairman of the board. GeoSyntec is a company of
22 about 400 people with about 20 some offices in the U.S.,
23 the U.K. and Malaysia.

24 Q. Now, you were here this morning when the board admonished
25 us with respect to direct prefiled testimony to try to

AR 055363

1 stick to just the highlights. For your edification, the
2 board does have your prefiled testimony available to it
3 and has previewed it and may ask you questions about it
4 afterwards.

5 So what I'd like to do is to hit the highlights of
6 your prefiled testimony and have you focus on the low-
7 flow aspect, low-flow analysis that you did. Could you
8 describe for all of us what you did with respect to
9 analyzing the port's low-flow analysis?

10 A. We reviewed the documents related to the embankment and
11 to PGG's analysis of the embankment itself, and the
12 Hydrus and Slice modelling that PGG did in their
13 evaluation of the low-flow analysis.

14 I commented on that analysis. We have done some
15 analysis ourselves for the purposes of showing that there
16 is a range of possibilities of answers that could result
17 from this analysis if the analysis were done differently.

18 Q. I think the best way to touch on the highlights is to
19 have you walk us through the various figures that you've
20 used in your testimony. And you've brought with you here
21 blow-ups. Why don't you start with the photographs and
22 put it in context for us. What do those photographs
23 show?

24 A. I have several major issues related to the low-flow
25 analyses. One major issue relates to the

AR 055364

1 characterization of the properties within the embankment
2 and the way PGG incorporates their assumptions in their
3 analyses.

4 A major assumption in the analyses is that the fill
5 materials that are brought into the embankment, all the
6 different types of soil that are allowed under the
7 specifications, would be blended together in some form
8 and that average properties were used. The analysis
9 didn't consider that an embankment is constructed by
10 placing horizontal layers.

11 These were some photos from the field visits in
12 January, and you can see here at some distance in this
13 section here, which was a surface failure, that there are
14 some indications of layering.

15 Q. Is that surface failure on the face of the embankment?

16 A. Yes, it is.

17 MS. COTTINGHAM: Can I ask a question. Are
18 these photographs part of the exhibits?

19 MR. STOCK: Yes, they are. It's Exhibit 705.

20 MS. COTTINGHAM: Thank you.

21 A. One of my major concerns in the analysis is that in
22 construction of an embankment, there are horizontal
23 layers. The Hart Crowser reports, in fact, with the
24 different soil groups that are allowed for the
25 embankment, recommends that during summer months, soils

AR 055365

1 with more silts and fines in them are placed during
2 non-rainy periods, and that during rainy periods, more
3 granular materials with less silts or fine soils are
4 placed.

5 So just the nature of the recommendations by Hart
6 Crowser are going to result in a layered embankment with
7 different types of materials.

8 Q. And does this photograph show what you're talking about?

9 A. Yes. You can see in this zone right here we have very
10 few cobbles and we have much finer material. Up above we
11 have some fill material that represents a wider variety
12 of materials, cobbles and some fines intermixed between
13 the two, and then another layer of material down here and
14 another different material down there.

15 So when all the materials are prescribed within a
16 range in the specifications, they end up in horizontal
17 layers like this. And the flow through the embankment
18 that is calculated in the PGG analysis, I believe, will
19 be controlled more by these layers in which the hydraulic
20 conductivity or the ability of the water to flow through
21 the soil is much slower.

22 So this material, the flow will be slower, it will
23 speed up. Where you have materials that are less
24 permeable, you'll get ponding on top and the water won't
25 flow as readily as it might in zones where we have a lot

AR 055366

1 of cobbles and sands.

2 Q. Can you explain for us what your figure 2 of your
3 prefiled testimony shows with respect to the different
4 range of soils? And I think you'll find it right there
5 behind the first photograph.

6 MS. COTTINGHAM: Is that attachment B?

7 MR. STOCK: It's actually behind his prefiled
8 testimony. They were appendices to the prefiled
9 testimony rather than as an exhibit, so if you go to
10 right before the tab A, you'll see his different figures.

11 Q. Explain for us what figure 2 illustrates.

12 A. For engineers and scientists, we show, we characterize
13 the grain size, the range of soils in a fill by these
14 types of curves. And it shows the particle size, the
15 diameter here based on the percentage by weight as they
16 exist.

17 So, for example, this curve here would represent
18 materials which had much more cobbles and rocks in it;
19 whereas, we get over here, we have much smaller grain
20 size diameter for each individual particle, so you'll see
21 this is a much finer soil with a lot more silt. These
22 two extremes represent the ranges which are allowed
23 within the port's specifications for construction. So
24 soils within that type are allowed to be placed.

25 Q. Are these the Hart Crowser specifications that you are

AR 055367

1 talking about?

2 A. Yes, they are. PGG's analysis assumed that it averaged
3 all of these properties out and used a single curve to
4 represent the entire embankment of almost 20 million
5 yards, and that the materials that came in would be -- it
6 would be a homogeneous structure.

7 And what I believe will happen is that the flow will
8 be controlled, the vertical flow will be controlled by
9 these horizontal layers of finer materials as we saw in
10 the previous figure.

11 Q. Have you graphed out for us the effects of these
12 different soil types that Hart Crowser has specified, and
13 is that figure 3b of your prefiled?

14 A. This figure is a representation of the properties of the
15 soils, of the ability of the soil to transmit water
16 through the embankment as measured by the hydraulic
17 conductivity which is in centimeters per second. So it
18 tells you how fast the water goes through the embankment.

19 These numbers here imply that this is 1 times 10 to
20 the minus 4 centimeters per second, so .0001 centimeters
21 per second. So it's very slow.

22 However, that property varies with how much water is
23 in the embankment. So the more water we have in the
24 embankment, the faster they flow. In a dry condition,
25 the hydraulic conductivity can be quite low. So the time

AR 055368

1 it takes for the water to get through the embankment will
2 be considerably longer. And the models that the port
3 used and that we use evaluate how the water moves through
4 the embankment and how these properties all change with
5 time, and that it calculates how long it takes for that
6 water to come out the bottom of the embankment into the
7 gravel drain.

8 Q. Can you explain for us what's on the lower axis, suction
9 head, the concept of suction head and what we're looking
10 at here.

11 A. Suction head really is that in soils which are not
12 saturated, which aren't completely flooded with water,
13 there's always some water. And much like you'll see on a
14 glass where you have a little meniscus where the water
15 wants to hang up on the side, the water between the soil
16 particles is actually in tension pulling it together, and
17 wants to pull in more water. So the tension in the water
18 cause it to want to increase the water content. So as
19 water becomes available, the soil particles will pull
20 more water in. And as they get wetter and wetter, the
21 tension to pull the water in decreases. And so as you
22 get closer and closer to the soil being saturated, the
23 pores become filled with water and so it moves more
24 quickly through the soil. When it's not saturated, it
25 moves quite slowly; hence, these very small numbers here,

AR 055369

1 .0 on out to 9 zeroes, as opposed to up here where we
2 only have three or four zeroes behind the decimal point.

3 Q. Dr. Lucia, I have a real basic question. When we look at
4 this, is it wetter to the left or to the right?

5 A. Wetter is to the left, your left.

6 Q. Can you explain for us, then, what these different lines
7 are showing, the different lines you're showing here?

8 A. When Hart Crowser originally started doing the low-flow
9 analysis, the infiltration through the embankment, they
10 began by approaching it much like I would have by looking
11 at the properties of the various soils, group 1B, 3 and 4
12 soils that are allowed in the embankment.

13 Q. Let me stop you for a second. And what is group 1B
14 soils?

15 A. These are soils which are described in the specifications
16 and in the reports as a type of soil that's going to be
17 placed in the embankment, as are group 3 and 4, this one
18 being the coarsest in the sense it has the fewest fines,
19 mostly rocks, this one being the finest in the sense that
20 it has less rocks, more silty types of soils.

21 Q. So we're moving from gravel or rock down to silt?

22 A. Correct.

23 Q. So what conclusions do you draw from this figure?

24 A. The actual ability of these soils to transmit water
25 through the embankment even under saturated condition

AR 055370

1 varies by several orders of magnitude, three orders of
2 magnitude here. And I believe in the embankment it will
3 be that type of difference in the hydraulic conductivity
4 or the rate the soil can transmit water. Now, there's a
5 number of other factors that affect that which I'll talk
6 about later. But when PGG did the analysis --

7 Q. PGG.

8 A. -- they assumed a single curve here, as opposed to
9 looking at the range of curves that Hart Crowser started
10 to look at.

11 Q. So the PGG analysis is the blue curve?

12 A. This is the single set of parameters that PGG used to
13 represent the entire embankment.

14 Q. How does the PGG model take into consideration, if it
15 does, the different soil types?

16 A. It assumes that all of these materials are mixed
17 together, it proportions them out by how much gravel and
18 silt it is, and then it puts it into one homogeneous
19 embankment and it assigns these properties here to the
20 entire embankment.

21 Q. Why don't you explain for us what your figure 5
22 illustrates.

23 A. The bottom part of this figure 5b represents how an
24 actual embankment looks when it gets constructed. There
25 are a number of layers as we saw in the other picture

AR 055371

1 that as embankments are built vertically, you get these
2 types of lenses in there.

3 Q. And that's what you were talking about in these
4 photographs here?

5 A. Right. This is a schematic representation of this
6 photograph. And as water gets to these less permeable
7 layers, it travels more easily around, and so the pathway
8 actually from the top to the bottom is longer than what
9 would be predicted if you just assumed a homogeneous
10 embankment.

11 Q. What are you showing on the top part of figure 5a?

12 A. One of my criticisms of the PGG analysis is that in
13 developing the parameters for the model, they use the
14 Rosetta model, which is you input certain number of
15 parameters and then you get these hydraulic conductivity
16 parameters out. Now, that model doesn't allow the use of
17 gravel. They made a simplifying assumption at that
18 point, which is like a domino effect, I believe it
19 affected a number of other results that they had, they
20 assumed that they couldn't determine the hydraulic
21 parameters using Rosetta, so they took the gravel out,
22 and so this is a representation of that, and they said
23 all the water will just flow through the particles,
24 between the gravel particles, which is essentially
25 correct, I mean, it's how it actually behaves, but since

AR 055372

1 they took the gravel out, they reduced the area over
2 which was available for water to flow into. So they made
3 an artificial correction to their flow, and they
4 multiplied the flow, the rainfall amounts, by a factor I
5 believe of approximately 2.2, because they said all the
6 water would be going through here and not through here
7 and so more water is going to go through here.

8 And there are other ways to make that correction.
9 It results in answers which are similar to the PGG's
10 hydraulic parameters, but it doesn't require that you
11 make this other assumption here. You can just put the
12 whole water into the whole embankment.

13 When they make that assumption, what happened, I
14 believe, was that they were using Hydrus 2D. And as Dr.
15 Leytham testified earlier, these models only allow so
16 much water to go in, and so we have approximately 2.2
17 times the amount of rainfall, and so I believe that the
18 2D model, they couldn't get Hydrus to accept all the
19 water, the program wasn't working right, and so they had
20 to go to a 1D model, and so they went to the
21 1-dimensional Hydrus model.

22 Q. And then once they went to the one-dimensional Hydrus
23 model, what did they do?

24 A. Then you have this correction you have to make at the top
25 where you're multiplying the rainfall, you have it flow

AR 055373

1 through here, then they corrected again at the bottom
2 where they reduced the amount by the amount they added at
3 the top, and then they put it into Slice, which I think
4 is an unnecessary complication.

5 Q. Did GeoSyntec then take the PGG data and look at the PGG
6 data and illustrate what was happening?

7 A. Well, we were trying to look at the range of property,
8 the range of behavior that would occur within the
9 embankment based upon the range of properties that
10 existed. And we looked at the effect of some of the
11 assumptions that PGG was making in their analysis.

12 Q. And you have an illustration of that. This is figure 6
13 of your prefiled testimony.

14 A. PGG concluded that the behavior would be essentially one
15 dimensional. And I think, to a degree, probably most of
16 the behaviors is one dimensional, because rain is
17 falling, it's moving down vertically, except for some of
18 these other factors such as the layers which causes it to
19 move horizontally at times.

20 Q. In fact, speaking of the layers, you heard Dr. Leytham's
21 testimony with respect to the photograph of the top of
22 the embankment there. How is that ponding on that top of
23 the embankment relevant to what you're talking about now?

24 A. I was out at the site visit and I saw this phenomena when
25 I was there, and I think this really relates to much like

AR 055374

1 that first photograph we have where we have these layers
2 that are less permeable and allow water to infiltrate
3 more slowly than some of the gravel layers. And so if
4 you stood out there on the embankment the day I was
5 there, you would see layers where it was primarily
6 cobbles and gravel with very little fines, and no water,
7 and then you would see layers or portions of it that had
8 fines and ponding water where the water was infiltrating
9 more slowly. So I think it's just relating to the
10 phenomena that we see in the other photograph over there.

11 Q. Okay. Can you walk us through what figure 6 is showing,
12 starting at the top. And also orient us in terms of
13 where the drainage layer is and what your figure is
14 first.

15 A. This is a cross-section through the embankment. This
16 zone right here is the drainage layer. The runway is in
17 here. The filter strips to help infiltration are over
18 there. This is a two-dimensional model out of Hydrus.
19 It was run using the Hart Crowser properties. And it was
20 done to show that there is horizontal flow. As you see,
21 these darker sections becoming lighter under the
22 embankment, we have some flow moving in from the sides.

23 In addition, you'll see we modeled it such that all
24 the infiltration was coming into the slope on the
25 embankment. PGG assumed all of the infiltration ran off.

AR 055375

1 Hart Crowser in their original studies, I believe, were
2 assuming something like 40 percent of the material would
3 infiltrate. Whatever it does, I mean, it is possible to
4 model this two dimensionally.

5 Now, this model represents one range of the
6 behavior, because it starts off with an embankment that's
7 fairly dry, probably not realistic, but it's no less
8 realistic than the starting point that PGG has where they
9 assume the water content throughout the embankment. I
10 think the actual conditions are unknown at this point and
11 it's somewhere within a range of behavior. This was
12 intended to show that you could do this model two
13 dimensionally.

14 Q. And then the next figure is figure 7. What is figure 7
15 illustrating?

16 A. Figure 7 is just intended to illustrate the differences
17 between one- and two-dimensional models. In each case,
18 we start with some initial condition.

19 Q. Can you explain to us what we're looking at? What are
20 these different columns representing?

21 A. Under each one of these days, this is a column where we
22 have one-dimensional flow and a column where we have two-
23 dimensional flow.

24 Q. So these are columns of fill?

25 A. Of fill. And this is, in effect, how PGG did their

AR 055376

1 analysis with one-dimensional columns, a series of one-
2 dimensional columns of different heights. Now, in both
3 cases there is the rainfall record which is input from
4 the model and same rainfall records that PGG used. And
5 the rainfall records are the same in both cases.

6 When I had my deposition, I misspoke about one
7 thing, that I said while the rate was the same, the area
8 was smaller here, but, in effect, what this shows, and
9 it's not really to scale, is that the area the rainfall
10 falls on in both sections are the same, it's just that
11 this is a much wider section so there's more volume for
12 the materials to -- more volume for the water to go into.
13 And it was intended to represent what happens at the edge
14 of a runway, to show that as water hits, it's blocked
15 from infiltrating on one side, it hits on the other side
16 and starts to go in underneath.

17 Q. Let me slow you down a minute. What is the difference
18 between the columns on the left and the columns on the
19 right in each of the different segments?

20 A. Column on the left is rainfall falls on the entire width
21 and it's truly one-dimensional.

22 Q. And that's what PGG was looking at?

23 A. That's what PGG looked at.

24 Q. And then explain your other.

25 A. Column on the right is a wider section than this. The

AR 055377

1 rainfall falls on the center portion and is allowed to go
2 both vertically and horizontally.

3 Q. So are you demonstrating the horizontal aspect of the
4 water flow through the embankment?

5 A. For these assumed conditions, it shows the differences
6 between having two-dimensional and one-dimensional.

7 Q. And then overall, as you march through time, what's
8 happening when you consider the two-dimensional aspect of
9 it?

10 A. In the two-dimensional aspect, the water is moving
11 horizontally and filling up areas that are dry, much like
12 you would see at the edges of the runway as the moisture
13 content starts to increase in that direction. So you
14 have a larger area for the water to flow into, so,
15 consequently, it goes vertically slower because you have
16 the same amount of rainfall coming in.

17 Q. All right. So what is the conclusion that GeoSyntec has
18 drawn from this analysis?

19 A. I believe that a more appropriate analysis would have
20 been the two-dimensional model in Hydrus, and had PGG not
21 made this correction of doubling the rainfall and
22 excluding water from flowing into the gravel, they could
23 have done the analysis in two dimensions and the results
24 would be different.

25 Q. What are the implications in terms of the low-flow

AR 055378

1 analysis?

2 A. The implications are that the timing would be different;
3 that water would recharge at later dates than what's
4 predicted in the analysis based on just these parameters.

5 Q. All right. And what is your figure 4 demonstrating?

6 A. What I think ultimately is my biggest criticism of the
7 analysis is that once construction is finished, the
8 conditions in the embankment are largely unknown but can
9 be predicted within a range, but there will be a time lag
10 prior to the time that we get into a steady-state
11 condition. And by that I mean, we put water on the top,
12 we've got water coming out the bottom and everything
13 happens in a normal fashion. PGG, for some reason, ran
14 ten years worth of analysis, but they don't report the
15 first six, they report year seven through 10 as the way
16 the low flow will occur. And I believe no matter what
17 initial conditions you put in, there is going to be
18 erratic behavior those first couple of years; there won't
19 be as much water as you predict under the steady-state
20 condition. This analysis was intended to represent that.

21 Q. Can you explain to us what your vertical and horizontal
22 lines are showing.

23 A. For the initial conditions that we assumed, which,
24 admittedly, are a dryer embankment, this is the time it
25 takes for water to start discharging at a steady-state

AR 055379

1 condition into the drainage layer.

2 Q. So on the left you have number of days?

3 A. Number of days and over there it's years. And this is
4 for embankment heights for three different types of
5 soils.

6 Q. All right. Why don't you walk us through, let's take the
7 150-foot height embankment, and walk us through what
8 you're showing on the 150-foot height on the right-hand
9 side.

10 A. On the right-hand side you will see for 150 feet for the
11 group 3, Hart Crowser group 3 properties, and the initial
12 conditions that we assumed, it would take up to six years
13 for water to travel through a 150-foot-high embankment
14 for the rainfall records that we used.

15 Q. And then what is the red line showing over on the
16 right-hand side for 150-foot embankment?

17 A. The red line is for a different set of soil properties,
18 group 1B properties, Hart Crowser group 1B, and at a
19 150-foot embankment, it would take a little over two
20 years for water to get to a steady-state condition.

21 Q. So if I understand you, is that red line on the
22 right-hand side at the 150-foot height the minimum amount
23 of time it's going to take for that type of soils?

24 A. I would preface that by saying for the initial conditions
25 that we assumed, that would be true. There are other

AR 055380

1 curves for each one of these. If you assumed initially
2 that you had a wetter embankment, these curves would be
3 -- would flatten out. So if I took even the 150-foot
4 embankment for these properties here, if I assumed wetter
5 initial conditions, it would be less than six years. For
6 these properties, it would drop down as well. For the
7 port's properties that they assumed, it would be about
8 three and half years.

9 But I think the point is that what hasn't been
10 studied is what is the range that we're likely to expect.
11 And I think if you were to do a complete analysis of this
12 and looked at a number of additional assumptions in the
13 construction of the embankment, you would find that there
14 would be some time period in which you would not get the
15 flows that are predicted in the PGG analysis.

16 Q. And as a result of your analysis, have you come to any
17 conclusion with respect to the stormwater storage vaults
18 proposed by the port?

19 A. I think that for the long term, the steady-state
20 condition, that the volume of water that falls on the
21 site that gets recharged is going to be the same, I mean,
22 the water will go through, that the amount of storage is
23 probably adequate. For the short term, this undetermined
24 period of time until the embankment gets to a steady-
25 state condition, there's going to be needs for additional

AR 055381

1 water to make up for water that's being stored in the
2 embankment over that period of time, which could be one,
3 two, three years, nobody knows at this point.

4 Q. So the big unknown is when do you get to steady state in
5 the embankment?

6 A. That's correct, when do you get to steady state.

7 Q. And just to wrap up here, what are the implications of
8 the low-flow analysis that you have looked at here and
9 the criticisms you have of it to the monitoring
10 requirements in the certification where the certification
11 provides that monitoring of groundwater will be for a
12 period of eight years?

13 A. I think if you looked at this type of analysis, you'd see
14 that the time at which you're starting to get groundwater
15 flow back to the condition that it was prior to the
16 embankment being installed, it's probably several years,
17 and, therefore, if you're assuming that eight years is
18 enough, based upon a steady-state condition occurring
19 immediately after construction, it's probably not enough
20 because there will be a period of one to unknown number
21 of years until flow gets reestablished again to the
22 conditions it was prior to construction.

23 MR. STOCK: All right. That's all the
24 questions I have.

25 MS. COTTINGHAM: Mr. Poulin.

AR 055382

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MR. POULIN: I have no questions, Your Honor.

EXAMINATION

BY MR. REAVIS:

Q. Dr. Lucia, I am Gil Reavis. We met at your deposition, if you recall.

MR. STOCK: Would you mind speaking up, Mr. Reavis.

MR. REAVIS: Sure.

Q. Let me go through some of these issues on low flow that you talked about, and particularly with regard to that last issue that this chart illustrates.

Let me just see if I can understand how you actually got to those particular lag times, and that is another way to describe this, is it not, is that there's a lag time between when the first rainfall hits and when you actually reach steady state?

A. That's a fair way to describe it.

Q. Now, the estimates of that lag time are based upon the modelling work that you did using Hydrus 2D; is that correct?

MR. STOCK: I should say that Dr. Lucia, to the extent he needs to rely upon or refer to any of his prior charts, I assume he's free to do that.

MS. COTTINGHAM: Yes.

AR 055383

1 A. These estimates are actually based on a one-dimensional
2 analysis using columns similar to the approach that PGG
3 used.

4 Q. But at least figure 4 is a result of a Hydrus model run?

5 A. Yes.

6 Q. Is that correct?

7 A. That's correct.

8 Q. And I believe figure 6 that we had up a minute ago, which
9 I can put up for you if you'd like, and figure 5 are also
10 the result of Hydrus model runs?

11 A. You said figure 6 and figure 5?

12 Q. Correct. And if I could just ask you about figure 6
13 first, if you could put that one on the front. As I
14 understand the way that the Hydrus model created some of
15 these diagrams and how it actually modeled this
16 embankment, what happened is in inputting the data, you
17 input data at the bottom of the embankment as being
18 saturated; is that correct?

19 A. That's correct.

20 Q. So this area, if I can approach it, toward the bottom
21 here, which looks like it's green, is the bottom of the
22 particular cell in Hydrus that you were using?

23 A. That's correct. These areas, you see moisture content
24 here, green being higher moisture content, red being
25 lower moisture content, so we have high moisture content

AR 055384

1 here grading up to lower moisture content as we go to the
2 surface.

3 Q. And maybe this is an easier way to illustrate that,
4 because these are the cells themselves, correct?

5 A. These represent the one-dimensional cells and, again,
6 this being wetter at the bottom and, correspondingly,
7 dryer soils as you go up.

8 Q. Okay. As I understand what happened, though, is that the
9 data that was input into the model was at the bottom here
10 for saturated conditions, correct?

11 A. That's correct.

12 Q. And that the model itself calculated everything above
13 that?

14 A. Right. We input this and it was saturated down here,
15 then we allowed the model to then come into equilibrium
16 and distribute water throughout it.

17 Q. So the moisture content at the top here, then, was
18 something that the model calculated, correct?

19 A. That's correct.

20 Q. Based upon the fact that the bottom was saturated?

21 A. That's correct. And it was intended to show one range of
22 what I think is a range of initial conditions. You could
23 have input water content throughout the entire embankment
24 here and then allowed the model to start running. It
25 would start getting everything in equilibrium with each

AR 055385

1 other and just redistributing the water around, but
2 that's equally an unknown during construction or
3 following construction.

4 Q. But if you had done that, you would have ended up with a
5 greater moisture content at the top of the cell?

6 A. We could have done a whole variety of things. We could
7 have looked at layers and put higher water contents in
8 the layers and lower water contents in other areas, but
9 my point really is is that you don't know where those are
10 going to be. We know they're going to be in there, we
11 know they will influence the vertical flow, but what we
12 really need to do is to look at the ranges of things that
13 are likely to happen. We could apply the saturated
14 condition over the entire embankment and get another
15 curve.

16 Q. But the result of the way you did it is reflected on
17 these diagrams, correct?

18 A. That's correct, it's the same thing. We have the higher
19 water content here. We allow the program to redistribute
20 the pressures and come into equilibrium and then we turn
21 the rain on.

22 Q. So, for example, this is day 1500, and moving back in
23 time, you get back to day zero, correct?

24 A. That's correct.

25 Q. And day zero is the first day on completion of the

AR 055386

1 embankment?

2 A. That would be correct.

3 Q. Now, with regard to the colors here, dryer is over here
4 on the red end, correct?

5 A. That's correct.

6 Q. So, for example, the Hydrus model that you ran produced a
7 result that at the very top of the embankment for about a
8 third of the way down it's a very dry condition,
9 correct?

10 A. Yes, it's very dry.

11 Q. And the lag times are going to vary depending on how dry
12 that soil is, correct?

13 A. No question.

14 Q. And the moisture content of that soil is going to depend
15 on what happens in the environment when the construction
16 is going on, correct?

17 A. It could be, you know, the three wettest years in the
18 history of Seattle when this is constructed; it could be
19 the three driest years; they could construct it in one
20 year. That's unlikely. There's a lot of unknown
21 conditions about how the thing would be built. I mean,
22 there are probably an infinite number of combinations
23 that you could come up with to model the initial
24 conditions. But I believe it's appropriate to evaluate
25 the range of those initial conditions, because, assuming

AR 055387

1 a single set of parameters and a single unique condition
2 at the end of construction, and the implication that
3 there is a single answer to the problem I think is
4 incorrect.

5 Q. I guess my question was limited to the moisture content
6 of the soil. And you're familiar enough with the plans
7 for the embankment construction to know that it's not
8 going to be built in a year, correct?

9 A. I know it's not going to be built in a year.

10 Q. In fact, it will actually take several years?

11 A. It will take several years.

12 Q. And, presumably, here in western Washington, it's going
13 to rain during those several years?

14 A. I presume it will, but to a degree that people don't know
15 at this time.

16 Q. Have you ever actually worked on a construction project
17 here where fill was imported and placed in western
18 Washington over a multi-year period?

19 A. I've worked on construction projects all over the world
20 in tropical climates and in dry climates, but I have not
21 worked on one in western Washington.

22 Q. But in the tropical climates, the moisture content of the
23 soil by the time construction is complete is greater than
24 it is in dry climates, correct?

25 A. Well, it depends. I mean, part of this will be

AR 055388

1 constructed during summer months, part of it will be
2 constructed during winter months, I mean, all of that was
3 considered in the Hart Crowser reports, and that there
4 are different soils recommended to be placed at different
5 times of the year because of the ease of construction.

6 Q. But your Hydrus model does not include any of those
7 specifics in determining the moisture content at the top
8 of this embankment, correct?

9 A. Well, no, it doesn't because I didn't feel it was my job
10 to analyze it, I, as a reviewer; I felt that the people
11 analyzing it ought to consider the range of possibilities
12 and I don't feel they have.

13 Q. So you're functioning here as a reviewer, not a designer,
14 correct?

15 A. That's correct.

16 Q. And it's up to the designers to evaluate these types of
17 issues and determine whether or not they make a
18 significant difference in the design of a system?

19 A. And it's up to the reviewers to comment when they think
20 it's not appropriate.

21 Q. Right. And that's your role here?

22 A. That's my role.

23 Q. Now, let me ask you then about this issue of Hydrus 1D
24 versus 2D. And 1D is one dimensional, 2D is two
25 dimensional, correct?

AR 055389

1 A. That's correct.

2 Q. Figure 6 that we have up here is a result of a two-
3 dimensional run; is that correct?

4 A. Yes, that's a two-dimensional run.

5 Q. So the horizontal flows that you're talking about here
6 would be reflected on figure 6, to the extent there are
7 any; is that correct?

8 A. They are reflected by the changing in color as you can
9 see under the runway, for example, you start to see
10 different changes and eventually becomes all orange and
11 more yellow.

12 Q. So let me just see if I understand this, then, sort of
13 graphically. If you look at this yellow area, and maybe
14 the borderline of it, it kind of shifts, it goes
15 vertically and then it kind of shifts every now and then
16 goes horizontally, correct?

17 A. That's fair.

18 Q. So the horizontal flow you are talking would be
19 represented by these horizontal shifts in the color?

20 A. Yeah. And, for example, here under the embankment, I
21 mean, there's gravity working in this direction and we've
22 got flow wanting to go in this direction, so you'll see
23 here we've got yellow, something less than yellow,
24 orange, red. So it's moving under the runway in this
25 direction and that direction and moving down.

AR 055390

1 Q. But I guess my question is, you can tell the extent of
2 horizontal movement by looking at this graph?

3 A. Yes, qualitatively, yes.

4 Q. Now, let me switch gears a little bit here and talk about
5 your criticism of PGG's work and, as you described it, I
6 think, you said they ignored the gravel content of the
7 soil, correct?

8 A. If I used the word ignored, I meant in that they removed
9 it from the analysis and you just had the flow go through
10 the sand and silt matrix. I don't mean to imply that
11 they just didn't think about it; they obviously thought
12 about it.

13 Q. But I think in your testimony a minute ago you said the
14 water is not actually going to flow through the gravel
15 itself, correct? In other words, we have a gravel
16 particle or a rock, the water is going to have to go
17 around it.

18 MR. STOCK: Can we put up figure 5. That's
19 what he is referring to now.

20 Q. (Continuing By Mr. Reavis): I guess I wasn't really
21 referring to figure 5. My question was more basic. If
22 you have an embankment that has dirt and rocks, if I can
23 view that as basic, that water going through that is not
24 going to pass through the rock, it's going to have to go
25 around the rock into the soil surrounding it, correct?

AR 055391

1 A. For the most part, but the rock also has an influence on
2 the flow; I mean, it's not like it isn't there, which is
3 the way PGG did it. Now, they had to do something to
4 correct for the gravel, no question about it, but my
5 concern about that issue is that there was another way to
6 do it that's in the literature that results in very
7 similar numbers, no question about it. But the effect of
8 making the corrections in a different way doesn't force
9 you to make all these other corrections about doubling
10 the rainfall and then subtracting it out at the bottom
11 and then having to use Slice. So while the corrections
12 result in similar numbers, they changed the whole way
13 that you end up doing the analysis, and I think if PGG
14 had done that originally, they wouldn't have switched
15 from 2D to 1D like they did.

16 Q. Let me ask you about these corrections, then, because, as
17 I understand it, you use the Rosetta model to determine
18 the hydraulic conductivity of the material, correct?

19 A. Correct.

20 Q. But what you're saying is that there are some techniques
21 out there that are described in a couple of academic
22 papers for making corrections to the Rosetta model,
23 right?

24 A. For making corrections to soil or gravels that allow you
25 to calculate partially-saturated parameters.

AR 055392

1 Q. Correct. And at some point in this process your company
2 actually ran the Hydrus model using that approach,
3 correcting the Rosetta model, correct?

4 A. Yeah, in the beginning we were looking at doing it a
5 whole different way, like I said, and we made the
6 corrections ourselves and we started to run the analysis,
7 and then we decided that what we would really do is focus
8 in on what PGG and Hart Crowser did since we weren't the
9 designers, you know, we were the reviewers. So, yes,
10 early on we did do those corrections.

11 Q. But you didn't keep the results of those model runs, did
12 you?

13 A. To the best of my knowledge, we didn't, no.

14 Q. But your testimony here today is that you don't think
15 those corrections are going to make a significant
16 difference with regard to the hydraulic conductivity of
17 the soil?

18 A. I know the corrections don't make a significant
19 difference regarding the properties, the hydraulic
20 properties of the soil, but where it does make a
21 significant difference is in the subsequent steps in the
22 modelling is that you're not forced into these other
23 corrections that PGG had to make.

24 Q. Now, one of those corrections, if I can just see if I
25 understand it, is that you actually multiplied by 2.2 on

AR 055393

1 the top and then divide by 2.2 on the bottom; is that
2 what you're talking about?

3 A. That's one of the additional things that they did.

4 Q. Now, in your testimony a minute ago, I think you said
5 that the PGG model assumes that all of this material is
6 mixed together; is that what you said?

7 A. That's what the report said, yes.

8 Q. Is that true, or is what the model does is assumes that
9 it may not be mixed together but it's going to behave
10 like it's mixed together?

11 MR. STOCK: Object to the form of the
12 question.

13 MS. COTTINGHAM: Sustained.

14 Q. (Continuing By Mr. Reavis): What I'm trying to figure
15 out is whether you're saying that -- actually, let me
16 show you a chart here, maybe that will be helpful.

17 As I understand what you're saying here is this is
18 the range of different grain sizes and fill properties,
19 correct?

20 A. That's correct.

21 Q. And that PGG picked something sort of in between the
22 upper and lower?

23 MR. STOCK: I object. That mischaracterizes
24 what Dr. Lucia says, and if he would just ask the
25 question, I think Dr. Lucia will explain. It

AR 055394

1 mischaracterizes the testimony.

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

4 Q. (Continuing By Mr. Reavis): Why don't you tell me what
5 this line does relative to this line and this line.

6 A. What my understanding that PGG did in their analysis is
7 not to pick something that's in between the range of
8 properties that are allowed by construction
9 specifications, but looked at all the materials that were
10 going to be allowed by construction and then figure out
11 how much gravel was in all of them, how much sand and
12 silt, and then derived a curve which was the average of
13 all of those properties put together, which is different
14 than just picking a curve in the middle between two
15 lines.

16 Q. But, in any event, it ends up in between two lines?

17 A. But, in any event, it ends up in between the two lines.

18 Q. I'm going to switch gears here a minute and ask you some
19 questions about fill criteria, which weren't things that
20 you addressed this morning but are in your prefiled
21 direct testimony. So I don't know if the board would
22 like to go ahead and go into that or whether now is a
23 good time to take a lunch break.

24 MR. STOCK: I think Dr. Lucia will have
25 something to say to some of Mr. Reavis' initial questions

AR 055395

1 on fill criteria, so I think it would be best if he goes
2 ahead and starts down that road and let's see where that
3 takes us, because I think it will be very short.

4 MS. COTTINGHAM: Okay. Let's proceed.

5 Q. (Continuing By Mr. Reavis): You have provided
6 testimony, have you not, in your prefiled direct relating
7 to fill criteria and related to the contaminant issue,
8 correct?

9 A. That's correct, I have.

10 Q. Now, it's true, is it not, that in the 401 certification
11 that there are two different charts that explain the
12 numeric criteria for fill?

13 MR. STOCK: I'm going to object to the form of
14 the question as vague. Maybe Mr. Reavis can show him in
15 the certification what he is referring to.

16 MS. COTTINGHAM: Can you show him? Is that
17 Exhibit 1?

18 MR. REAVIS: Yes, it is.

19 MS. COTTINGHAM: It's a black notebook.

20 Q. (Continuing By Mr. Reavis): Exhibit Number 1 is a copy
21 of the September 401 certification. My question related
22 to if you could take a look at page 17, and that contains
23 a table, does it not, of numeric criteria?

24 A. That's correct.

25 Q. And if you flip over to the last page of the exhibit,

AR 055396

1 which is table 1 to attachment E, there's another table
2 there, correct?

3 A. That's correct.

4 Q. And do you know which one of those tables governs the
5 fill that's going to be accepted for the third runway
6 embankment?

7 A. My understanding is that the table on page 17 governs,
8 unless there is a failure to meet the criteria where the
9 soil appears unacceptable, and at that point, then, the
10 additional SPLP tests would be performed.

11 Q. Okay.

12 A. So the last table we talked about would be appropriate,
13 but to maybe expound a little bit more on this, and
14 related to what he said, that since my deposition on this
15 matter, I understand the port has done additional
16 analysis with Riley of Papadopoulos. And that had been
17 one of my criticisms earlier is that there hadn't been
18 sufficient analysis done to really evaluate the degree to
19 which these parameters and the subsequent alternatives in
20 terms of less contaminated fill were protective. And
21 currently in the process of evaluating that report and my
22 opinions on this matter, my understanding is that I will
23 be brought back to testify in rebuttal after I've had a
24 chance to review Mr. Riley's report.

25 Q. Well, are you telling us, then, that the several pages in

AR 055397

1 your prefiled direct testimony relating to fill issues no
2 longer represent your opinions?

3 A. No, I'm not. I'm just saying that there's been
4 additional information which I understand now is part of
5 this hearing that I haven't yet had an opportunity to
6 review. It may not change my opinions whatsoever, but I
7 haven't reviewed Mr. Riley's work yet and how it relates
8 to the level -- how protective these standards are and
9 these criteria are.

10 MR. STOCK: And, Miss Cottingham, this is the
11 problem created by the port bringing in at the last
12 minute Mr. Riley's report on the modelling infiltration
13 through the embankment, and so Dr. Lucia and GeoSyntec
14 are in the process of looking at that. That was one of
15 his major criticisms, as you've read in the prefiled
16 testimony. So our plan is to bring him back in rebuttal,
17 and that will probably be next Thursday or Friday.

18 MS. COTTINGHAM: We will acknowledge your
19 continuing objection on which I ruled yesterday to allow
20 in those.

21 MR. STOCK: Yes.

22 MR. REAVIS: And let me just state for the
23 record, if for no other reason, that the Riley report
24 wasn't produced in the last minute, it's been in
25 existence for a month now.

AR 055398

1 MR. STOCK: I think that is the last minute
2 given the extent of the report and that we're here, but I
3 accept the board's ruling so we won't argue.

4 MR. REAVIS: I suspect I am going to have a
5 number of questions, not withstanding his statement, to
6 go through with him, so it's probably going to take a few
7 minutes.

8 MS. COTTINGHAM: Why don't we take a lunch
9 break. Why don't we try and shorten it down today. Why
10 don't we just take an hour for lunch today and be back
11 here at one o'clock.

12 MR. EGLICK: Ms. Cottingham, I just wanted to
13 ask, I don't know whether it's ever been resolved which
14 party will go next after ACC. We have an order of
15 witnesses, but do we know whether it will be Ecology or
16 the port?

17 MS. COTTINGHAM: It will actually be CASE.

18 MR. EGLICK: I mean after this side of the
19 room. And if we could get that clarified so that we can
20 make arrangements to have the proper people here at the
21 proper time.

22 MS. COTTINGHAM: At some point either today or
23 early tomorrow can you indicate which of you is going to
24 go first. At the end of every day we had arranged to
25 line up who the witnesses are and that should be a good

AR 055399

1 indication.

2 MR. EGLICK: Thank you.

3 MS. COTTINGHAM: With that, we'll go off the
4 record and be back at 1 o'clock.

5 (Whereupon, a recess was taken.)

6 (Mr. Jensen joined the proceedings.)

7 MS. COTTINGHAM: On the record.

8 MR. REAVIS: Miss Cottingham, if we could, I
9 think it would make more sense, rather than starting this
10 testimony, for us to discuss this issue of whether or not
11 it's appropriate to bring him back, Dr. Lucia back as a
12 rebuttal witness, given the basis it's being offered, for
13 him not being able to complete his testimony. And if
14 you'd like, I can explain sort of the chronology of this
15 whole Riley report issue.

16 MS. COTTINGHAM: So, in essence, your motion
17 is to preclude rebuttal testimony?

18 MR. REAVIS: With regard to this witness on
19 this particular basis it's being asserted. I'm not
20 suggesting that there is no rebuttal testimony at all, I
21 just don't think these circumstances justify rebuttal
22 testimony from this witness.

23 MS. COTTINGHAM: Why don't you lay out your
24 rationale and then I will determine --

25 MR. REAVIS: The chronology of this is in

AR 055400

1 early February there were communications with ACC's
2 counsel about the Riley report, and some of this was
3 attached to that motion that we discussed yesterday on
4 the alleged late-produced reports. As an exhibit, there
5 was an email string that was attached to that. So I'd
6 just like to make a couple of points about that. There's
7 an email from Mr. Witek on February the 7th indicating
8 with regard to the Riley report that he'd like to get
9 that so he can send it to his hydro modelling person, how
10 soon could he get it. And we responded that we are still
11 waiting on some data, but we expected the report would be
12 back by February the 15th. It was in fact back by
13 February 15th, it was forwarded electronically on that
14 day. So ACC had the Riley report February the 15th,
15 almost two weeks before the close of discovery.

16 Most witnesses' prefiled testimony went in February
17 the 22nd. Dr. Lucia's actually went in later because we
18 had postponed his deposition for a different reason, but
19 he was deposed on the 26th, and that was 11 days after
20 ACC's counsel had gotten this report. His prefiled
21 testimony went in on the 27th.

22 So at his deposition I asked Dr. Lucia if he had
23 seen the Riley report. He indicated he had not, or at
24 least that he hadn't reviewed it. I think that was the
25 substance of the testimony. And so we proceeded forward,

1 and his direct testimony was filed, we filed our direct
2 based upon what he said in his direct. And our position
3 on this is the Riley report was produced during the
4 course of discovery, it was listed as an exhibit, it was
5 specifically sent to ACC before the close of discovery,
6 and that we prepared our case here based upon that
7 information that was disclosed during the discovery and
8 the exhibits that were disclosed during discovery.

9 There's nothing in Dr. Lucia's prefiled testimony
10 that says that he's unable to formulate these opinions
11 until after he reviews the Riley report. This is the
12 first we have heard of that is here today in the middle
13 of his testimony. So I think it's extremely unfair to
14 allow him, based upon this chronology, when he had the
15 documents for some time and he didn't tell anybody that
16 he wasn't prepared to express opinions, and now come back
17 and say he can't do it, he needs to come back as a
18 rebuttal witness later on. I believe that's not a
19 situation that justifies allowing rebuttal testimony.

20 So our proposal would be that the board rule on this
21 issue and determine that he has to go forward with his
22 direct testimony now, and I'm prepared to do that and
23 complete my cross examination.

24 MS. COTTINGHAM: Mr. Eglick or Mr. Stock?

25 MR. STOCK: It's a unique argument, and

1 Mr. Eglick is chomping at the bit, so I'll let him go.

2 MR. EGLICK: My gums are hurting. The
3 argument you've just heard is that the party that is the
4 appellant with the burden of proof should not be
5 permitted to present rebuttal testimony. I've never been
6 involved in a hearing where the argument has been made
7 that rebuttal is precluded. The idea that prefiled
8 testimony would mean that rebuttal would be precluded
9 would, once again, turn the concept of prefiled testimony
10 on its head.

11 And I'm going to address for a moment some of these
12 dates and times and things that Mr. Reavis has asserted,
13 but I actually think the more fundamental issue is what
14 do they have to do with the idea that you get to do
15 rebuttal to a witness's testimony. Dr. Lucia presented
16 his prefiled. Dr. Riley, in response, has presented his
17 testimony, which includes some reliance on these
18 materials that we think were late and should have been
19 excluded, even apart from the prehearing order, should
20 have been excluded because of the way that they were not
21 prepared or produced in time on discovery. But putting
22 that aside, the fact is that in the normal course, if
23 there were no prefiled testimony, we would, of course, be
24 allowed to bring our expert back and say, well, now that
25 Dr. Riley has said, well, I've done these studies and it

1 means Dr. Lucia is wrong on some of the things he said,
2 Dr. Lucia would, of course, be allowed to come back in
3 rebuttal and say, well, no, that's not correct for these
4 and these and these reasons. That's the normal course of
5 a trial. There's nothing here that makes that normal
6 course less compelling, and, in fact, there's very much
7 that makes the normal course more compelling.

8 You may have heard Dr. Lucia is in demand, and he's
9 in demand because he is an expert and he is someone who
10 is recognized in both academia as well as in the business
11 world and internationally as an expert. The port is, I
12 think, saying quite proudly, and I wouldn't be so proud
13 of it if I were the port, that they produced Mr. Riley's
14 report - and I think this is actually the most accurate
15 statement of it - after 6 p.m. on February 15th. It was
16 the product, on the part of Mr. Riley, of work that began
17 at least a month earlier, and it involved what at least
18 he is claiming is some fairly complex analysis. And what
19 the port is saying, well, you shouldn't get to do
20 rebuttal and, in fact, you should have been able to have
21 Dr. Lucia wherever he was in the world, because he is not
22 sitting at his desk in California waiting for Mr. Riley's
23 report to come in, be able to review that, analyze it and
24 then incorporate it into his prefiled testimony.

25 Well, that's not the way the world works. It

AR 055404

1 doesn't work that way for lawyers; I suspect, in some
2 cases, it doesn't work that way for the board; and it
3 certainly doesn't work that way for consultants who have
4 other obligations, and, frankly, that would be an
5 unreasonable expectation in this case.

6 So what we would ask is that the board not change
7 the normal process - the fact that there is prefiled
8 testimony was not meant to give some party an advantage
9 and mean the entire case had to be front loaded - and
10 allow Dr. Lucia, allow the appellants the normal
11 privilege and normal right of presenting rebuttal
12 testimony to what Dr. Riley is apparently going to
13 testify to. Anything else I think is really going to
14 represent kind of a revolution in how an appeal is
15 normally or a trial is normally handled.

16 And I guess I want to also add if we had known that
17 this attempt to cut off rebuttal, because the concept
18 here I don't think would be any different for others, was
19 going to be made, I would, of course, have come with
20 citations and those sorts of things to demonstrate to the
21 board that rebuttal is typically something that's done in
22 a trial or an appeal context, but I would ask you to just
23 take notice of that for the moment.

24 MS. COTTINGHAM: I have some questions for
25 both parties.

AR 055405

1 Mr. Eglick, is it your intention to have the
2 rebuttal be rebuttal of the testimony of Mr. Riley or is
3 it to be direct testimony on rebuttal of his review of
4 the written material?

5 MR. EGLICK: I don't know that one can
6 distinguish. I mean, the Riley testimony, as I
7 understand it, incorporates this work that he did
8 starting, I think, in January when he was first asked to
9 do it, and that's Riley testimony in response to Lucia
10 prefiled testimony. So then, presumably, Mr. Riley is
11 going to come in here and say, here is my prefiled
12 testimony, and perhaps talk about it, and then Dr. Lucia
13 would address the prefiled and whatever Mr. Riley has to
14 say about it, as well, to the extent he can be made aware
15 of that.

16 So I think the prefiled is really kind of the
17 artificiality here. It will be rebuttal testimony as it
18 always is, rebutting what is said in the testimony that
19 Mr. Riley gives. The only twist here is some of it won't
20 be said by Mr. Riley, he'll presumably sit there and say,
21 "It's in writing here and I endorse it."

22 MS. COTTINGHAM: That answered my question.

23 And, Mr. Reavis, is your concern that you would not
24 have the opportunity to put on your own rebuttal
25 testimony of Mr. Riley following a rebuttal of Mr. Lucia?

1 MR. REAVIS: I think there's a couple of
2 concerns that we have. That is one of them, certainly,
3 you know. Given the limited amount of time, I'm not sure
4 how much rebuttal is going to be available, but,
5 certainly, that's a concern. Also, as I understand what
6 Dr. Lucia was saying earlier, that some of his opinions
7 that he has already presented in his prefiled might
8 change or have to be modified as a result of reviewing
9 the Riley report, so if we go forward with cross
10 examination now, and those change, we don't know what his
11 new opinions are going to be, he is going to come up
12 again and testify later in the trial perhaps contrary,
13 perhaps somehow different than his prefiled testimony, so
14 we've had no preview of that opportunity, no opportunity
15 to allow our experts to go out and sort of figure out
16 where he is coming from. So I do think that this is a
17 different situation than most because of the prefiled
18 requirement.

19 And all of our other experts seem to have been able
20 to review documents that were produced during discovery
21 and formulate their opinions about it. I know Dr. Lucia
22 is the only one who has, so far, come forward and
23 testified that he's been unable to do that.

24 Now, I think if the board concludes that Dr. Lucia
25 can do that, I'm not sure what's going to happen with

1 those 16 other exhibits that were the subject of the
2 motion that was denied yesterday. I just don't want to
3 think the other danger here is we open the door to other
4 experts being able to come in and say, well, they haven't
5 had time, therefore, you can sort of disregard the
6 prefiled and we have to come in and do it all over again.

7 MR. EGLICK: May I respond?

8 MS. COTTINGHAM: You may.

9 MR. EGLICK: Our perspective on this is so
10 different. I would ask you to step back and remember
11 that the prefiled was not supposed to be a means of
12 changing the normal burdens and process, it was supposed
13 to be - and I understand the board suggested this morning
14 that we all remember this - the prefiled was supposed to
15 be just a means of presenting direct in a more efficient
16 way. There was never a requirement discussed or imposed
17 that, for example, when ACC received, two weeks after we
18 filed our prefiled testimony, received the prefiled
19 testimony of the port, that we would then have to have
20 our witnesses prepared in their direct appearance here to
21 respond to that prefiled. Even if that had been assumed,
22 and I don't think it was, in Dr. Lucia's case, this would
23 be particularly anomalous.

24 The materials that we're talking about here were not
25 even commenced in preparation by Mr. Riley until January.

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1 They didn't begin to exist until January. They were not
2 produced to us until after 6 p.m. on February 15th. Dr.
3 Lucia's prefiled went in no more than a couple of weeks
4 after that, I believe less. And the idea that on
5 something that took Mr. Riley a month and more,
6 including, apparently, some complex modelling to do, for
7 which we still do not have the electronic data backing it
8 up, would be addressed by Dr. Lucia today, I think it's a
9 great advantage for the port, but it really turns things
10 on its head.

11 Also, you can't have surreply and surrebuttal. My
12 experience, when I've been in this board and other
13 places, is that the board often says, well, look, the
14 appellant has the burden of proof, they go first, there's
15 reply, and then there's rebuttal and we're not going to
16 go through another round. The idea that the port is
17 saying, well, if Dr. Lucia comes in rebuttal and responds
18 to our reply, then we need to do another round, is not
19 one that is normally viewed as a compelling argument and
20 it's not an inequitable situation in any event.

21 So, I guess I can't emphasize to the board how
22 critical this is. In a way, what I really would like to
23 ask the board to do, because this is why we're in this
24 situation, is revisit the whole question of how Mr.
25 Riley's report came to be only commenced in January, only

1 produced on February 15 after 6 p.m., and, incidentally,
2 February 15 is a Friday, so that means after 6 p.m., we
3 really got it the following Monday. And keep in mind the
4 goal here with the appellants having the burden of proof
5 is to make sure that there's a full and fair opportunity
6 to have these issues explored. So that should be, I
7 think, our touchstone. Thank you.

8 MS. COTTINGHAM: What I'd like to do is to
9 allow for this, hopefully, limited purpose for Mr. Lucia
10 to come back for rebuttal following Mr. Riley, but to
11 allow the port or Ecology to do some surcross examination
12 and, if necessary, some surrebuttal. We'll try and limit
13 it to that. And you can make that decision as you get
14 Mr. Riley on the stand.

15 MR. REAVIS: One question I had then. It
16 would seem to be appropriate, given that scenario, that
17 we at least get a little bit of time to deal with his
18 testimony, and it would seem appropriate if he is going
19 to be reviewing that report, if he could submit some sort
20 of statement about what his opinions are prior to the
21 date that he comes back here so we can prepare some cross
22 examination. Given that he is going to be responding to
23 Mr. Riley, it would be nice to be able to have some idea
24 of what his opinions are so that we can prepare our cross
25 examination to the board at that time.

AR 055410

1 MS. COTTINGHAM: Would that be a possibility?

2 MR. EGLICK: I think we're procedurally
3 turning things on its head almost as if the port has the
4 burden of proof, and, of course, that would be great if
5 the port did, but I don't think that was the opening
6 argument that they made. Given the time frames involved,
7 I think that would be difficult. And it would not have
8 happened if, you know, the normal course had been
9 followed -- excuse me, it would not have happened if the
10 normal course had followed, because, you know, Dr. Lucia
11 could have sat here, listened to what Mr. Riley had to
12 say and come back. There was never any requirement for
13 prefiled rebuttal. He could have come back and given
14 rebuttal. This seems to be a new requirement.

15 I also wanted to say that given that we have the
16 burden of proof, if we don't end with rebuttal and then
17 we go to sur --

18 MS. COTTINGHAM: Sur-cross.

19 MR. EGLICK: You're saying cross, Mr. Stock is
20 saying -- sur something. Then, you know, then really we
21 have the burden of proof. We would like -- what's the
22 next step, I'm not even going to attempt the terminology.

23 MS. COTTINGHAM: The last bite at the apple.

24 MR. EGLICK: Right. Because that's typically
25 the way it is done because we have the burden. What I

1 would suggest -- and by the way, I think there's another
2 issue we are going to have to face, and that is, given
3 the way all this has come down, if the board is not going
4 to revisit the motion on Mr. Riley, I would like the
5 board to consider whether or not the rebuttal, especially
6 given what's now been said, the rebuttal will be an
7 increment of additional time in addition to the time
8 already allocated. But what I would ask the board to do
9 is just do what's done in the normal course, which is, if
10 we have rebuttal, we present it and they cross examine on
11 it and that be the end of it and there not be a
12 requirement for prefiled rebuttal, because we may have
13 other rebuttal witnesses, that's not unheard of, and
14 there's no way we're going to be able to file prefiled
15 rebuttal while we're also in the hearing.

16 MS. COTTINGHAM: So you're saying to end at
17 cross examination of the rebuttal witness.

18 MR. EGLICK: And that's typically the way I
19 have seen it done. When we had the prehearing
20 conference, one of the things that I observed was that I
21 had been involved in a case that had prefiled testimony
22 before the board, and I have to admit it doesn't sound as
23 if it's as momentous a case as this one, it was a case
24 involving a very large salmon net-pen aquaculture
25 facility, and it actually took two weeks and it involved

1 a lot of experts on things like drift cards and where the
2 currents go and so on, and that's where we did prefiled
3 testimony. And, in that case, the way it was done was
4 there was prefiled opening from the appellants and then
5 prefiled response, and then rebuttal was put on on a live
6 non-prefiled basis and that was the end of the case.
7 Well, there were briefs, post-hearing briefs. But that's
8 the way I've seen it done, and given who has the burden
9 and so on, that's normally considered the same as it's
10 done in any trial or other proceeding.

11 MS. COTTINGHAM: Thank you. I think I will
12 slightly modify. I will allow the rebuttal and allow the
13 cross and I'll reserve judgment on a showing by port or
14 Ecology that they need to have a rebuttal of that
15 rebuttal.

16 MR. REAVIS: Can we also reserve the question
17 of timing of that? I guess what I'm concerned about is
18 if Dr. Lucia goes out and reviews the Riley report, comes
19 forward with several technical opinions, and then I have
20 got to cross him immediately thereafter without having an
21 opportunity to discuss that with my expert. I would like
22 to at least put a placeholder in, depending on what the
23 testimony looks like, to allow us to come back, have a
24 little bit of time to consult with Dr. Riley and so I can
25 prepare a little bit of cross examination at that point.

1 MS. COTTINGHAM: As we get closer to when that
2 time might be for the rebuttal witness, perhaps we can
3 have it so that the rebuttal witness comes on in the
4 morning, gives Mr. Reavis some time and -- but not to
5 make him stay over extra time.

6 MR. EGLICK: We will certainly try to work
7 with these folks on that. We have plane schedules and
8 Dr. Lucia's schedule is horrendous, but --

9 MR. STOCK: It is. In fact, Dr. Lucia is
10 leaving the country on Friday and will be gone for
11 several days to the Far East, and so it is, bottom line,
12 unfair to ask him to be doing this, given his schedule,
13 but --

14 MR. REAVIS: I think we're all pretty busy.

15 MS. COTTINGHAM: With that, we will continue
16 with the cross examination.

17 MR. EGLICK: Thank you.

18

19 EXAMINATION (continued)

20 BY MR. REAVIS:

21 Q. Dr. Lucia, I think when we left off, we were discussing
22 the numeric criteria in the 401 certification. Do you
23 recall that?

24 A. Yes, I do.

25 Q. And I think I was just getting into with you the

AR 055414

1 discussion of the last page of that exhibit, which is
2 Exhibit Number 1, which is a table of numeric criteria.

3 Do you see that?

4 A. Yes, I do.

5 Q. Now, is it your understanding that those criteria do not
6 apply unless the port chooses to do SPLP?

7 A. I am sorry, when I answered it that way before, I was
8 just answering too quickly and I misspoke. What I
9 understand from that table is that on page 18 it lists,
10 it describes an alternative to the limitation listed
11 above, and it says if that alternative is selected, then
12 the criteria in this table, I believe, is what applies.
13 So although it's in the section on SPLP testing, it's not
14 necessarily applies to SPLP testing.

15 Q. Have you seen any of the prefiled testimony of port
16 witnesses indicating that this is in fact the alternative
17 that the port is pursuing?

18 A. It's my understanding that this is the alternative the
19 port is pursuing, the alternative described on page 18 of
20 the wedge.

21 Q. So that would then mean that the table 1 that's the end
22 page of Exhibit Number 1 represents the numeric criteria
23 that will be applicable to the embankment fill, as you
24 understand it?

25 A. As I understand it, that's correct.

AR 055415

1 Q. And the relevant numbers on that table are the last
2 column on the right and the next-to-the-last column, so
3 that would be the fourth and fifth columns on table 1?

4 MR. STOCK: Object to the form of the
5 question. What's the relevant column?

6 MS. COTTINGHAM: Can you clarify.

7 Q. (Continuing By Mr. Reavis): Which columns of numbers are
8 applicable to fill that will be brought in to the third
9 runway to your knowledge?

10 MR. STOCK: Object to the form. That's
11 incomplete. Where in the fill, the embankment or the
12 wedge?

13 Q. (Continuing By Mr. Reavis): Which column applies to the
14 wedge with regard to fill that will be brought in for the
15 embankment?

16 A. I believe it's the third column over, what they call the
17 drainage layer cover on this criteria, on this table.
18 They don't use the term wedge here, but --

19 Q. That column says FWS, do you know what that stands for?

20 A. Fish & Wildlife Service.

21 Q. Isn't it true, though, that the 401 certification
22 requires the port to comply with the more stringent of
23 the criteria contained in either the Fish & Wildlife
24 Service biological opinion or the original 401
25 certification?

AR 055416

1 MR. STOCK: Object. Incomplete hypothetical.
2 Object to the form. It's vague.

3 MS. COTTINGHAM: Would you restate it?

4 Q. (Continuing By Mr. Reavis): Is it true, Dr. Lucia, that
5 the 401 certification requires the port to comply with
6 whatever criteria are more stringent, either those in the
7 Fish & Wildlife Service biological opinion or in the
8 original 401?

9 MR. STOCK: Same objection. Under what
10 circumstances?

11 MR. REAVIS: I, frankly, don't understand what
12 the vagueness objection is all about. I think it's a
13 fairly straightforward question.

14 MS. COTTINGHAM: I'm going to overrule.

15 MR. POULIN: If I might add an objection. I
16 believe this line of questioning disregards the potential
17 application of the SPLP process which may override either
18 one of these tables, as I understand.

19 MR. REAVIS: That's what I am trying to ask
20 him is --

21 MS. COTTINGHAM: I'm going to overrule the
22 objection. Please answer the question.

23 A. Now I'm lost.

24 Q. Can you tell me which of these columns, the numbers in
25 which of these columns are intended to apply to the

AR 055417

1 wedge, assuming that the port is required to comply with
2 the more stringent of the criteria that contain the
3 biological opinion or the 401, original 401? Do you know
4 the answer to that?

5 A. It's my understanding, based on the way this is written
6 on page 18, that if they choose the alternative, which I
7 am assuming that they do, that I believe that the final
8 drainage layer cover criteria, which is the third column.

9 Q. Okay. Let me ask you then to look at the next column
10 over, column 4, says, "Final Drainage Layer Cover
11 Criteria" and in parenthesis, "Most Conservative FWS and
12 Ecology Values."

13 A. I am sorry, when I said third column over, I meant third
14 column with numbers in it, not the third column itself,
15 so that would be the fourth column.

16 Q. Okay. And then the fifth column, or fourth column, the
17 last column there on the right, would be the numbers that
18 are applicable to the remainder of the embankment beyond
19 the wedge; is that correct?

20 A. It's my understanding that these are the criteria and if
21 it fails this criteria, then you go to the SPLP
22 methodology to determine whether the material is
23 acceptable or not.

24 Q. Correct. But these are the initial screening criteria in
25 the last two columns on table number 1?

AR 055418

1 A. That's my understanding.

2 Q. Now, your prefiled testimony states that the September
3 401 relaxed the requirements for fill; do you remember
4 that?

5 MR. STOCK: Can you refer him to where you are
6 referring in the prefiled?

7 Q. (Continuing By Mr. Reavis): I can, but do you remember
8 that, Dr. Lucia, that statement?

9 A. I stated that the September, the overall September
10 criteria are less restrictive than the August criteria.

11 Q. But isn't it true, though, that some of the numeric
12 criteria actually became more stringent between August
13 and September?

14 A. That may be the case. I don't remember particular
15 numbers being more or less, but my comment really related
16 to the removal of this six-foot layer of clay material
17 over the entire drainage blanket and replacing it with
18 the alternative described here on page 18, where only
19 this wedge was now going to be in place; regardless of
20 what the numeric criteria are themselves, that that
21 criteria by itself constituted a less-restrictive design.

22 Q. Okay. And I want to get into that issue in just a
23 minute. But I just wanted to see if you recognize that
24 there are certain ways in which the 401 fill criteria
25 became more stringent between August and September. And

AR 055419

1 let me ask you, then, if you could refer to the table on
2 page 17 and compare it to table 1, which is the last page
3 of that exhibit.

4 A. You don't mind if I take this out, do you?

5 Q. That's fine.

6 MS. COTTINGHAM: So long as you get it back
7 into the right place.

8 Q. If you look at arsenic, for example, the number on page
9 17 is 20 milligrams per kilogram, correct?

10 A. That's correct.

11 Q. Now, if you look then at the arsenic number on table 1 on
12 the next-to-the-last column, being the column applicable
13 to the wedge, the arsenic number is 7 milligrams per
14 kilogram, correct?

15 A. That's correct.

16 Q. So that number has become more stringent at least as
17 applied to the wedge?

18 A. At least as applies to the wedge, yes, that number is
19 more stringent.

20 Q. Same thing with regard to cadmium.

21 MR. STOCK: Well, I am going to object to this
22 line of questions because the wedge wasn't even an option
23 in the first certification, and that is Dr. Lucia's
24 point.

25 MS. COTTINGHAM: I'm going to overrule the

AR 055420

1 objection.

2 Q. (Continuing By Mr. Reavis): If you look at cadmium, the
3 number is 2 milligrams per kilogram, and, again, looking
4 at the wedge on the last page, it's 1 milligram per
5 kilogram, correct?

6 A. That's correct.

7 Q. So that one went down in between August and September, is
8 that correct?

9 A. That's correct.

10 Q. Look at lead on page 17, lowest number there was 220, and
11 if you look at table 1, that has gone down to 24.

12 A. That is correct.

13 Q. Mercury has gone down, has it not, from 2 to .07?

14 A. That's correct.

15 Q. And nickel has gone down from 100 to 48; is that correct?

16 A. That's correct.

17 Q. Now, I want to talk a little bit about water quality
18 impacts, because the fill criteria in this 401
19 certification applied to soil, did it not?

20 A. That's correct, applies to soil.

21 Q. The 401 certification relates to water quality; is that
22 right?

23 A. The intent is, yeah, to protect water quality.

24 Q. And just because a particular constituent exists in the
25 soil doesn't mean that that constituent will adversely

AR 055421

1 affect water quality?

2 A. No, exactly the point.

3 Q. And in order to determine whether there will be some
4 effect on water quality, you have to do some calculations
5 to determine how high the constituent is in the soil and
6 whether that, by the time it gets to the water, will
7 adversely affect the water?

8 MR. STOCK: Objection. Incomplete
9 hypothetical. He is throwing out these general
10 propositions without putting them in context.

11 MR. REAVIS: He is an expert; I think he can
12 testify about general propositions of the science in his
13 field.

14 MS. COTTINGHAM: I am going to overrule.

15 Q. (Continuing By Mr. Reavis): So is that correct, you have
16 to do some calculations to determine whether the
17 constituents in soil could affect water quality?

18 A. I think there are two major issues related to the impact
19 on water quality. One is what you're alluding to, is
20 regardless of what the criteria are, regardless of what
21 the concentrations are of any of these various metals or
22 hydrocarbons in the embankment, the real question is how
23 mobile are they and how can they travel from wherever
24 they are to impact groundwater.

25 The second issue is your ability to detect the

AR 055422

1 levels of those various contaminants in the fill prior to
2 placing them so that you're assured that the criteria
3 that you have established for the fill is what the fill
4 really is.

5 And really those have been my, if you wanted to take
6 all my opinions and summarize them up into a package,
7 those are my two biggest criticisms of the work that's
8 been done.

9 Q. And the second one relates to the whole sampling and the
10 number of samples and so forth; is that correct?

11 A. The second one relates to the protocol that's established
12 in the 401 in the sense that there is a minimum number of
13 samples for a borrow pit over 100,000 cubic yards. They
14 are only required to run six samples. I am assuming
15 there will be large borrow pits as part of this project
16 of millions of yards. And I believe a sampling program
17 that is more statistically representative should be
18 developed. And I believe Mr. Kmet, who is with Ecology,
19 felt the same way, that this is not a sufficient sampling
20 program to assure that the materials coming into the
21 embankment will meet the criteria.

22 Q. Okay. Let's set that aside a minute and we will talk
23 about that a little later. What I want to ask you about
24 now is the first of those points that you mentioned, will
25 a particular constituent mobilize in the soil and will it

AR 055423

1 pose any risk to water quality by the time it gets to the
2 water?

3 MR. STOCK: Object, compound.

4 MS. COTTINGHAM: Ask each one individually.

5 Q. (Continuing By Mr. Reavis): Let me ask you this
6 question: Isn't it true that there are scientific
7 methodologies to determine how much of a particular
8 constituent can exist in the soil without adversely
9 affecting water quality?

10 A. There are modelling techniques available, transport
11 modelling, that you can evaluate the ability of metals,
12 petroleum products to move through the soil and transport
13 itself, whatever impact you're looking at.

14 Q. And there are computer programs that do that?

15 A. Yes, there are.

16 Q. And you have utilized those in your field of practice,
17 have you not?

18 A. Yes, I have.

19 Q. And sometimes those programs are used to determine
20 whether particular constituents could adversely affect
21 surface water, correct?

22 A. Correct.

23 Q. And one of the ways to do that calculation is to start
24 with the surface water and then work backwards up towards
25 the soil to figure out whether or what levels that

AR 055424

1 constituent can exist in the soil without violating a
2 water quality standard?

3 A. There are techniques available to do that type of
4 modelling.

5 Q. In fact, there is one that's set forth in Washington law
6 in the regulations under the Model Toxics Control Act;
7 isn't that right?

8 A. Yes, I understand that there is.

9 Q. And that's sometimes referred to as the three-phase
10 partitioning model?

11 A. Yes, I've heard it referred to as that.

12 Q. Now, you have not in your work in this case done any of
13 these calculations to determine whether the fill criteria
14 contained in the 401 will lead to any adverse water
15 quality effects, have you?

16 A. No, I haven't.

17 Q. Wouldn't you agree that doing that type of calculation is
18 necessary to determine whether there in fact will be
19 water quality problems?

20 A. I believe if you are going to establish criteria like
21 have been established in the August and in the September,
22 that you need to do an analysis to evaluate. For
23 example, when you switch from having the six-foot layer
24 of less-contaminated material above the gravel drain to
25 this wedge, that you need to have a basis for making that

AR 055425

1 change in your design. And one of my criticisms in my
2 previous declarations was that I didn't see any
3 calculations to evaluate that one was equally protective
4 as the other one was. And that's what I understand Mr.
5 Riley's analysis evaluates.

6 Q. Well, let me ask it, have you read Mr. Riley's prefiled
7 direct?

8 A. Quickly, yes, I have.

9 Q. Now, my question was a little bit different, and I think
10 it is, wouldn't you agree that doing some sort of
11 calculation from the level of constituents in the fill is
12 necessary in order to determine whether or not that level
13 can cause any water quality impacts?

14 MR. STOCK: Object, asked and answered.

15 MS. COTTINGHAM: Can you read back the
16 question.

17 (Question read back by the Court Reporter.)

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

20 Q. (Continuing By Mr. Reavis): Now, do you know of any
21 evidence that you reviewed in connection with this case
22 showing that the levels of contaminants in this
23 particular 401 will in fact lead to water quality
24 violations?

25 A. I haven't reviewed anything that would indicate that.

AR 055426

1 Q. Okay. Have you reviewed Miss Gould's prefiled testimony?

2 A. Yes, I have.

3 Q. And Miss Gould has done this particular type of
4 calculation that we are discussing, has she not, the
5 calculation?

6 A. And I believe Miss Gould also refers to Mr. Riley's
7 analysis in her prefiled testimony as well.

8 Q. Now, let's then talk a little bit about the wedge. As I
9 understand your testimony, you believe that the wedge is
10 less protective essentially because it doesn't cover the
11 entirety of the bottom level of the embankment; is that
12 correct?

13 MR. STOCK: For Dr. Lucia's sake, a blowup of
14 his figure is there for your purposes.

15 MR. REAVIS: I'm not sure I need it for my
16 questioning.

17 MR. STOCK: He may need it to answer your
18 question and that's why I'm saying it's right there.

19 A. I can probably answer it more clearly so everybody
20 understands better if we have a picture.

21 My comment related to the wedge being less
22 protective is that I'm assuming that when the port
23 decided on the need for six feet of less-contaminated
24 fill above the drainage layer, that was based upon some
25 analysis that showed that that was required, that that

AR 055427

1 would make this project protective and meet whatever
2 water quality goals that they were trying to meet. So
3 when the wedge was placed and this additional material
4 was removed, I didn't see anything that justified -- that
5 compared the two designs and said, ultimately, this is as
6 protective as that. Now, maybe they're both protective,
7 maybe they're both not, but I haven't seen the analysis
8 that would justify the change from one to the other.
9 And, obviously, somebody felt that this was necessary. I
10 am sure this wasn't done capriciously because it's an
11 expensive thing to do.

12 Q. So your criticism, then, is you haven't seen that
13 analysis; you're not saying that you know for a fact that
14 analysis has not been done?

15 A. I'm saying that I haven't seen an analysis that compares
16 these two. Mr. Riley's report addresses the degree of
17 environmental protection of the wedge and that's what
18 we're in the process of reviewing right now.

19 Q. Okay. You haven't done any calculations of your own to
20 demonstrate that the wedge in fact is not protective of
21 water quality?

22 A. No, I haven't.

23 Q. Now, let's talk about this number-of-samples issue that
24 you raised a minute ago. Now, before you even get to
25 doing the sampling, isn't it true that the 401 requires

AR 055428

1 an investigation of the property similar to a phase I
2 type investigation?

3 A. A phase I investigation basically being a paper study to
4 see whether in fact there's any documentation that the
5 site has a problem, and that is required.

6 Q. And usually a phase I considers not just, you know, paper
7 somewhere, but it also considers historical aerial
8 photographs; is that correct?

9 A. It typically includes aerial photographs.

10 Q. So if, for example, there was a chemical plant on the
11 site years ago, you would expect that would be the kind
12 of thing that a phase I would identify?

13 A. If it's in a chemical plant, I'm sure that would show up
14 quite readily, but there are plenty of other things that
15 happen to sites that don't happen to happen while an
16 airplane is flying over.

17 Q. But that's the purpose for the phase II often, isn't it,
18 to actually go out and take the samples?

19 A. A phase II is designed to go out and sample the site; if
20 there are indications that there's a problem, focus in on
21 the problem, or do broader sampling of the site.

22 Q. Now, in terms of number of samples, the 401 requirements
23 are stated on page 16 of Exhibit 1, are they not?

24 A. Correct. It presents the minimum number of samples based
25 upon the size of the borrow area.

AR 055429

1 Q. And because that's a minimum number, presumably, Ecology
2 under the 401 can require more samples?

3 A. Well, I think it would be a better criteria to have
4 something in here that says, you know, you have to get
5 enough samples such that you have, say, a 95 percent
6 confidence level that you will meet the criteria. The
7 problem with this criteria is that the way this is
8 written, if one of these metals or petroleum products
9 exceeds it, my understanding is the whole site would be
10 excluded. And also there's no criteria on the number of
11 SPLP tests that are required. So if you have one fail
12 and then you go to the SPLP testing procedure, how many
13 tests are you required to have? One for a
14 5-million-cubic-yard site. If that fails, does that
15 exclude the whole site? Well, that's not good
16 engineering either.

17 Q. Okay. Well, but, presumably, Ecology -- let me back up
18 just a minute. Do you know from review of the 401
19 certification that the port is required to submit these
20 sample results to Ecology before its set in fill?

21 A. Yes, I understand that they are required to submit them
22 to Ecology, yes.

23 Q. And your suggestion is that someone make sure that those
24 samples meet this 95 percent confidence level that you're
25 talking about, correct?

AR 055430

1 A. My suggestion is that the criteria that's going to be
2 used to evaluate whether the fill is acceptable or not be
3 included in the 401 certification, because it's been my
4 experience that once you establish minimum criteria, that
5 tends to be the criteria, and while people may have good
6 intentions and want to do the right thing, pressures of
7 the job and others will often force them to the minimum,
8 and the minimum standard in this case should be higher.

9 Q. Have you seen any of the testimony from Ecology witnesses
10 about how this sampling will be implemented?

11 A. The only thing I remember seeing is Mr. Kmet's, I
12 believe, a series of e-mails, and I'm not sure I recall
13 his testimony exactly, but his desire or recommendation
14 that the state regulations regarding sampling be imposed
15 in terms of getting enough samples to reach a certain
16 confidence level so that you understand what the levels
17 of contaminants are.

18 Q. Now, that's Mr. Kmet, I believe, that you are referring
19 to?

20 A. Kmet, yeah.

21 Q. Now, what Mr. Kmet was referring to in those documents
22 that I think you are talking about was the number of
23 samples you would need at a site that's known to be
24 contaminated; is that correct?

25 A. I believe Mr. Kmet also felt that criteria should apply

AR 055431

1 to this site, to this program as well, at least in the
2 e-mails that I saw.

3 Q. Presumably we'll be able to evaluate those e-mails
4 ourselves, but --

5 MR. STOCK: I am going to move to strike the
6 gratuitous comment and ask Mr. Reavis to limit it to
7 questions instead of those types of comments.

8 MS. COTTINGHAM: Sustained.

9 Q. (Continuing By Mr. Reavis): Isn't it true that for some
10 sites, even some large sites, six samples can be enough
11 to give someone this 95 percent confidence level?

12 A. It could happen.

13 Q. And I think earlier at your deposition you said three
14 could even be enough.

15 A. Three could be enough. Depends upon the variability of
16 the contamination at the site.

17 Q. So what someone needs to do upon receipt of the samples
18 is determine whether or not there's a lot of variability,
19 and if there is, to require more samples in order to
20 reach the 95 percent confidence level, correct?

21 A. Well, if that's going to be a requirement, why not put it
22 in here.

23 Q. But the point is, isn't it, presumably, that Ecology can
24 make that decision once the samples come in and Ecology
25 has a chance to review the samples?

AR 055432

1 MR. STOCK: I'm going to object. It's
2 beginning to get argumentative. Mr. Reavis keeps wanting
3 to make the same point.

4 MR. REAVIS: I guess I am just trying to get
5 an answer.

6 MR. STOCK: He has answered the question.

7 MS. COTTINGHAM: Could you restate your
8 question.

9 Q. (Continuing By Mr. Reavis): Presumably someone at
10 Ecology can review these samples and determine what the
11 variability is and determine if more samples are needed
12 to reach the 95 percent confidence level?

13 MR. STOCK: Object, argumentative.

14 A. I can't speculate on what they might do. I am assuming
15 they would probably look at the requirements of the
16 project as stated in this document and use that as their
17 guideline.

18 Q. Okay. So you're assuming that Ecology is not going to
19 attempt to achieve some sort of confidential level?

20 MR. STOCK: Object, argumentative. How long
21 is this line of questioning going to continue? There's
22 been now seven or eight or nine questions on the same
23 point that Mr. Reavis is trying to make, and Dr. Lucia
24 has answered them. Can we move on?

25 MR. REAVIS: I'm trying to move on, but this

AR 055433

1 is a significant component of his testimony and I just
2 want to make sure that everyone understands what his
3 concern is here.

4 MS. COTTINGHAM: Why don't you be a little
5 more straightforward and not edge over toward badgering
6 the witness.

7 Q. (Continuing By Mr. Reavis): Let me just ask it this way:
8 Do you know of any reason why someone at Ecology could
9 not evaluate these samples and determine whether or not
10 there was a need for more samples in order to reach a
11 confidence level?

12 MR. STOCK: Miss Cottingham, that is the same
13 exact same question that he just asked. It is
14 argumentative at this point and I request that we move
15 on.

16 MR. REAVIS: I think --

17 MS. COTTINGHAM: I'm going to sustain this.
18 The line of questioning is getting repetitive.

19 MR. REAVIS: I think that's all I have for
20 now.

21 MS. COTTINGHAM: Mr. Young.

22

23 EXAMINATION

24 BY MR. YOUNG:

25 Q. I just want to ask a few questions about the low flow

AR 055434

1 thing, and if I may, can I go back to that. On the
2 bottom axis there, you've got grain diameter in
3 millimeters. Does that represent the grain diameter of
4 the fill?

5 A. Yes. What it does is it says that these are the grain-
6 size particles, the percentage by weight. For example,
7 we could look at ten millimeters on the curve that the
8 port used, so that 60 percent of the materials would be
9 less than that size.

10 Q. So what's the total range then of the fill in terms of
11 grain size?

12 A. Of the fill?

13 Q. What's the largest grain that I would find in the fill?

14 A. By specifications, it would be a little over 100
15 millimeters.

16 Q. And what's the smallest size?

17 A. Well, the specifications, I believe it's probably .07, 50
18 percent smaller than probably a number 200 sieve, so like
19 200 openings per inch, so the specifications will allow
20 some materials which will have 50 percent, which is sort
21 of the smallest particle that you can really distinguish
22 by eye.

23 Q. And the largest size was, I think you said, 100, slightly
24 over 100?

25 A. Yeah, probably that's about four inches, I guess.

AR 055435

1 Q. So the largest rock then I would find in the fill is
2 about four inches big in diameter?

3 A. Well, you could find anything, I'm just saying what the
4 specifications that were written to allow material on
5 site, these are the limits that were incorporated in the
6 construction specifications.

7 Q. Assuming that it's built according to the specifications,
8 we could look through the entire 20 million yards and it
9 all would consist of rocks four inches in diameter or
10 less?

11 A. It should, yes.

12 Q. And, now, you say that what PGG didn't do was consider
13 the range of behavior of this fill, did I understand that
14 correctly, that in your view there's a range of behavior
15 of the fill insofar as water going through it is
16 concerned?

17 MR. STOCK: I'm going to object. It
18 mischaracterizes what Dr. Lucia said. He can just ask
19 Dr. Lucia for clarification.

20 MS. COTTINGHAM: Would you ask it in a form
21 that doesn't recharacterize his testimony.

22 MR. YOUNG: Well, I wasn't trying to
23 recharacterize his testimony, I'm just trying to
24 transition into my topic here.

25 Q. You have the opinion that the fill will exhibit a range

AR 055436

1 of behavior insofar as water infiltrating through it is
2 concerned; is that right?

3 A. That's correct.

4 Q. Given the fact that all the grains in the fill are four
5 inches in diameter or less, assuming it's built according
6 to specifications, isn't that range of behavior a fairly
7 narrow range?

8 A. Not really. You can evaluate it or maybe understand it
9 better --

10 Q. It was a yes or no question.

11 MR. STOCK: Excuse me.

12 MR. YOUNG: It was a yes or no question and he
13 said no.

14 MR. STOCK: I am going to object to Mr. Young
15 instructing Dr. Lucia not to answer the question. There
16 is a question pending and he can answer the question.

17 MR. YOUNG: If he wants to redirect, he can.

18 MR. STOCK: Is the question being withdrawn?

19 MR. YOUNG: No. It was a yes or no question.

20 MS. COTTINGHAM: Why don't you restate the
21 question and just keep your answer to the question asked.

22 Q. (Continuing by Mr. Young): The question asked was given
23 the fact that the grain size in the fill is four inches
24 or less in diameter throughout the entire fill, isn't the
25 range of behavior that it exhibits with respect to

AR 055437

1 infiltration of water going to be a relatively narrow
2 range, yes or no?

3 A. When you say range of behavior, I mean, what values or
4 range?

5 Q. Well, there's no solid rock in the fill, yes, is that
6 fairly accurate? I mean, rocks over four inches in
7 diameter, if it's built according to specifications,
8 there won't be those in the fill, isn't that right?

9 A. If it's built according to specification, there won't be
10 anything over four inches.

11 Q. There's not going to be a solid layer of rock in there?

12 A. I would think not.

13 Q. There isn't going to be a solid layer of glacial till in
14 there?

15 A. I would think not.

16 Q. There isn't going to be a solid layer of peat soils in
17 there, is there?

18 A. No, there wouldn't be.

19 Q. So the range of behavior as far as the hydrology of the
20 fill is concerned is going to be narrower than you would
21 find, for example, in nature; isn't that fair to say?

22 A. I didn't make any comparisons between the embankment and
23 nature.

24 Q. Well --

25 A. I don't know what you mean by nature. Which sites?

AR 055438

1 Q. What is found, what kinds of soils are found in nature.
2 Isn't the range of behavior that the fill exhibits going
3 to be narrower in terms of hydrology than would be
4 found --

5 MR. STOCK: Miss Cottingham, this is getting
6 argumentative, particularly given the tone of Mr. Young's
7 voice, so I am going to object to the form of the
8 question as argumentative and also the tone in which it's
9 being asked.

10 MR. YOUNG: I don't think that's a proper
11 objection.

12 MR. STOCK: Well, tone can certainly suggest
13 argumentation, and my objection is that Mr. Young's tone
14 is argumentative as well, as to the form of the question.

15 MS. COTTINGHAM: Why don't we watch the
16 civility here. I'm not going to sustain the objection,
17 but keep your questioning at a neutral level.

18 MR. YOUNG: I wasn't trying to be, I'm just
19 trying to stay up with the flow of things here.

20 Q. So did you get the question there?

21 A. What I understand the question is, is that the range of
22 behavior at this site is less than any sites we would
23 find in nature?

24 Q. Right.

25 A. I'd say no. I have worked at other sites where the range

AR 055439

1 of grain size, just for example, is smaller than the
2 range that we see that are allowed in specifications for
3 this project.

4 MR. YOUNG: That's all the questions that I
5 have.

6 MS. COTTINGHAM: Any redirect?

7 MR. STOCK: Yes, I have a few on redirect.

8

9

EXAMINATION

10 BY MR. STOCK:

11 Q. Dr. Lucia, at paragraph 14 of your prefiled testimony,
12 you state, "Unless the port opts for the alternative that
13 involves attachment E to the certification, and there is
14 no requirement that it do so, the drainage cover layer
15 can consist of materials that are more contaminated than
16 the naturally-occurring area soils." Can you explain to
17 us what you meant by that? And if it would help using
18 the diagram of the wedge, you can go ahead and do that.

19 MR. REAVIS: I'm not sure this is responsive to
20 the cross examination, but I guess I will wait to hear
21 the answer.

22 A. Well, if you go on to read farther down in paragraph 14,
23 it says, "When compared to Puget Sound background
24 concentration contained in the FWS biological opinion,
25 concentrations of arsenic, cadmium, lead and mercury all

AR 055440

1 exceed Puget Sound background levels."

2 Q. And then over on page 9 of your prefiled testimony, you
3 made the comparison there in the table between Puget
4 Sound background levels and what the 401 certification
5 allows; is that right?

6 A. That's correct.

7 Q. And with respect to your statement over on paragraph 13
8 on page 8, what conclusions did you reach with respect to
9 whether the conditions in the certification meet the
10 requirements of the biological opinion?

11 A. The biological opinion states, "The surficial three feet
12 of fill will be screened to not exceed the proposed
13 ecological standard for MTCA method A or the proposed
14 ecological standard." That requirement isn't
15 incorporated in the alternative which allows the wedge
16 for the upper three feet of soil.

17 MR. REAVIS: I am going to object to this line
18 of questioning because there wasn't anything about this
19 particular paragraph or this particular opinion in the
20 cross examination, so redirect is going way beyond the
21 scope of the cross examination.

22 MS. COTTINGHAM: I believe you asked questions
23 about the wedge and the criteria in the various columns,
24 so I'm going to allow the questioning.

25 Q. (Continuing By Mr. Stock): Actually, I have one final

AR 055441

1 question for you, Dr. Lucia. Does the 401 as written
2 allow placement of TPH-contaminated fill next to the
3 drainage layer?

4 A. Yes, in those portions beyond the wedge where the general
5 fill is placed against the drainage layer, that is
6 allowed.

7 MR. STOCK: That's all the questions I have.
8 Thank you.

9 MS. COTTINGHAM: Any board questions?

10 MR. JENSEN: No.

11 MR. LYNCH: No.

12 MS. COTTINGHAM: I have two questions for you.

13

14 EXAMINATION

15 BY MS. COTTINGHAM:

16 Q. On your figure 6, which is one of the boards here, I
17 believe it was the one that has bright red and yellow and
18 orange on it, and you may have answered this before, but
19 there were a lot of questions and I may have missed it.
20 Two things; did you assume a time frame for which the
21 fill was constructed within?

22 A. No.

23 Q. And second question is, did you assume that everything
24 was dry at the start?

25 A. The materials are assumed in the beginning to be actually

AR 055442

1 quite dry, but it's based upon assuming a water level
2 here and allowing the soils to all come into equilibrium,
3 so a starting condition in the program is to allow for
4 saturated soils here and then all the soils remaining
5 come into equilibrium and then the rain is turned on. So
6 it does represent one edge of the range of behavior. The
7 embankment in construction more likely will be wetter
8 than what's assumed in here, but to some unknown degree.

9 Q. Second question I have is you use the term steady state
10 when you are talking here. Does steady state equate to
11 saturated or is it something less than saturated?

12 A. It's not a saturated condition. What will happen as the
13 embankment is completed and we have a rainfall event,
14 what you will have is water traveling down -- and you can
15 see here, this happens to be just a snapshot, here is a
16 more saturated zone as it moves through the fill. And so
17 what steady state implies is that we have got to the
18 condition where each yearly event is moving through,
19 coming out the bottom and a new yearly event is
20 influencing the top. And the embankment itself is a
21 combination of probably some saturated and some
22 unsaturated zones, but it reflects the condition that it
23 will probably have, you know, forever more or similar
24 conditions of what it will have forever more.

25 MS. COTTINGHAM: I have no further questions.

AR 055443

1 Are there any questions as a result of board
2 questions?

3 MR. STOCK: No.

4 MS. COTTINGHAM: Mr. Reavis?

5 MR. REAVIS: No.

6 MS. COTTINGHAM: Okay. You're excused. Thank
7 you.

8 MS. OSBORN: ACC calls Dan Swenson.

9
10 DAN SWENSON, having been first duly sworn on oath or
11 affirmed to tell the truth, the whole truth and nothing
12 but the truth, testified as follows:

13

14 EXAMINATION

15 BY MS. OSBORN:

16 Q. Good afternoon. Could you state and spell your name for
17 the record.

18 A. Dan Swenson, D-A-N S-W-E-N-S-O-N.

19 Q. And could you tell us what your job is.

20 A. I'm the section supervisor for the water resources
21 program in the Northwest Regional Office for the
22 Department of Ecology.

23 Q. Could you describe briefly what your role is as section
24 supervisor?

25 A. It's a wide variety of roles, but one of the key roles is

AR 055444

1 that our office is responsible for processing water right
2 applications that come into the Department of Ecology for
3 the Northwest Region. We do investigations of those
4 applications and then based upon recommendations of
5 staff, I make a final decision on a water right, which is
6 the recommendation which is contained in the report of
7 examination.

8 Q. And do you have signature authority for issuing the
9 permits, the water right permits that you have just
10 described?

11 A. Yes, I do.

12 Q. Are you familiar with the third runway project?

13 A. Generally, I am.

14 Q. I would like to have you take a look at Exhibit 578,
15 which should be in one of the boxes, notebooks right in
16 front of you.

17 MS. COTTINGHAM: What color notebook is it in?

18 MS. OSBORN: It's the aqua blue, Volume 2, ACC
19 exhibits.

20 A. I have it in front of me.

21 Q. Can you tell us what this document is?

22 A. This is a water right application from the Port of
23 Seattle.

24 Q. And was this water right application submitted to your
25 office?

AR 055445

1 A. Yes.

2 Q. Do you know what the status is of this water right
3 application?

4 A. It's still a pending water right application.

5 Q. So a decision has not yet been made?

6 A. No, it has not.

7 Q. What does this application seek to do? If I could call
8 your attention to --

9 A. In part 4, right.

10 Q. Correct.

11 A. Yes. The proposed purpose of the use is flow
12 augmentation for Des Moines Creek and domestic supply,
13 and I can't read the next part, I guess slash golf course
14 irrigation.

15 Q. So does this water right application propose to change
16 the purpose of use of the water right?

17 A. Yes, it does.

18 Q. Of an existing water right; is that right?

19 A. Yes.

20 Q. And the change would be to add the purpose of use of flow
21 augmentation in Des Moines Creek; is that right?

22 A. Yes.

23 Q. Are you familiar with the concept of beneficial use under
24 the water code?

25 A. Yes, I am.

AR 055446

1 Q. And can you describe what beneficial use means?
2 A. It's taking water and putting it to a specific use such
3 as irrigation of a golf course or providing water to a
4 domestic service, a home, a business.
5 Q. So is it the purpose of use for which water is applied?
6 A. Yes.
7 Q. Is instream flow augmentation a beneficial use under the
8 water code?
9 A. In the sense that if we were creating an instream flow
10 regime for a particular river, let's say, we would view
11 that as a beneficial use.
12 Q. When you say regime, what do you mean by that?
13 A. Well, the state has set instream flows on various streams
14 and rivers and that would be a beneficial use.
15 Q. Is the instream flow augmentation purpose as set forth in
16 this application a beneficial use under the water code?
17 A. It's not clear to me that that would be the case.
18 Q. Have you issued water rights for instream flow
19 augmentation purposes in the past?
20 A. I have not, I do not believe I have.
21 Q. You have not personally? Do you know whether such water
22 rights have been issued in your office?
23 A. I couldn't say for sure.
24 Q. Are you familiar with the Conifer Ridge water right?
25 A. Right.

AR 055447

1 Q. Did you issue that one?

2 A. I did not.

3 Q. Does that have an instream flow augmentation purpose?

4 A. It has a mitigation component to it where, as I
5 understand it, the water right applicant was irrigating a
6 golf course, I believe, and in order to gain approval for
7 that water right, they were required to mitigate for
8 their beneficial use of water and the water right does
9 contain that mitigation component.

10 Q. And the mitigation component involves putting water in
11 stream?

12 A. Yes, it does.

13 Q. Are you familiar with the Kitsap Public Utility District
14 water right?

15 A. Yes.

16 Q. Did you issue that water right?

17 A. If it's the one for -- I'm trying to think.

18 Q. Seabeck.

19 A. Seabeck aquifer, right. There we did issue, again, it
20 was for mitigation for the water right.

21 Q. And that involved putting water in stream for mitigation
22 purposes; is that right?

23 A. Yes, it did.

24 Q. Are you familiar with the Snoqualmie Ridge water right?

25 A. Generally.

AR 055448

1 Q. Did you issue that water right?

2 A. No, I did not.

3 Q. So if I understand the distinction you're making as to
4 instream flow augmentation is whether it is for
5 mitigation or not?

6 A. I would tend to look at those particular water rights,
7 and using the Conifer Ridge one or the Kitsap PUD one,
8 there is a beneficial use associated with the underlying
9 application via domestic use or golf course irrigation.
10 Then as a part of that, we have required mitigation in
11 order to basically be able to approve the water right.

12 Q. Well, is mitigation a beneficial use?

13 A. I'm not sure, quite frankly. When you read -- when you
14 look at the issue -- clearly, the use of that water is a
15 benefit to that stream. Whether or not you classify that
16 as a beneficial use I think is part of what this whole
17 hearing is about.

18 Q. Are you familiar with the Water Resources Act of 1971?

19 A. Yes.

20 Q. Do you use and apply that statute in your work?

21 A. Yes.

22 Q. And in interpreting and issuing water rights?

23 A. Yes.

24 Q. Does RCW 90.54 speak to the question of what beneficial
25 uses are in Washington?

AR 055449

1 A. Yes, it does.

2 Q. And is maintaining instream flows, is that included as a
3 beneficial use under the statute?

4 A. I don't recall if those were the exact terms, but there
5 is language in there about maintaining - I can't recall
6 the exact words - benefits to the streams.

7 Q. Now, if a developer wishes to use storm water for
8 beneficial use, must they obtain a water right?

9 A. In my opinion, no.

10 Q. So, for example, if a developer wished to capture storm
11 water for the purpose of irrigating land, that would not
12 require a water right?

13 A. In that case, yes. I was supposing your question was
14 going a different direction, I guess. I'm sorry. If a
15 person were to capture storm water and put it to a
16 beneficial use such as golf course irrigation, or
17 something similar to that, that would require a water
18 right.

19 Q. Are you familiar with the port's proposal to obtain water
20 from Seattle Public Utilities?

21 A. I am aware that they talked to the City of Seattle.

22 Q. Were you involved in any of those discussions?

23 A. Not directly.

24 Q. Did you participate in a meeting between the port and SPU
25 and Department of Ecology staff?

AR 055450

1 A. I'm trying to recall if -- I believe I did. It's
2 probably in here someplace that I attended that meeting,
3 so if you can point it out, I can confirm that.

4 Q. Did the Department of Ecology inform Seattle Public
5 Utilities that a change in purpose would be required of
6 its water right claim in order to provide water to the
7 port for mitigation purposes?

8 A. That was discussed about it would potentially require a
9 change in purpose of use.

10 Q. And what we were talking about is adding a purpose of use
11 of stream flow mitigation to the SPU water right claim;
12 is that right?

13 A. I believe that was.

14 Q. I would like to have you take a look at Exhibit 758,
15 which is in ACC exhibits, Volume 7.

16 A. 758 did you say?

17 Q. Mm-hmm. Do you know what this is?

18 A. It looks like it's probably a printout from the Water
19 Rights Application Tracking System.

20 Q. Which is also known as the WRATS system?

21 A. WRATS, yes.

22 Q. Do you know whether this is a WRATS list from your
23 office?

24 A. It would appear to be since it includes King County water
25 rights which is in my office's jurisdiction.

AR 055451

1 Q. If you look over several columns over toward the end,
2 there is the column indicator T R S, township, range and
3 section, is that what that stands for?

4 A. Yes, it is.

5 Q. And you will note that it states T22?

6 A. Right.

7 Q. And if you flip through the document a little bit further
8 down several pages down, the T R S changes to T23; is
9 that right?

10 A. Yes, it does.

11 Q. Do you know where T22 and T23 are?

12 A. They're in King County.

13 Q. Do you know whether they encompass the airport?

14 A. I don't know that.

15 Q. Could I have you take a look at document 2132, which
16 should be in front of you.

17 MS. COTTINGHAM: What color of a notebook?

18 MS. OSBORN: Ecology's Volume 10, green.

19 MS. COTTINGHAM: What exhibit number?

20 MS. OSBORN: Exhibit 2132.

21 A. I have it here.

22 Q. And I'd like you to turn to the map following page 12.
23 First of all, could you identify from the front what this
24 is.

25 A. It's a public notice of application for permit, and it

AR 055452

1 appears to be a U.S. Army Corps of engineer permit.

2 Q. And if you look towards the bottom, or towards the middle
3 of the page where it says, "Applicant," does it say,
4 "Port of Seattle"?

5 A. Yes, it does.

6 Q. Looking at the map following page 12.

7 A. Okay.

8 Q. It's the map following page 12. This map has a legend,
9 "Impact Mitigation Sites for Proposed Master Plan Update
10 Improvements at Seattle Tacoma International Airport."

11 A. Okay.

12 Q. And if you look, there is some legal description
13 contained within that paragraph; is that right?

14 A. Right, there is.

15 Q. And does that indicate that they are in township 23 and
16 township 22?

17 A. Yes.

18 Q. So would that indicate to you that the WRATS list that we
19 are looking at, which is Exhibit 758, are for townships
20 that are surrounding the airport?

21 A. Yes, I would assume that would be the case.

22 Q. Now, in the column entitled, "Type/Stat," there are a
23 number of items that are listed, going back to 758 there,
24 under the second column, "Type/Stat."

25 A. Right.

AR 055453

1 Q. There are codes there. What does CE stand for?

2 A. Water rights certificate.

3 Q. And PE?

4 A. Water right permit.

5 Q. And CAN?

6 A. Cancelled.

7 Q. And a little further down, we have AP?

8 A. Application.

9 Q. And REJ?

10 A. Rejected.

11 Q. So taking a look at what is actually the fifth page of
12 this exhibit, which is the one that starts at the top
13 with the number S1-21285. And I apologize this didn't
14 come with page numbers when we received it from your
15 office.

16 A. That's okay. I have it.

17 Q. A little bit further down --

18 MS. COTTINGHAM: Which page are you on,
19 though, the very first one?

20 MS. OSBORN: The fifth page. They're double-
21 sided pages.

22 Q. So it starts with S1-21285. Toward the bottom there is
23 the code in that second column AP, that stands for
24 application again?

25 A. Yes.

AR 055454

1 Q. Is that right? So these are outstanding applications
2 with your office; is that right?
3 A. Yes, they would be.
4 Q. And there are several such applications indicated; is
5 that right?
6 A. Yes, there appear to be a number on that page.
7 Q. From King County Water District; is that right?
8 A. I see one that was rejected from King County Water
9 District.
10 Q. Looking a little further down towards the bottom of the
11 page where the column indicates AP ?
12 A. I'm sorry, I'm not seeing it.
13 Q. Can you identify some of the outstanding applications
14 that are shown on this list?
15 A. Well, I see one that says the Port of Seattle. And very
16 bottom, to make sure we are on the bottom page, it says
17 Grand Lodge.
18 Q. Yes. So moving up from the bottom there.
19 A. Okay. I see one application from Kent, from SeaTac, from
20 Kent, King County Water District.
21 Q. Okay. That's fine. Thank you. And moving a little bit
22 further down the list on what is the 11th page of this
23 document.
24 MS. COTTINGHAM: Could you tell us what the
25 name is on the bottom so --

AR 055455

1 MS. OSBORN: On the bottom is Kincaid, J. in
2 the category of names, and the top is Black River Quarry.

3 MS. COTTINGHAM: Okay.

4 Q. Have you found that, Mr. Swenson?

5 A. Yes.

6 Q. And towards the bottom there, again, there's some
7 applications outstanding; is that right?

8 A. Yes.

9 Q. For example, Seattle City Water?

10 A. I assume it's Water Department probably.

11 Q. Okay. I didn't know what the "D" stood for. So these
12 are outstanding applications?

13 A. Yes, they would be.

14 Q. Still pending with your offices?

15 A. Yes.

16 Q. In the vicinity of SeaTac?

17 A. Yes.

18 Q. Now, these are groundwater applications; is that correct?

19 A. If they have a G1 in the first column there, they would
20 be groundwater.

21 Q. And is groundwater managed in an integrated fashion with
22 surface water in Washington?

23 A. Yes, it is.

24 Q. And is that because pumping from groundwater can in some
25 circumstances deplete surface water flows?

AR 055456

1 A. Yes, that could be the case.

2 Q. I would like to switch gears just a little bit. Are you
3 familiar with the water supply for the Mariner stadium, I
4 think it's also called Safeco Field; is that right?

5 A. Yes.

6 Q. Were you involved or did you issue the water rights for
7 the stadium?

8 A. I did.

9 Q. When the stadium was under construction, were there wells
10 on the site?

11 A. Under construction were there wells on site?

12 Q. Were there dewatering wells on the site?

13 A. They had to dewater. I don't recall how they were doing
14 the dewatering.

15 Q. The stadium towards the end of construction then applied
16 for a water right; is that correct?

17 A. I don't remember the exact sequence of when the water
18 right was applied for as related to the construction.

19 Q. Eventually they did apply for a water right?

20 A. Right.

21 Q. And that was for irrigation of the field; is that right?

22 A. Yes, it was.

23 Q. But you don't recall whether they were using dewatering
24 wells on the site?

25 A. I assume they were because the way the stadium was built,

AR 055457

1 the field is basically almost into the water table, so in
2 order to construct the stadium, they had to do
3 dewatering.

4 Q. Does your office require a water right for dewatering
5 purposes?

6 A. Not generally unless the water is put to a beneficial
7 use.

8 Q. So if they were using dewatering wells for the
9 construction of the stadium, a water right wasn't
10 required?

11 A. Right.

12 Q. But when they converted those wells to a beneficial
13 purpose, water right was required?

14 A. Yes.

15 MS. OSBORN: That's all I have of this witness.

16 MS. COTTINGHAM: Mr. Poulin.

17

18 EXAMINATION

19 BY MR. POULIN:

20 Q. Hi, Mr. Swenson. I am Rick Poulin with CASE. You
21 mentioned that the application of water to a beneficial
22 use would require a water right then, did I hear that?

23 A. Yes.

24 Q. If an applicant wants to impound water to apply to a
25 beneficial use, does there need to be a right for that

AR 055458

1 impoundment?

2 A. There could be depending on the size of the impoundment.

3 Q. How does that work?

4 A. If they were to impound more than ten acre feet for a
5 beneficial purpose, then a storage permit could be
6 required.

7 Q. And does that require a separate application?

8 A. Yes, often we will see the storage and the beneficial use
9 application come in together.

10 Q. Does seniority of water rights apply to impoundment as
11 well as the use?

12 A. In terms of an application for a reservoir permit, it
13 would be given a priority date and have to be processed
14 and handled in accordance with that priority date.

15 Q. Thank you. No further questions.

16 MS. COTTINGHAM: Mr. Young or Mr. Reavis.

17

18 EXAMINATION

19 BY MR. YOUNG:

20 Q. Mr. Swenson, some reference was made to this Water Rights
21 Application Tracking System printout.

22 A. Correct.

23 Q. Is this current, can you tell?

24 A. I cannot tell. I do not know when it was printed.

25 Q. That's all I have. No further questions.

AR 055459

1 MS. COTTINGHAM: Mr. Reavis.

2 MR. REAVIS: I don't have any questions.

3 MS. COTTINGHAM: Any redirect as a result of
4 the questions?

5 MS. OSBORN: Just one. I would like to hand
6 Mr. Swenson the fax sheet or the email printout sheet
7 from which these files that were electronically attached.

8 MS. COTTINGHAM: Is this part of the exhibit?

9 MS. OSBORN: It is not. It should have been,
10 but it is not.

11 MR. YOUNG: I am going to object to using a
12 document that's not an exhibit.

13 MS. COTTINGHAM: Can you share it with
14 counsel?

15 MS. OSBORN: Unfortunately, I don't have a copy
16 of it here, but I would be happy to have them look at it.

17 MR. YOUNG: I've seen it. I object to using a
18 document that's not an exhibit.

19 MS. COTTINGHAM: Do you have any explanation
20 why it was not part of the exhibit?

21 MR. POULIN: When the WRATS list went into the
22 exhibit list, I failed to ask that this email transmittal
23 document be included.

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

AR 055460

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MS. OSBORN: I have no further questions.

MS. COTTINGHAM: Any questions from the board?
You're excused. Thank you.

MS. OSBORN: ACC calls Bob Barwin.

MS. COTTINGHAM: Let me ask a question before
you call Mr. Barwin up. Would this be an appropriate
time to take a little ten-minute break?

MS. OSBORN: Fine by me.

MS. COTTINGHAM: Until quarter to.

(Whereupon, a recess was taken.)

MS. COTTINGHAM: We'll go back on the record.

MS. OSBORN: Thank you. ACC calls Bob Barwin.

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

EXAMINATION

BY MS. OSBORN.

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

A. Yes. My name is Robert Barwin, B-A-R-W-I-N.

Q. What is your job?

A. I'm employed as the water quality - I did it again -
water resources section manager in the Central Regional
Office for Department of Ecology, which is located in

AR 055461

1 Yakima.

2 Q. Are you Dan Swenson's counterpart in Yakima?

3 A. Yes, I am.

4 Q. Do you have the same duties?

5 A. Yes, I do.

6 Q. And you oversee the issuance of water rights out of the
7 Yakima office; is that right?

8 A. Yes.

9 Q. And you have signature authority for those water permits;
10 is that right?

11 A. Yes, I do.

12 Q. Okay. I would like to take you back in time to the day
13 when I was sitting in this seat and you were sitting in
14 that seat several years ago. Do you recall that
15 occasion?

16 A. That would have been when I was the water quality section
17 manager. Yes, I do remember it.

18 Q. Do you recall the case that was involved in?

19 A. Yes.

20 Q. And it was Battle Mountain Gold; is that right?

21 A. Correct.

22 Q. Did that case involve a mitigation plan?

23 A. Yes, it did.

24 Q. And did it involve the issuance of water rights?

25 A. The project in general involved a number of water rights,

AR 055462

1 and among the mitigation plans for the Battle Mountain
2 Gold project or Crown Jewel project was a hydrologic
3 mitigation plan. There were mitigation plans during
4 project operation and also mitigation plans for after
5 closure of the mine.

6 Q. After closure of the mine?

7 A. Correct.

8 Q. Okay. What was your role with respect to the mitigation
9 plans, the hydrologic mitigation plan?

10 A. Along the way, I guess over a seven-year period, I worked
11 on an environmental impact statement which included a
12 number of models and they were evolutionary over that
13 period of time, trying to improve the models, the general
14 notion to be to predict what the consequences of project
15 construction, operation and closure would be and to
16 forecast alterations to hydrology on the project site and
17 what that would mean to water right holders and to the
18 environment in several streams that drained off the
19 mountain.

20 Q. And were you involved in the preparation of the
21 mitigation plan for offsetting those impacts?

22 A. Yeah, in terms of the mitigation plan itself, I was a
23 reviewer of a plan proposed by the Battle Mountain Gold
24 Company.

25 Q. Was the purpose of the mitigation plan to offset the

AR 055463

1 impacts of the project?

2 MR. YOUNG: I am going to object on relevance
3 grounds. This is a different case.

4 MS. COTTINGHAM: Explain your relevance.

5 MS. OSBORN: The relevance is that this is an
6 example of a mitigation plan for water rights for project
7 impacts similar to the third runway project and not
8 simply associated with water rights.

9 MS. COTTINGHAM: I don't quite yet see the
10 relevance.

11 MS. OSBORN: Well, I am trying to lay a
12 foundation here.

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

15 MS. OSBORN: Okay.

16 Q. What was the purpose of the mitigation plan, was it to
17 offset the impacts of the project itself?

18 A. Yeah, the hydrologic mitigation plan was an attempt on
19 the part of the company and the permitting agencies to
20 provide a long-term supply of water to offset what the
21 modeled or projected, I'll say, negative impacts, the
22 flow losses that we saw or projected during certain times
23 of the year as a result of project implementation.

24 Q. And just to go back so people understand, the project
25 here was the development of a gold mine; is that right?

AR 055464

1 A. Correct.

2 Q. And it involved the removal of several million cubic
3 yards of soil from the affected mountain; is that right?

4 A. Several tens of millions of yards, yes.

5 Q. And that had an impact on the local streams, is that
6 correct, and the purpose was to replace or offset the
7 impacts on the local streams; is that right?

8 A. Yes.

9 Q. Was the purpose of the mitigation plan essentially to
10 mimic the natural system?

11 MR. YOUNG: Object again on relevance grounds.

12 MS. OSBORN: The Battle Mountain Gold --

13 MS. COTTINGHAM: The board is going to take a
14 recess for just about a minute or two. We'll go off the
15 record.

16 (Whereupon, a recess was taken.)

17 MS. COTTINGHAM: We'll go back on the record.

18 The board is going to allow a narrow area of
19 questioning. We have in our records the findings of fact
20 and conclusions of law in Battle Mountain Gold that we
21 can rely on for legal conclusions and for facts relating
22 to Battle Mountain Gold. If you want to ask questions
23 that are not either findings of fact in Battle Mountain
24 Gold, or legal conclusions, you may continue questioning
25 the witness.

AR 055465

1 MS. OSBORN: Thank you. I need to go through
2 my questions for just a moment here and identify --

3 MS. COTTINGHAM: That's fine.

4 (Pause in the proceedings.)

5 Q. I guess to clarify here, and then I will move on from
6 this line of questioning regarding Battle Mountain Gold,
7 the source of water for the mitigation plan in the Battle
8 Mountain Gold case involved water from a pit lake that
9 was created by the mine; is that correct?

10 A. That's correct, for the post closure, the long-term of
11 permitted mitigation was from water derived on the site
12 in the pit that would have been created or the lake that
13 would form if it would have been created.

14 Q. Sorry, excuse me, I didn't mean to interrupt. And the
15 pit lake was filled with water that was groundwater
16 inflow or rainfall?

17 A. Both.

18 Q. Is the use of water for instream flow mitigation purposes
19 a beneficial use under the water code?

20 A. 90.54 RCW certainly does recognize instream flow as a
21 beneficial use.

22 Q. If a developer wants to use water to mitigate a project
23 for instream flow purposes, do they require a water
24 right?

25 A. If a developer wants to use water for that purpose, and

AR 055466

1 that's the beneficial use, for them to do that lawfully
2 and have some sense of priority, it would require a water
3 right. I don't know if that's all I'd need to know to
4 fully answer that question.

5 Q. If a developer, and I use the term developer in its
6 broadest term, just to say an entity or party was, for
7 example, pumping water from a well to put it in stream
8 for mitigation purpose, would that require water right?

9 MR. YOUNG: Objection; calling for a legal
10 conclusion.

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

12 MS. OSBORN: May I make an argument in my
13 defense here or perhaps voir dire the --

14 MS. COTTINGHAM: Or you could lay a foundation
15 for what you're trying to get at.

16 Q. (Continuing By Ms. Osborn): Now you stated that you are
17 the signature authority for the issuance of water rights
18 out of your office; is that correct?

19 A. Yes, I am.

20 Q. And does that require that you understand the water code,
21 the laws pertaining to issuance or allocation of water in
22 Washington State?

23 A. I believe it does.

24 Q. And do you read and use those laws?

25 A. Yes.

AR 055467

1 Q. Do you understand those laws?

2 A. As much as one can be expected to, yes.

3 Q. And do you apply those laws in issuing water rights?

4 A. Yes, I do.

5 Q. Okay. So if a party wants to pump, for example, from a
6 well and to put water into a stream for mitigation
7 purposes, does that require a water right?

8 MR. YOUNG: I have the same objection. That
9 is a legal conclusion. Whether a water right is
10 required, it depends upon a multitude of factors, not
11 just what's in the water code, but what's in hundreds,
12 literally, of cases addressing that issue.

13 MS. COTTINGHAM: You can respond.

14 MS. OSBORN: First of all, I'm not sure what
15 the hundreds of cases are that Mr. Young is talking
16 about, but it's a pretty simple question, if you withdraw
17 water from a well and apply it to a purpose, is a water
18 right required. I don't think that's a legal conclusion.
19 It's a pretty straightforward question that Mr. Barwin
20 has to deal with on a regular basis, probably daily basis
21 in his office.

22 MS. COTTINGHAM: Why don't you ask the
23 question in such a way that does not ask him to give a
24 yes or no answer.

25 Q. (Continuing By Ms. Osborn): Is water a public resource

AR 055468

1 in Washington?

2 A. Yes.

3 Q. And does use of water usually require a permit?

4 A. If there's an appropriation for the unintended beneficial
5 use, that is what a water right is intended to apply to.

6 Q. And so are those the two key elements in your view of
7 determining whether a water right is required, the
8 appropriation and then the beneficial use; is that right?

9 A. Generally, yes.

10 Q. Is the removal of water from a well, can that be an
11 appropriation?

12 A. Yes.

13 Q. And is the application of water for mitigation purpose
14 instream a beneficial use?

15 A. It could be in the context of a mitigation plan or some
16 other strategy. I guess I would say for a long time that
17 I've worked with Ecology, the notion of privately-held
18 rights for instream flow is not one that's been commonly
19 accepted. Instream flow rights, by my understanding,
20 have generally been the domain of the state through the
21 Department of Ecology in flow setting, so --

22 Q. Are you talking about the minimum flow regulations?

23 A. Yeah, and the tie to say 90.54 and the beneficial use of
24 instream flow. So I think there is something
25 distinguishable in mitigation plans versus instream flows

AR 055469

1 generally or protection of aquatic resources generally
2 and how that's done.

3 Q. So you would distinguish between those two; is that
4 right?

5 A. I do distinguish between those two.

6 Q. Are you familiar with the state's trust water rights
7 program?

8 A. Yes, I am.

9 Q. And does that allow the creation of water rights for
10 instream purposes?

11 A. Yes, it does.

12 Q. And so when you say you distinguish between private
13 instream water rights and the state, is that a
14 distinction you're also making?

15 A. Yes, because that's a way that rights that are in, I'll
16 call it, the private domain that are for an out-of-stream
17 beneficial use can be changed in purpose and place of use
18 and put to a different purpose and held by the state in
19 trust to put that priority of right in stream for that
20 beneficial purpose.

21 Q. So that is a mechanism by which an individual party,
22 private party, would be able to create an instream water
23 right; is that correct?

24 A. Correct.

25 Q. And does your office issue instream water rights under

AR 055470

1 the trust program?

2 A. Yes, we do.

3 Q. Are you familiar with water rights that have been issued
4 for instream purposes that are not in the trust program?

5 A. I am not.

6 Q. Are you familiar with the Trend West project in Yakima
7 Valley?

8 A. Yes.

9 Q. And have they obtained instream water rights through the
10 general stream adjudication in Yakima?

11 A. Correct, the distinguishing characteristic being the
12 judge has approved that at this point; the Department of
13 Ecology is yet to act on the trust water application.

14 Q. And that is a judge in state court; is that correct?

15 A. Judge Stauffacher who presides over the general
16 adjudication.

17 Q. In Yakima county court?

18 A. Correct.

19 Q. If a private party wanted to use storm water for a
20 beneficial use, would that require a water right?

21 MR. PEARCE: Objection; calls for a legal
22 conclusion.

23 MS. COTTINGHAM: Can you read back the
24 question for me.

25 (Question read back by the Court Reporter.)

AR 055471

1 MS. COTTINGHAM: Why don't you ask the
2 question in such a way that it does not require him to
3 give a legal conclusion.

4 Q. (Continuing By Ms. Osborn): The capture of storm water,
5 can that be an appropriation under the water code? Let
6 me give you a hypothetical here.

7 If a private party wanted to capture storm water
8 into some kind of reservoir system and then apply that
9 water for irrigation purposes, would that require a water
10 right?

11 A. Yes, the appropriation for irrigation would require a
12 water right.

13 Q. So capturing storm water for the beneficial use would be
14 an appropriation; is that right?

15 A. Let me try to put it in my words.

16 Q. Sure.

17 A. At the point at which it's storm water, there are other
18 legal obligations that the landowner has and the state
19 has in terms of management of that water and some
20 considerable doubt and maybe room for a lot of legal
21 debate, discussion or argument about whether that water
22 that's storm water and at the time it is a point source
23 under the Clean Water Act, if that water is really even
24 available for appropriation. It needs to be handled in a
25 certain way under the Clean Water Act and can only be

AR 055472

1 released for discharge or maybe for some other purposes
2 once it is sufficiently treated to be protective of a
3 whole host of public health and environmental
4 requirements. At some point when it stops being storm
5 water and it goes to that intended beneficial use, a
6 water right permit is, I would say, surely required.

7 Q. Are there any exemptions to the requirement to obtain a
8 water right permit for beneficial use?

9 A. In the groundwater code there are for small withdrawals
10 up to 5,000 gallons per day.

11 Q. And is that what is commonly known as the domestic well
12 exemption?

13 A. Correct.

14 Q. In your region have you had recent experience with the
15 domestic well exemption?

16 A. Yes, I have.

17 Q. Are water users trying to use the exemption for
18 nontraditional purposes?

19 MR. YOUNG: Object; it's irrelevant.

20 MS. COTTINGHAM: I'm going to sustain that
21 objection.

22 MS. OSBORN: I have no further questions.

23 MS. COTTINGHAM: Mr. Poulin.

24 MR. POULIN: I have no questions, Your Honor.

25 MS. COTTINGHAM: Ecology or the port, who

AR 055473

1 should I turn to first on all these questions?

2 MR. PEARCE: Ecology probably.

3

4

EXAMINATION

5 BY MR. YOUNG:

6 Q. You are aware of the decision that was made by the
7 director of the Department of Ecology in this particular
8 case?

9 MS. COTTINGHAM: Can you speak up.

10 Q. You are aware of the decision that the director of the
11 Department of Ecology made in this particular case?

12 A. Yes, I am.

13 MS. OSBORN: Objection to the form of the
14 question. I don't understand what he means by "this
15 particular case."

16 MS. COTTINGHAM: Can you clarify.

17 MR. YOUNG: I meant in the case that we're in
18 today.

19 MS. COTTINGHAM: Thank you.

20 A. Yes.

21 Q. Involving the third runway?

22 A. Yes.

23 Q. Do you agree or disagree with that decision?

24 MR. POULIN: Objection as to the assumption of
25 facts not in evidence. I'm not clear on what decision of

AR 055474

1 the director he is referring to.

2 MS. COTTINGHAM: He clarified the one that
3 we're in in this appeal.

4 MS. OSBORN: Are we talking about the 401
5 decision?

6 Q. (Continuing By Mr. Young): What was the decision?

7 A. The assumption I made from your question is the decision
8 on the part of the Department of Ecology not to require a
9 water right for the operation of the stormwater facility
10 at the third runway.

11 Q. And do you agree or disagree with that?

12 A. I agree.

13 MS. OSBORN: Objection. Why doesn't this call
14 for a legal conclusion?

15 MR. YOUNG: I'm just asking him whether he
16 agrees with the decision.

17 MS. COTTINGHAM: Asking him a personal
18 question.

19 A. Yes, I agree with it.

20 MR. YOUNG: I have no further questions.

21 MS. COTTINGHAM: Mr. Reavis.

22 MR. PEARCE: I have no questions. Thank you.

23 MS. COTTINGHAM: Any cross as a result of the
24 questions?

25 ////

AR 055475

1 EXAMINATION

2 BY MS. OSBORN:

3 Q. Mr. Barwin, you just said you agree with the director's
4 decision. Are you referring to the decision not to
5 require a water right for stormwater purposes in this
6 case?

7 A. Correct.

8 Q. And specifically the decision not to require a water
9 right for mitigation purposes?

10 A. Yes. And, in fact, because I have only been to a couple
11 of meetings and only had the whole operation described in
12 general to me, I'm far from a highly-informed person
13 about all of the details, but to the extent that I do
14 know what's going on with this project, and am aware of
15 the discussion that occurred at the senior management
16 team or among those close to Tom Fitzsimmons, I do
17 understand, and it, to me, is a very gray area, and I
18 agree with the judgment that was made not to require a
19 water right permit for the operation of the stormwater
20 facility.

21 MS. OSBORN: Thank you. I have no further
22 questions.

23 MS. COTTINGHAM: Any board questions?

24 MR. JENSEN: Yes.

25 ////

AR 055476

1 EXAMINATION

2 BY MR. JENSEN:

3 Q. Mr. Barwin, are you familiar with the Dr. Bevin decision
4 of the Pollution Control Hearings Board?

5 A. Certainly not by that name.

6 Q. Are you familiar with any decision where the Pollution
7 Control Hearings Board granted an appeal to require a
8 water right permit for instream use by a private party?

9 A. I am not familiar with any case from the PCHB that, in
10 essence, affirmed the granting of an instream flow right.
11 Just maybe it's one that's not within my region or having
12 come across.

13 Q. Well, technically, what the case involved was a
14 non-consumptive use requirement to have the stream flow
15 by his property in its natural condition.

16 A. Without a diversion?

17 Q. Yes. Do you remember that case?

18 A. I don't remember the case, but if I remember the
19 principle, it would lead me to the conclusion that
20 diversion was a requirement to get a permit, that would
21 be the principle, and I just don't remember the cite to
22 the specific case.

23 Q. Right. And you remember the case held that the diversion
24 was not required?

25 A. That I do not remember, so --

AR 055477

1 Q. Okay. That's all.

2 MS. COTTINGHAM: Any more questions?

3 MR. JENSEN: No.

4 MS. COTTINGHAM: Any questions?

5 MR. LYNCH: I have a question.

6

7

EXAMINATION

8

BY MR. LYNCH:

9 Q. In your area of the state where you work, is reclaimed
10 water used at all?

11 A. Yes. In fact, I was very involved in development of the
12 reclaimed water standards.

13 Q. Does the use of reclaimed water require a water permit, a
14 water rights permit?

15 A. Again, that's a hard one to answer. One answer is the
16 Legislature granted by statute the exclusive right to use
17 reclaimed water to the reclaimer of that water, so a
18 permit is not required to be issued by Ecology. One
19 could infer that if there was a right required, it was
20 granted by the Legislature when RCW 90.46 was passed.

21 MS. COTTINGHAM: Are there any questions as a
22 result of board questions?

23 MS. OSBORN: None here.

24 MR. YOUNG: No.

25 MS. COTTINGHAM: You're excused.

AR 055478

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MS. OSBORN: ACC calls George Schlender.

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

EXAMINATION

BY MS. OSBORN:

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

A. George Schlender.

Q. How is that spelled?

A. S-C-H-L-E-N-D-E-R.

Q. And what is your job, Mr. Schlender?

A. I'm the section manager for the water resources program in the Eastern Regional Office.

Q. Is that in Spokane?

A. That is in Spokane.

Q. And is your job similar or counterpart to that of Mr. Barwin and Mr. Swenson?

A. That would be correct, yes.

Q. And you have similar duties?

A. I do.

Q. Just your geographic scope is in the eastern region of the state?

A. Yeah.

AR 055479

1 Q. And that job includes overseeing issuance of water right
2 permits; is that correct?

3 A. Water right decisions and permits, yes.

4 Q. And you have signature authority for signing those
5 permits; is that correct?

6 A. Yes, I do.

7 Q. Are you familiar with the Wallula generation power
8 project?

9 A. Yes, I am. That's a project that is currently before
10 licensing before the Energy Facility Licensing Council,
11 and so we have worked with that project on water right
12 transfers and issues, yes.

13 Q. And that project is in your region in the eastern region?

14 A. Yes, it's in Walla Walla County.

15 Q. Are you familiar with the design of the Wallula
16 generation power project?

17 A. The design?

18 Q. Let me ask you a simpler question here. Will the power
19 project use water for cooling?

20 A. Yes, it's a water-cooled project.

21 Q. So it will use a fairly significant amount of water; is
22 that right?

23 A. Quite a bit, yes.

24 Q. Are you familiar with the water supply proposal for the
25 Wallula plant?

AR 055480

1 A. Yes, I am.

2 Q. Is the authorization to use water being processed in an
3 unusual way? Is it being processed through the EFSEC,
4 the Energy Facility Site Evaluation Council?

5 A. Right, it is a little bit unusual. We have prepared a
6 report for the applicant and EFSEC that basically
7 quantifies water rights and the ability to transfer those
8 rights for the beneficial use of the power plant, so we
9 are not issuing the transfer, you know, from the
10 standpoint of processing an application, we are issuing a
11 report that EFSEC could use to fold into their
12 stipulation agreement and licensing agreement.

13 Q. And is this the same type of report that you would issue
14 if you were processing the water supply proposal directly
15 as a water right?

16 A. That is the way that we constructed them with all
17 pertinent conditions, so it basically looks just like a
18 decision, but it is a report.

19 Q. Do you know what the proposed water sources are for the
20 project?

21 A. The proposed water sources are existing water rights and
22 permits, actually a permit. The permit already has the
23 current use and place of use. There is a poplar farm
24 that is currently irrigating poplars for pulp production
25 that would be converted to power production, so we

AR 055481

1 evaluated a series of six or seven water rights as far as
2 their beneficial use and the ability to transfer those to
3 the power plant for that particular purpose, satisfying
4 the portions in general of the code so that we look at
5 the consumptive use portion of the rights so that we
6 don't impact existing water users or the Columbia River.

7 Q. Do you know whether the power plant is proposing to use
8 storm water as a part of its source of water?

9 A. They initially had proposed to capture storm water in a
10 lined pond and then use it for cooling water, but my
11 understanding is that has been subsequently withdrawn and
12 they are not intending to do that any longer.

13 MS. OSBORN: In that case, I have no further
14 questions for you.

15 MS. COTTINGHAM: Mr. Poulin.

16 MR. POULIN: No questions, Your Honor.

17 MR. YOUNG: Nothing.

18 MR. PEARCE: Nothing. Thank you.

19 MS. COTTINGHAM: Any board questions? You're
20 excused.

21 MS. OSBORN: Thank you for coming over.

22 ACC calls William Rozeboom.

23 MR. YOUNG: Are we going to do Doug Rushton?

24 MS. OSBORN: No, not at this moment.

25 MS. COTTINGHAM: How about if we shut the

AR 055482

1 clock off and let's go off the record for a few moments
2 while the board finds their documents.

3 (Discussion had off the record.)

4 MS. COTTINGHAM: We'll go back on the record
5 and start the clock.

6
7 WILLIAM ROZEBOOM, having been first duly sworn on oath or
8 affirmed to tell the truth, the whole truth and nothing
9 but the truth, testified as follows:

10

11

EXAMINATION

12

BY MS. OSBORN:

13

Q. Could you please State and spell your name for the
14 record.

14

15

A. My name is William Rozeboom, spelled R-O-Z-E-B-O-O-M.

16

Q. And, Mr. Rozeboom, what is your job?

17

A. I'm a senior engineer with Northwest Hydraulic
18 Consultants.

18

19

Q. How long have you held that position?

20

A. In this office, I've been here for nine years.

21

Q. Could you describe for the board your relevant experience
22 relating to the low-flow modelling in this matter.

22

23

A. I have been assisting the ACC in reviewing the stormwater
24 management, the low-flow plan, since October or November
25 of 1999, so I've had more than two years reviewing all

25

AR 055483

1 the documents that have been produced.

2 Q. And could you describe for the board, based on the
3 prefiled testimony that we've provided in this case, sort
4 of the big picture concerns that you have about the
5 project, briefly.

6 A. I can. In the prefiled I'd point the board to page 8 and
7 paragraph 14, which kind of summarizes what I considered
8 the big picture to this, and that is the overall
9 methodology to determining what project impacts are is to
10 have a calibrated model of existing conditions and then
11 to have a modified model representing future conditions,
12 and then comparing results of the two models, that
13 defines what the impacts are and sets the basis for
14 providing necessary mitigation.

15 And, in this case, the existing conditions model or
16 the calibrated model is quite poor, does not do a good
17 job of simulating the observed flows as was testified to
18 earlier by Dr. Leytham. And the future conditions models
19 are also flawed because they fail to account for many of
20 the physical changes which are anticipated to occur
21 between the base condition and the year 2006 future
22 condition.

23 Q. And so taking it in that construct you have just created,
24 what are your comments, very generally, about the
25 existing conditions model created for the low-flow

AR 055484

1 project?

2 A. Well, the existing conditions model is simply poorly
3 calibrated; it does not reflect the observed low flows
4 that have been recorded at King County gage sites. In
5 particular, the Walker Creek and Des Moines Creek models
6 are very poorly calibrated. Des Moines Creek at the
7 upper gage site, the simulated low flows, for instance,
8 are about one half of the observed low flows, and that's
9 just bad, I mean, that's not even close to being a good
10 calibration.

11 Q. Do you agree with the opinions of your colleague, Dr.
12 Malcom Leytham, on this subject?

13 A. I do.

14 Q. With respect to the future conditions modelling that
15 occurred for the low-flow plan, could you describe
16 generally what your concerns are?

17 A. The concern I have there is that there are a number of
18 activities which are proposed which are not reflected in
19 the models. There are several -- these are all described
20 in the prefiled depositions, prefiled testimony. One is
21 the industrial wastewater system and improvements and
22 lead production efforts which are going to take place
23 with that. There are some other concerns related to the
24 land use changes and physical material removal of the
25 site of the borrow pits which are located just to the

AR 055485

1 south of the airport and are, in fact, master plan update
2 projects. Neither the IWS changes or the borrow area
3 changes are represented in the models.

4 Another change which is not modeled is in the
5 placement of the third runway embankment. There are
6 presently some wetland soils at the base of the
7 embankment, and from the PGG reports schematic, it shows
8 that the future condition assumes that those wetland
9 soils will remain beneath the embankment, whereas, the
10 current development proposal calls for removal of those
11 wetland soils. So it's another instance where the
12 physical changes which are expected to occur between now
13 and the future condition are simply not reflected in the
14 analysis.

15 Q. Thank you. I believe in paragraphs 23 and 24 of your
16 prefiled testimony, you talk about the use of different
17 models for the embankment modelling, for that portion of
18 the low-flow model, and you made the statement that it's
19 like comparing apples and oranges, and subsequent
20 response to that in some of the port's testimony has been
21 that you are advocating for a single model to model the
22 embankment hydrology. Is that correct?

23 A. Well, yes and no. The responses to my testimony kind of
24 misstate what I am saying, and what I think is stated
25 fairly clearly in the testimony, I am advocating that a

1 single methodology should be used in both the current
2 conditions and the future conditions, and that's
3 consistent with the approach taken by Pacific Groundwater
4 Group when they did their study for Ecology in year 2000.
5 The apples and oranges has to do with using a complex
6 hybrid model to examine future conditions but using a
7 simplistic HSPF model to examine current conditions.
8 And there are some technical differences between the
9 models that just don't make a comparison of results
10 meaningful.

11 Q. So, to clarify, you're not arguing that only HSPF, for
12 example, be used to model the embankment; is that
13 correct?

14 A. That's correct, and, in fact, I think that the approach
15 taken in integrating a Hydrus/Slice together with HSPF is
16 by far a superior way of assessing impacts, but that same
17 approach needs to be applied to the current condition as
18 well. You can't just have the sophisticated methodology
19 in the future conditions, you need to use that same tool
20 to examine both current and future.

21 Q. In your prefiled testimony you also discuss the issue of
22 time steps, rainfall time steps, in modelling
23 infiltration to the embankment. Could you explain for
24 the board what you mean with that issue?

25 A. I can. The issue really is how much water is able to get

AR 055487

1 into the embankment and then after it seeps through the
2 embankment to support low stream flows in the summer.
3 And the two questions of concern are, number one, what is
4 the infiltration capacity of the material, how easily can
5 the water soak into it. And that was addressed by Dr.
6 Leytham this morning.

7 The second question is how rapidly is the water
8 applied to the embankment. If water is applied over a
9 long period of time, the average rates of application are
10 fairly low and there's lots of time for the water to soak
11 in. If the water is applied quickly, it means that the
12 capacity to absorb the water is going to be exceeded and
13 there is going to be greater surface runoff.

14 It is specified by the King County manual that 15-
15 minute time steps are to be used when doing things like
16 sizing conveyance systems and for sizing flow-based water
17 quality facilities such as bioswales and filter strips.
18 The King County manual specifies that 15-minute time
19 steps shall be used.

20 What we have in this instance is we have rainfall
21 falling on the runway surface, it flows off for about 105
22 feet of runway and then it flows over about 75 feet of
23 filter strip before it has opportunity to be picked up in
24 a storm drain system. And that says very much a
25 conveyance kind of question and it's also biofiltration

AR 055488

1 or filter strip question for which the King County manual
2 specifies 15-minute time step.

3 The 15-minute time step is going to have rates of
4 runoff which are much greater than the rates of hourly
5 runoff because the hour data -- it takes 15-minute data
6 and averages them over an hour. So the port has
7 continued to use an hourly time step in this modelling
8 effort and is having low rates of runoff, whereas, the
9 more appropriate way to address this would be with
10 15-minute data which would give more flashy high rates of
11 runoff representing what's actually occurring.

12 The consequence of that is that the lower runoff
13 rates are allowing more water to seep into the embankment
14 than is actually likely to occur. When more water seeps
15 into the embankment, that means more water is then
16 available to emerge in the summer to support the low
17 stream flows than might occur.

18 Q. Do you have other concerns about the modelling for the
19 low-flow plan?

20 A. Well, there are a number of additional concerns, but they
21 are covered in my prefilled testimony, and I know the
22 board expressed interest this morning in not restating
23 everything, so I'll just defer to my prefilled testimony
24 and say that the points I raise I think are worth
25 consideration.

AR 055489

1 MS. OSBORN: Thank you. That's all the
2 questions I have.

3 MS. COTTINGHAM: Mr. Poulin.
4

5 EXAMINATION

6 BY MR. POULIN:

7 Q. Mr. Rozeboom, Rick Poulin from CASE. Today on the stand
8 and also in your prefiled, you used the expression
9 flashy. Could you explain what you mean by that?

10 A. Hydrologically, flashy means something that happens very
11 quickly. For example, during a cloud burst, during a
12 cloud burst event, the rain is going to come down very
13 rapidly and you're going to get a surge of runoff. We
14 consider that surge of runoff as being a flashy runoff.

15 Q. And could you, please, explain the significance of these
16 errors or shortcomings that you've described, what's the
17 "so what" of these things?

18 A. Can you be more specific, which ones you're referring to?

19 Q. Sure. With respect to which particular --

20 A. There are so many errors, I need to be directed to which
21 error to speak to.

22 Q. I'll pick one, the rate of runoff or, rather, the rate of
23 infiltration.

24 A. The rate of infiltration and the time step, is that --

25 Q. Yes, exactly, the time step. What's the significance of

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that?

A. The significance is that using a longer time step produces computed infiltration which is greater than the infiltration using a shorter time step. The shorter time step, in my view, is more accurate. So the longer time step allows computation of greater infiltration, greater seepage flow to the stream and lesser impact to the stream flow.

Q. So is that an over prediction of infiltration?

A. It over predicts infiltration and under predicts impacts.

MR. POULIN: Thank you. No further questions.

MS. COTTINGHAM: Mr. Young, any cross, or Mr. Reavis.

MR. YOUNG: I think Mr. Reavis is chomping at the bit here.

MR. REAVIS: I don't know if I'd describe it that way, but I'll start.

MR. STOCK: Mr. Eglick didn't want it described that way either.

[Laughter]

EXAMINATION

BY MR. REAVIS:

Q. Mr. Rozeboom, it's true, is it not, that people in your field often perform a couple of different functions, and

AR 055491

1 you alluded to this earlier today, there are some people
2 who are primarily reviewers and there are other people
3 who are designers of hydrologic systems, correct?

4 A. I don't see a clear distinction, no.

5 Q. Isn't the job of the reviewer to, say, take a particular
6 report or plan and review it to determine whether or not
7 it complies, for example, with the stormwater manual?

8 A. The function of a reviewer is to perform that function.
9 However, a reviewer is not necessarily a person who does
10 not also perform other functions in other situations.

11 Q. Sure. I mean, the same person can do either on a given
12 day.

13 A. Correct.

14 Q. But in the job of a reviewer, it's often not the
15 responsibility to try to quantify some of the impacts
16 you're dealing with, but, rather, to point out potential
17 problems and let someone else run with it from there to
18 figure out what the impacts are?

19 A. Yes and no. Oftentimes in a review capacity, I need to
20 make a judgment call whether the finding is worth
21 discussing. If there's something which might be
22 technically inaccurate but is of no consequence, I'm not
23 going to raise it. So there is sort of a screening
24 process that goes on in the review comments to only
25 identify those which are worth pursuing.

AR 055492

1 Q. Even those that are worth pursuing, oftentimes a reviewer
2 does not quantify the impact?
3 A. That could be true.
4 Q. And your role in this particular project has been as a
5 reviewer?
6 A. Yes.
7 Q. Do you have any prior experience with low-flow mitigation
8 proposals?
9 A. This is the first such proposal I've seen.
10 Q. Part of the review that you did was to determine whether
11 or not the port's stormwater management plan complied
12 with the King County stormwater design manual, correct;
13 is that one of the things that you looked at?
14 A. We were not tasked with that explicitly, but that came
15 out as an element of our review.
16 Q. Okay. Do you know Kelly Whiting at King County?
17 A. I do.
18 Q. And he was actually asked by the Department of Ecology to
19 review the port's stormwater management plan for that
20 purpose, was he not, to see whether it complied with the
21 King County manual?
22 A. He was asked to review the port's plan to see if it
23 complied with the technical provisions of the manual.
24 Q. Okay. And you distinguish technical provisions from what
25 I think you call regulatory requirements?

AR 055493

1 A. No, that distinction is made by the port. I don't make
2 that same distinction.

3 Q. Okay. Well, how would you describe, then, what it was
4 that Mr. Whiting was not doing with regard to review of
5 the stormwater management plan?

6 A. The aspects I know that he was not looking at, he was not
7 able to pursue the large site drainage review. Chapter 2
8 of the King County surface water design manual deals
9 exclusively with drainage submittals, and that was not
10 part of his review.

11 Q. So I was just trying to clarify your testimony,
12 particularly, in paragraph 6 of your prefiled testimony,
13 regarding whether or not the port should have complied
14 with those regulatory requirements of the King County
15 manual. Is that one of the criticisms you have here is
16 that it was not -- the port's stormwater management plan
17 was not required to comply with those regulatory
18 requirements?

19 A. In answering this, my answer is influenced by testimony
20 of one of the port's consultants who responded that the
21 1998 manual was not adopted at the time of an interlocal
22 agreement between the port and SeaTac, so, to answer,
23 I'll recognize that that may have been the case. The
24 port is located within the city of SeaTac. City of
25 SeaTac has adopted a King County surface water design

AR 055494

1 manual. If it was not the 1998 manual, my belief,
2 without knowledge of the SeaTac code, is that SeaTac
3 would have specified adoption of the 1990 King County
4 manual which preceded the current 1998 manual. And, in
5 that instance, that manual still would have had design
6 review requirements.

7 And my criticism, yes, is that it's bypassing the
8 design review requirements.

9 Q. So I guess putting aside the question of whether or not,
10 under this interlocal agreement you referred to, there's
11 a requirement to comply with all of these regulatory
12 requirements, as I understand it, your criticism is that
13 it should go through this drainage review process that's
14 described in the manual?

15 A. Yes.

16 Q. Can you tell us what that process involves?

17 A. The process is spelled out in very specific detail in
18 chapter 2 of the manual.

19 Q. Okay. Well, do you have any opinion or are you able to
20 predict whether any changes would be necessary if the
21 port had gone through that drainage review process?

22 A. It would be speculative.

23 Q. Now, you have provided some testimony about the fact, and
24 I don't mean to misstate your testimony here so correct
25 me if I don't get it completely right, but the stormwater

AR 055495

1 management plan does not take into account construction
2 of the Des Moines regional detention facility. Is that
3 the nature of your comment?

4 A. Yes. The plan does identify that such facility has been
5 proposed. Earlier versions of the port's SMP relied
6 exclusively on construction of such a facility.

7 Q. Can you describe for us what that facility is or is
8 contemplated to be?

9 A. In broad terms, it's a large detention pond which would
10 be constructed in the area of the Tye Golf Course.

11 Q. And that's not built yet, is it?

12 A. No, it's not.

13 Q. And there's no certainty that that will be built; do you
14 know whether or not that's true?

15 A. It's not built and I'm not aware of any plans to start
16 construction.

17 Q. Do you know whether if that type of facility were in fact
18 constructed, that it would have to go through some sort
19 of review process in order to be approved?

20 A. I don't know. I presume that there would be some
21 internal review at least on the part of King County and
22 the participating agencies.

23 Q. Do you know if there is any other regulatory approvals
24 that would be required for that RDF?

25 A. I don't know.

AR 055496

1 Q. Do you know whether or not the port's stormwater
2 management plan would have to be amended if the RDF is
3 constructed?

4 A. It would have to be superseded with additional
5 information at a minimum.

6 Q. In fact, the stormwater management plan says that it will
7 be amended if the RDF is constructed; isn't that correct?

8 A. That could be, I don't recall.

9 Q. Let me move on to the question of the industrial waste-
10 water system, otherwise known as the IWS. As I
11 understand your testimony, you have concerns about
12 potential leaks in the IWS and what correction of those
13 leaks could do to the area's hydrology; is that a fair
14 summary?

15 A. Yes.

16 Q. Because, as I understand it, for example, if you have a
17 leaky pipe that is contributing to groundwater recharge
18 and you stop the leaks, you reduce the groundwater
19 recharge; is that correct?

20 A. That would be my assumption.

21 Q. But you don't have any knowledge, do you, that the IWS
22 system is in fact leaking?

23 A. Pointing again to the port's responses to testimony, I
24 believe it was Keith Smith's response indicated that
25 testing was done on a portion of the port's stormwater

AR 055497

1 system, and of that portion, I think the numbers were
2 that 40 percent of the pipes, plus or minus, were tested
3 and of the 40 percent of the pipes, then something like
4 13 or 15 percent of the entire system needed repair. So
5 with the numbers given, it would seem that about 40
6 percent of the system's pipes have leaks or had leaks
7 prior to repair.

8 Q. Have you attempted to quantify how much groundwater
9 recharge might be occurring as a result of those leaks
10 that are described in Mr. Smith's testimony?

11 A. I have not seen the source of Mr. Smith's comments. I
12 presume that there was a leak assessment report; that
13 report might have information which would allow that to
14 be done.

15 Q. But you haven't attempted to quantify it, correct?

16 A. I have not had the information available.

17 Q. Isn't it true that if a pipe leaks, it can leak from the
18 inside of the pipe outward, or if it's sitting in the
19 groundwater area, the groundwater can leak into the pipe?

20 A. That would be true.

21 Q. And oftentimes when you don't even have anything
22 discharging in the pipe, you can have base flow in the
23 pipe because groundwater is flowing into the pipe?

24 A. That is true. I believe that's not the situation here.
25 The IWS area is pretty much entirely -- it's not entirely

AR 055498

1 paved but it's close to being entirely paved where pipes
2 are located, and I would be very surprised to have
3 saturated soil conditions underneath the IWS system.

4 Q. Do you know whether or not there is evidence of base flow
5 in the IWS system when there are no apparent discharges
6 to the system?

7 A. I don't know. I could speculate, if you like, that the
8 IWS system is not limited to stormwater runoff, but there
9 may be other industrial processes which might provide
10 municipal water into the system and might provide flow,
11 but that would be speculative.

12 Q. Okay. For the purpose of this question, I want you to
13 assume that there is some groundwater flow into the pipe
14 at certain times. Now, if you were to then fix the pipe
15 to where it wasn't leaking, then what effect would that
16 have on groundwater recharge?

17 MS. OSBORN: Objection. It calls for
18 speculation that --

19 A. It's a hypothetical that I just can't picture occurring
20 anyplace in the IWS system.

21 Q. Well, let me just see if I can make it more simple, then,
22 because this is -- well, if you have a pipe that is
23 taking water out of the groundwater system because the
24 water is leaking into it and it's going down to the IWS
25 treatment plant, then if you correct those leaks, do you

AR 055499

1 know what sort impact that's going to have on the system?

2 MS. OSBORN: I object. Mr. Rozeboom has
3 stated that he doesn't believe that this is a scenario
4 that's occurring beneath the airport. This also seems
5 like an opportunity for Mr. Reavis to testify about what
6 he thinks is happening.

7 MS. COTTINGHAM: I am going to sustain the
8 objection.

9 Q. (Continuing By Mr. Reavis): Let me ask you about the
10 development of the borrow sites. And as I understand it,
11 you're suggesting that the port should include in the
12 model proposed or some development that might occur in
13 the area of borrow sites 3 and 4?

14 A. And also borrow site 1.

15 Q. Okay. Let's talk about 3 and 4 first. I think your
16 testimony refers to a proposed agreement between the port
17 and the City of SeaTac relating to development of borrow
18 sites 3 and 4?

19 A. Correct.

20 Q. Do you know what the status is of that agreement?

21 A. I have seen a copy that's signed and executed.

22 Q. And when did you see that?

23 A. January.

24 Q. Have you seen Mr. Fendt's testimony where he talks about
25 whether or not that agreement has been signed?

AR 055500

1 A. I saw that.

2 Q. You just believe he's incorrect?

3 A. I believe it's inconsistent with the copy of the signed
4 agreement which I have seen.

5 Q. Have you seen Mr. Cheyne's testimony where he talks about
6 whether or not there are any current plans to develop
7 those borrow sites?

8 A. Yes, I have.

9 Q. Do you have any reason to disagree with his statement
10 that development is speculative?

11 A. The agreement commits to, in the short term, grading the
12 site for building pads and the stated intent to complete
13 the redevelopment per the zoning within five years. So
14 for the port to say that there are no plans for
15 redevelopment when there's a commitment to grade the site
16 for building pads and complete the development within
17 five years, I don't quite understand his statement.

18 Q. And that agreement to grade and do the building pads,
19 your understanding of that is based upon this agreement
20 that you believe that you have seen a signed copy of?

21 A. Correct.

22 Q. Do you know whether there are any current plans to
23 develop borrow sites 1 and 2?

24 A. I'm unaware of any such plans.

25 Q. Have you seen Mr. Cheyne's testimony on those sites?

AR 055501

1 A. I've seen Mr. Cheyne's testimony; I don't recall what he
2 may have said about those other sites. I don't think the
3 borrow area 2 is even slated for development as a borrow
4 area this time, I think it's elsewhere.

5 Q. Now, just as a matter of modelling procedure, you're not
6 suggesting that a modeler should consider speculative
7 development in the modelling for future purposes?

8 MS. OSBORN: Objection. Mischaracterizes
9 testimony of the witness.

10 MR. REAVIS: I am trying to establish whether
11 or not or how definite a particular development needs to
12 be included in the model.

13 MS. COTTINGHAM: I think you need to define
14 speculative.

15 Q. (Continuing By Mr. Reavis): Why don't I just ask you,
16 how firm does a particular future development need to be
17 in order for you, as a hydrologist, to include that in a
18 model?

19 A. The way that such models are normally conducted is to
20 assume that the site will be developed consistent with
21 the approved land use zoning. In this case, the land use
22 zoning is approved for aviation, commercial and similar
23 uses. So the modelling would assume a percent impervious
24 consistent with that type of land use development.

25 Q. So the particular land use zoning is what controls?

AR 055502

1 A. That's common practice for the models in this area.

2 Q. Let me get back to this agreement then and just ask one
3 more question about it. The copy that you saw that was
4 signed, was it signed by both the City of SeaTac, SeaTac
5 and the port?

6 A. I believe so, yes.

7 Q. Have you done any calculations to determine what the
8 magnitude might be as a result of development of these
9 borrow sites, magnitude of the impact on flows?

10 A. I have not.

11 MR. REAVIS: That's all I have. Thanks.

12 MS. COTTINGHAM: Mr. Young.

13

14

EXAMINATION

15 BY MR. YOUNG:

16 Q. You mentioned something in your testimony that I just
17 wanted to follow up on. You mentioned Pacific
18 Groundwater Group study in July of 2000?

19 A. I think I meant the Pacific -- the purple-covered report.
20 It may have been June 2000. Did I get the month wrong?

21 Q. Maybe it was June 2000.

22 A. But there was a study conducted, this was a
23 legislatively-sponsored or mandated study which Pacific
24 Groundwater Group performed.

25 Q. I think you mentioned that in a favorable way; did I hear

AR 055503

1 that correctly?

2 A. You did.

3 Q. And I guess what I mean by that is you were favorable of
4 the procedure that they used in that study; is that
5 right?

6 MS. OSBORN: I will object just to the extent
7 that Mr. Rozeboom did provide some limited testimony
8 about the study, and that the form of the question is
9 such that it seems to be attempting to expand that.

10 MS. COTTINGHAM: Keep within the scope of the
11 direct.

12 Q. (Continuing By Mr. Young): I want to look at something
13 in your testimony which is on page 20. This is in your
14 prefiled testimony. Do you have that in front of you?

15 A. It's in front of me.

16 Q. And on page 20, this is actually one long paragraph here,
17 this is where you are talking about the time steps and
18 the 15-minute data; is that right?

19 A. Yes.

20 Q. And about the middle there, you say, "The 15-minute data
21 set consists of 1,753,152 individual data values for the
22 50 years of record." Did I read that correctly?

23 A. You did.

24 Q. And so I think what you're saying is that the port should
25 have used those 1,753,152 individual data values in

AR 055504

1 performing its modelling?

2 A. That is standard hydrologic practice, yes.

3 Q. Okay. And then you go on to say that "Non-zero rainfall
4 is reported by 95,345 of these data values, representing
5 about 5 percent of the full record." Did I read that
6 correctly?

7 A. Yes.

8 Q. And then you go on, "In other words, the 15-minute data
9 show that it rains 5 percent of the time and that it is
10 not raining about 95 percent of the time." Did I read
11 that correctly?

12 A. Yes.

13 Q. You know, just when I read that, intuitively, does that
14 mean to you that it only rains 5 percent of the time at
15 SeaTac?

16 A. Those are what the data show.

17 Q. So that doesn't raise any questions in your mind as to
18 whether that's accurate or not?

19 A. No.

20 Q. Did you look at the individual 1,753,000 individual data
21 values?

22 A. With computer assistance, yes.

23 Q. So, I take it, you used some sort of computer search
24 function to determine how many had non-zero values and
25 how many didn't; is that fair to say?

AR 055505

1 A. The hydrologic tools we have to conduct these analyses
2 have some functions which process those sorts of data
3 questions automatically, so it was not a difficult task
4 to perform, it was --

5 Q. I assume it's not difficult to do, but you used some sort
6 of computer tool to do it; is that a fair statement?

7 A. That's correct.

8 Q. Is it possible that there's an error in there?

9 A. Possible, but I do not believe that there is an error.

10 Q. It's possible.

11 MS. OSBORN: Objection, asked and answered.

12 MS. COTTINGHAM: Sustained.

13 Q. (Continuing By Mr. Young): With regard to the stormwater
14 management plan that the port has developed, that
15 involves using the HSPF model to predict high flows for
16 the streams; is that generally correct?

17 A. The HSPF model performs a continuous simulation, it
18 simulates all flows from base flows to peak flows and
19 everything in between.

20 Q. And I think your opinion is that the calibration for high
21 flows in the stormwater management plan is adequate; is
22 that right?

23 A. That's the word I used.

24 Q. And it's adequate for all three of the creeks involved
25 here; is that right?

AR 055506

1 A. That's my previous statement.

2 Q. And the stormwater management plan involves, does it not,
3 a retrofitting of existing conditions; is that correct?

4 A. It does.

5 Q. That is to say a retrofit of facilities that are not
6 being redeveloped?

7 MS. OSBORN: Objection. I think this is
8 outside of the scope of Mr. Rozeboom's prefiled direct
9 testimony.

10 Q. I think you actually mention the retrofit in your
11 testimony; isn't that right?

12 A. I've written so many comment letters that it becomes a
13 blur which are in this testimony and which are in
14 previous ones.

15 Q. You are familiar with the retrofit provisions of the
16 stormwater management plan; is that fair to say?

17 A. The retrofit provision in this case refers to
18 establishing a 90-percent forested base and condition as
19 defined in the predevelopment targets for sizing of
20 flow-control facilities. That's the retrofit that I
21 think we are talking about.

22 Q. So the port then is going to size its facilities to meet
23 a target flow based upon a 90-percent forested condition;
24 is that right?

25 A. That's what the SMPs provide, yes.

AR 055507

1 Q. And that is something that goes beyond the requirements
2 of the King County manual; isn't that correct?

3 A. It goes beyond the requirements of the 1998 King County
4 manual.

5 Q. The manual would require a target flow regime based upon
6 1979 conditions; is that correct?

7 A. The manual generally requires target conditions
8 corresponding to the land use prior to the development
9 action occurring.

10 Q. In this case, we are talking about meeting a target flow
11 regime based upon essentially predevelopment conditions;
12 isn't that fair to say?

13 A. Predevelopment would have 100 percent forested so it's
14 not entirely predevelopment.

15 Q. We're at 90 percent of forested; is that right?

16 A. Correct.

17 Q. And what effect does that have on the port's flow-control
18 facilities?

19 MS. OSBORN: Objection. I think this is
20 outside the scope of Mr. Rozeboom's prefiled direct.

21 MR. YOUNG: No, I don't think it is, because
22 he speaks directly to the requirements of the King County
23 manual. I'm looking at paragraph 7, he talks about the
24 King County manual; paragraph 8 he does as well.

25 MS. COTTINGHAM: I'm going to overrule the

AR 055508

1 objection.

2 MR. POULIN: I'd like to object to the
3 vagueness of the question. I'm not sure what he is
4 getting at.

5 Q. (Continuing By Mr. Young): My question is what effect
6 does the retrofit requirement have on the port's
7 flow-control facilities?

8 MS. COTTINGHAM: I will allow the question.

9 A. The basic effect would be to result in facilities which
10 would tend to be larger than flow-control facilities
11 which would otherwise be required and which, in turn, are
12 more protective of the stream resources than flow-control
13 facilities which would otherwise be required.

14 Q. In what way are they more protective of the stream
15 resources?

16 A. The King County manual, more or less -- well, it
17 establishes current conditions as defining targets.
18 Currently Mill Creek is reportedly degraded in part
19 because of past development which has resulted in
20 increased peak flows, which has caused heighten
21 velocities, which has caused erosion and all the problems
22 associated with that. So it's more protective because
23 the flow-control facilities are going to try to turn back
24 the clock somewhat and reduce the peak flows.

25 Q. Which will have the effect of reducing erosion in the

AR 055509

1 basin; is that fair to say?

2 A. It would have the effect of reducing erosion below the
3 port's outfalls, yes.

4 Q. Are you familiar with the Des Moines Creek basin plan?

5 A. Somewhat.

6 Q. That's something you reviewed as part of all the stuff
7 you reviewed for this project?

8 A. I have looked at it, but I have not examined it in the
9 same detail as the port's proposal.

10 Q. Do you recall that reduction of erosion is one of the
11 high-priority items in the Des Moines Creek basin?

12 A. I don't recall, but it makes sense that it would be.

13 Q. And do you recall that reduction of metals concentrations
14 in the creeks is a lower priority item in the Des Moines
15 Creek basin plan?

16 A. I don't.

17 MS. OSBORN: Objection. This really is getting
18 outside the scope of Mr. Rozeboom's testimony.

19 MS. COTTINGHAM: Can you point where in the
20 direct written testimony this topic is?

21 MR. YOUNG: He does mention the Des Moines
22 Creek basin plan in paragraph 9.

23 MS. COTTINGHAM: I'll overrule the objection.

24 Q. (Continuing By Mr. Young): I think you said you didn't
25 recall that particular part of the plan; is that correct?

AR 05510

1 A. Can you point where in paragraph 9 I refer to the plan?
2 Q. It says, "The Des Moines Creek basin plan committee will
3 construct an RDF..."
4 A. That's citing the port's document, that's not citing the
5 Des Moines Creek plan.
6 Q. I saw those words Des Moines Creek basin plan committee,
7 jumped out at me. That's what I was referring to.
8 You are a surface water hydrologist; is that
9 correct?
10 A. That's correct.
11 Q. And that is a separate discipline from groundwater
12 hydrology; is that fair to say?
13 A. Yes. There is obviously overlap between the two
14 disciplines.
15 Q. Yes, but as I understand it, groundwater hydrology is a
16 specialty in and of itself; is that fair to say?
17 A. Yes, it is.
18 Q. And that's typically geologists who specialize in that
19 area; is that fair to say?
20 A. Geologists, hydrogeologists, yes.
21 Q. And you're not a geologist; is that correct?
22 A. Not by profession. The engineering background I have
23 includes geology courses and education.
24 Q. But you're not a geologist?
25 A. I'm not a practicing geologist.

AR 055511

1 Q. And is that also true for Dr. Leytham?

2 A. Dr. Leytham is not a geologist either.

3 Q. He is not a groundwater hydrology person, is he?

4 A. No.

5 MS. OSBORN: I am going to object if

6 Mr. Young --

7 MS. COTTINGHAM: I'll sustain this objection.

8 You should have asked Mr. Leytham.

9 MR. YOUNG: I'll move on.

10 Q. With regard to the 15-minute time step issue, your view
11 is that 15-minute time steps should have been used.
12 Isn't it true the port originally was using daily time
13 steps?

14 A. The port never used daily time steps for HSPF modelling.

15 Q. They did not?

16 A. No.

17 Q. Now they are using hourly time steps; isn't that right?

18 A. The port has consistently used hourly time steps for the
19 HSPF modelling.

20 Q. And your opinion is that the 15-minute time step is
21 better because that would better approximate the rate at
22 which the rain runs off the runways?

23 A. Yes.

24 Q. The runways are flat, aren't they?

25 A. I hope that they would drain and not pool water. I've

AR 055512

1 not designed a runway.

2 Q. They would have some slope to them so that water runs
3 off, I assume; is that right?

4 A. That's the hope.

5 Q. But they're basically flat; isn't that fair to say?

6 MS. OSBORN: Objection.

7 MS. COTTINGHAM: You're going to need to lay a
8 foundation.

9 Q. (Continuing By Mr. Young): Do you know whether the
10 filter strips that are going to be adjacent to the
11 runways are flat or not?

12 A. The filter strips will have to have some slope on them to
13 function.

14 Q. It will be a minimal slope; isn't that correct to say?

15 A. I haven't seen the design detail. I don't recall seeing
16 the design detail on the filter strips, nor would I know
17 what the final design would look like.

18 Q. Assuming that there are minimal slopes, then the runoff
19 is going to be slow; isn't that right?

20 MR. POULIN: Objection, Your Honor. This
21 calls to mind Ms. Sheldon's bathtub. There is no
22 foundation about the slope.

23 MS. COTTINGHAM: I think you're going to have
24 to lay a foundation for this as well.

25 Q. (Continuing By Mr. Young): You are familiar with filter

AR 055513

1 strips from your experience as a surface water
2 hydrologist; isn't that fair to say?

3 A. I have not designed any; I'm familiar with their
4 description in the King County manual.

5 Q. Isn't the whole purpose of them so that water flows
6 slowly through the filter strip so that pollutants and so
7 forth can settle out; isn't that fair to say?

8 A. Yes.

9 Q. So are there design criteria, then, that are associated
10 with their slope?

11 A. Yes.

12 Q. And is that design criteria -- what is the slope?

13 A. I can't recall.

14 Q. Is it a small slope?

15 A. It would be --

16 MS. OSBORN: Objection. He said he can't
17 recall.

18 MS. COTTINGHAM: I think he answered the
19 question.

20 MR. YOUNG: I thought he was going to answer.

21 Q. Can you answer that, is it going to be a small slope?

22 MS. OSBORN: Objection. That's two questions.

23 MS. COTTINGHAM: I'm going to overrule that
24 objection. I think it's only one question.

25 A. I am sorry, could you repeat the one question.

AR 055514

1 Q. Is it a small slope for a filter strip?

2 A. It is probably in the order of 1 percent.

3 Q. And so water will move slowly through the filter strip,
4 yes?

5 A. Yes.

6 Q. So that would then be the opposite of what you call a
7 flashy response; isn't that right?

8 A. The flashy response comes from the fact that the rain is
9 falling on the runway pavement and is going to get off
10 fairly quickly, I presume, so that the aircraft can land
11 safely without hydroplaning. Again, I am not a runway
12 expert; I'm speculating that that's desirable.

13 Q. Once it gets into the filter strip, it's going to move
14 slowly, correct?

15 MS. OSBORN: Objection to the form of the
16 question. Perhaps Mr. Young could define slowly.

17 MR. YOUNG: I think he knows what the word
18 means.

19 MS. OSBORN: I don't know what the word means.
20 It's a relative term.

21 MS. COTTINGHAM: I'm not sure you're being as
22 clear as possible. Is it running through the filter
23 strip or across -- you need to be a little clearer on
24 what you're trying to get at.

25 MR. YOUNG: I will defer that line of

AR 055515

1 questioning to another witness, so I have no further
2 questions.

3 MS. COTTINGHAM: Any redirect?

4 MS. OSBORN: Just a moment, please.

5

6

EXAMINATION

7

BY MS. OSBORN:

8 Q. Mr. Rozeboom, you recall Mr. Reavis asked you if you have
9 prior experience with low-flow mitigation proposals, is
10 that correct, do you recall that question?

11 A. Yes.

12 Q. And does this low-flow mitigation proposal incorporate
13 components of the stormwater management plan; example,
14 the modelling?

15 A. It uses an HSPF model which is based on, but not
16 identical to, the HSPF model used for the stormwater
17 management plan.

18 Q. And you reviewed the stormwater management plan; is that
19 correct?

20 A. Yes.

21 Q. And you review storm management plans as part of your
22 work with NHC; is that correct?

23 A. I have, yes.

24 Q. Mr. Reavis asked you a series of questions about the
25 industrial wastewater system and whether you knew how

AR 055516

1 much groundwater recharge there was or had quantified the
2 amount of leakage, et cetera. Was the industrial
3 wastewater system analyzed in the process of modelling
4 the low-flow plan or the stormwater plan?

5 A. To my knowledge, it's not. It's been one of the issues
6 which I've been raising for some time probably for at
7 least a year and half, maybe two years, that the
8 relationship between industrial wastewater system and the
9 port's stormwater facilities has largely been overlooked.
10 I am of the opinion that the industrial wastewater system
11 has a potential for having a large impact on the stream
12 low flows because it's a very large system, it covers
13 about 400 acres, and that provides opportunity for a
14 large volume of water which could get back into the
15 stream via the ground if that system leaks. And
16 especially since there are very substantial discrepancies
17 between the calibrated or simulated flow results and the
18 observed flow results, the observed results are
19 consistently coming out higher than the calibrated
20 results, so there's missing water somewhere and it's my
21 belief that something is missing. I'm suggesting that
22 the IWS may be the explanation for why the calibration is
23 so bad and I think that should be corrected so that
24 there's a solid understanding of how the system works.

25 Q. Mr. Reavis also -- I can't remember if it was Mr. Reavis

AR 055517

1 or Mr. Young -- asked you about whether you felt that the
2 calibration for peak flows in the various creeks were
3 adequate. Do you recall that question?

4 A. I do.

5 Q. And there have been questions about whether there's
6 disagreement between you and Mr. Leytham about peak flow
7 calibration in Walker Creek.

8 A. I recall that.

9 Q. Why have you said two different things about this
10 calibration?

11 A. Well, I think what's happening there is that the context
12 of the two statements is not apparent from the documents.
13 And, really, Dr. Leytham and I are asking two different
14 questions. The question that Dr. Leytham was asking is,
15 is the calibration sufficient to achieve Ecology's stated
16 performance standard, which is to retrofit to a 10
17 percent impervious/90 percent forested basin, and that's
18 the context of his review of the calibration.

19 I have had a longer history of looking at these
20 reports and I had a different question that I was asking.
21 I have reviewed the November 1999 SMP, then there was a
22 July 2000 SMP, I believe there's an August 2000 SMP,
23 several versions, and throughout all of those versions,
24 there were multiple questions being raised, two of which
25 are important; number one, what is the adequacy of the

AR 055518

1 calibration, but the second one, what are the performance
2 standards. And up until the December 2000 SMP, the one
3 which was approved, the port continuously held out that
4 the performance standards were subject to negotiation, it
5 was trying to negotiate a lesser standard. The
6 performance standard which I had in my head when I was
7 reviewing the sufficiency of the calibration was, were
8 there going to be significant adverse environmental
9 impacts and was there reasonable assurance that
10 mitigation would be provided. And so long as the
11 performance standard was up in the air together with the
12 calibration of the answer, I felt there was a risk of
13 adverse environmental impacts.

14 When the final December 2000 SMP came out and it
15 agreed to the level 2 flow control with this very
16 protective standard, to me that was sufficient to accept
17 the calibration that the two as a package were adequate
18 to make sure that there were not going to be any
19 significant adverse impacts.

20 So Dr. Leytham and I are really asking two different
21 things. I am asking, is the calibration adequate in
22 conjunction with the performance standard that there will
23 not be adverse impacts to stream, and I believe the
24 answer is yes, as I stated. I believe that Dr. Leytham
25 was looking at it from the context of whether the

AR 055519

1 calibration was accurate enough to strictly satisfy
2 Ecology's flow standards that's now specified in the SMP.
3 So there's a different context in our statements. I
4 don't think there is any fundamental disagreement between
5 us.

6 MS. OSBORN: Thank you. That's all the
7 questions that I have.

8 MS. COTTINGHAM: Any board questions?

9 MR. JENSEN: No.

10 MR. LYNCH: I have one question.

11

12

EXAMINATION

13

BY MR. LYNCH:

14

Q. Page 26 of your prefiled testimony, the last sentence,
15 you're talking about the Des Moines Creek and upper basin
16 low flows established by the calibrated model were
17 approximately one half of the observed low flows. And
18 the last sentence of that paragraph 35 you said, "In
19 practical terms, this approach to monitoring means that
20 there is a built-in cushion for up to 50 percent
21 reduction in low stream flows before the monitoring
22 protocols would recognize that low-flow reductions are
23 occurring." I'm trying to understand exactly the
24 importance that you're attaching to this phrase. Are you
25 saying that the low stream flows occurring, that any

AR 055520

1 mitigation, that any release of waters that would be
2 stored in order to offset the low stream flows would only
3 kick in if you got below this 50 percent mark established
4 through this calibrated model?

5 I don't know if I asked that very directly, but --
6 A. Let me attempt to answer if I may. The proposed stream
7 flow mitigation is not limited to the modelling results.
8 The proposed mitigation says we are going to go ahead and
9 release water at certain rates for certain periods of
10 time. But on top of that, there's expectations that the
11 actual stream flows will be monitored. So where this 50
12 percent reduction comes in is in the context of when
13 would additional mitigation be required, when would you
14 look at the stream and say the flows are too low, we need
15 to release more water? And that's where this 50 percent
16 comes in.

17 To use round numbers -- number 1 cfs is too high,
18 but it's a round number, so I'll use it for illustration.
19 If the current low flow were 1 cfs in the real world,
20 that should be the target that you want to preserve 1 cfs
21 and not have an impact, but the modeled low flow is only
22 a half a cfs, and that's the kind of difference we are
23 talking about at Des Moines Creek. In the future, then,
24 after they provided the mitigation, if they say, well,
25 we're actually measuring low flows at 0.6 cfs, they are

1 saying, well, we don't have an impact because we are
2 higher than we said it was going to be, we only promised
3 half a cfs because that's what the model showed, and my
4 point is you need to pay attention to what the recorded
5 data show, because recorded data are measuring the true
6 flow in the stream. And if you are trying to not reduce
7 the true flow in the stream, you need to look at the real
8 data, not the simulated data which are coming out too
9 small.

10 Q. I understand.

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

13 MS. OSBORN: None here.

14 MR. YOUNG: No.

15 MR. REAVIS: No.

16 MR. POULIN: No, Your Honor.

17 MS. COTTINGHAM: You're excused.

18 MS. OSBORN: Could I take a very brief break
19 to figure out who my next witness is?

20 MS. COTTINGHAM: How about if we take a
21 ten-minute break.

22 (Whereupon, a recess was taken.)

23 MR. STOCK: We're ready to call our next
24 witness which will be Mr. Rushton of the Department of
25 Ecology, but I know that you had mentioned earlier in the

1 day that that there was something you wanted to --

2 MS. COTTINGHAM: It will wait.

3 MR. STOCK: And then we also, with respect to
4 the order of witnesses tomorrow, I suspect we will be
5 able to complete our remaining witnesses, so either
6 Ecology or the port will need to be putting on witnesses
7 tomorrow, and for our planning purposes, we would like to
8 know who those witnesses are.

9 MS. COTTINGHAM: When we're done with Doug
10 Rushton, if we don't have time for another witness -- I
11 take it you don't have anyone else to call today?

12 MR. STOCK: Dr. Willing is here, but I don't
13 know whether -- we certainly won't finish with Dr.
14 Willing today.

15 MS. OSBORN: One concern I have, Miss
16 Cottingham, is that if Ecology is starting, they have
17 listed Dave Garland as one of their earlier witnesses,
18 and we have an outstanding motion respecting
19 Mr. Garland's testimony that needs resolution. But since
20 we don't know whose going tomorrow --

21 MS. COTTINGHAM: And we won't know until they
22 tell us, which will be at the end of the day today, and
23 depending on that, I will let you know whether I will
24 rule in the morning or at lunch tomorrow, depending on
25 our schedule.

AR 055523

1 A. Yes.

2 Q. Did you write this document?

3 A. I was one of several authors, I was the lead author on
4 it.

5 Q. You were the lead author, is that what you said?

6 A. Yes.

7 Q. Is this a draft document?

8 A. Yes, it is.

9 Q. Is there a final?

10 A. Not yet. The comment period, in fact, is still open.

11 Q. When do you expect a final will be done?

12 A. Probably several months out, three to four months; it
13 depends on volume of comments we get and the amount of
14 effort needed to respond to those comments.

15 MS. COTTINGHAM: You're going to have to speak
16 up. The microphone is not a broadcast microphone.

17 Q. (Continuing By Ms. Cottingham): Are you familiar with an
18 activity called watershed planning?

19 A. Yes, I am.

20 Q. Does this document discuss watershed planning?

21 A. Yes, it does.

22 Q. Is watershed planning a local based program or activity
23 to plan for future water supply?

24 A. Future water supply is one of the things that's
25 considered in watershed planning.

AR 055525

1 Q. What are some of the other things?
2 A. Dealing with fish, aesthetics, water quality, other
3 instream values.
4 Q. And when you say "dealing with fish," does that include
5 instream flow setting?
6 A. It could, it could. Instream flow setting is optional
7 for the so-called 2514 watershed planning groups.
8 Q. And do you know the statute under which watershed
9 planning occurs?
10 A. Yes, it's chapter 90.82 RCW.
11 Q. Do you know whether there are watershed plans being
12 prepared in basins around Washington where minimum
13 instream flows have been established by regulation?
14 A. Yes, there are.
15 Q. And how about in areas where streams have been closed by
16 regulation?
17 A. I think the only two that I am aware of that are closed
18 by regulation would be the Chambers Clover Creek and also
19 the Walla Walla, and I think they both are doing
20 watershed planning. Walla Walla I think is toying with
21 it.
22 Q. And does watershed planning involve instream flow
23 setting?
24 A. The local planning groups can recommend flows to Ecology,
25 it's an optional element of their plan, they don't have

AR 055526

1 to do it.

2 Q. Is the Guide to Instream Flow Setting, this document,
3 Exhibit 757, does it provide information about how to go
4 about instream flow setting in Washington?

5 A. Well, I wouldn't call it instream flow setting, I would
6 call it instream flow recommending, because Ecology is
7 the one that has the authority to actually set the flows.
8 Its purpose is to provide background information to help
9 the local groups make their decisions.

10 Q. And could watershed planning groups utilize this document
11 as a basis for doing the instream flow recommendations?

12 A. Yes, it's a baseline document, kind of an educational
13 tool to help them in their decision making.

14 Q. And, in fact, is that one of the purposes of this
15 document?

16 A. Yes.

17 Q. I would like to have you take a look at table 1, which is
18 on page 31 of the document, and if you could just
19 identify this table for us.

20 A. It's called table 1, "Environmental Effects of Stream
21 Flow Level Approaches."

22 Q. And does this table identify different approaches that
23 could be taken with instream flow setting?

24 A. Yeah. This was set up as kind of a bookends approach,
25 the idea if you go for lower flows, recommending lower

AR 05527

1 flows in your basin, these are likely impacts, could
2 happen, maybe not, or higher flows, and the idea is that
3 most planning areas would be between that somewhere.

4 Q. So that a watershed planning group could recommend a
5 higher flow or a lower flow depending upon the wishes of
6 that group?

7 A. And this would be a general impact, which they would have
8 to see if it fits their specific situation.

9 MS. OSBORN: That's all the questions I have.

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

12 MR. POULIN: Yes.

13

14 EXAMINATION

15 BY MR. POULIN:

16 Q. Mr. Rushton, I am Rick Poulin for CASE. Do you work with
17 water quality standards in your occupation?

18 A. No, I do not.

19 MR. POULIN: No further questions.

20 MS. COTTINGHAM: Any cross examination?

21 MR. YOUNG: None.

22 MR. PEARCE: No questions. Thank you, Your
23 Honor.

24 MS. COTTINGHAM: Any board questions?

25 MR. JENSEN: No.

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1 MR. LYNCH: No.

2 MS. COTTINGHAM: You're excused. Call your
3 next witness.

4 MS. OSBORN: ACC calls Peter Willing.

5
6 PETER WILLING, Ph.D., having been first duly sworn on
7 oath or affirmed to tell the truth, the whole truth and
8 nothing but the truth, testified as follows:

9
10 EXAMINATION

11 BY MS. OSBORN:

12 Q. Please state your name and spell your last name for the
13 record.

14 A. My name is Peter Willing, W-I-L-L-I-N-G.

15 Q. And, Dr. Willing, could you provide a general bit of
16 information about your background; for example, what is
17 your educational background?

18 A. I have worked in the water field since 1970. I have
19 graduate degrees, both a master's and a Ph.D., from
20 Cornell University, and I have worked in the field
21 continuously since completing my graduate work.

22 Q. And what type of work have you done in the field, so to
23 speak?

24 A. I have specialized in the relationship between land use
25 and water quality on quite a number of different

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1 projects, and have also served as a manager of a public
2 water supply utility.

3 Q. Have you been retained by ACC in this matter?

4 A. Yes, I have.

5 Q. To review the port's documents relating to the third
6 runway; is that correct?

7 A. Yes, I have.

8 Q. And could you just describe briefly the documents that
9 you have reviewed.

10 A. I have reviewed the low stream flow augmentation plans in
11 at least four different versions that I can remember. I
12 have spent a lot of time looking at the stormwater
13 management plan and several different versions. I have
14 reviewed an office full of other documents that were
15 published either by the port or by port consultants.

16 Q. How long have you been working on this project for ACC?

17 A. Since November of 1999.

18 Q. I wonder if we could start by having you give a brief
19 overview of your testimony that's been provided to the
20 board in the prefiled written testimony.

21 A. My testimony deals to some extent with the low-flow
22 augmentation plans for the streams in SeaTac area; deals
23 with the quality of storm water that's anticipated or
24 known to come from the SeaTac area from the SeaTac
25 Airport; and deals also with the sufficiency of

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1 stormwater monitoring, water quality monitoring programs.
2 And I have measured all of these different issues against
3 what I understand to be the burden involved in this case,
4 which is the provision of reasonable assurance that water
5 quality standards will not be violated.

6 Q. And, generally, what have you concluded about the
7 documents that you have reviewed?

8 A. The low stream flow augmentation plan started out with
9 Des Moines Creek and has gone through quite a number of
10 iterations since then, and has gone successively from one
11 water source to another, and each of the water sources
12 has had its difficulties. The one in vogue at the
13 present time is to use carry-over storm water that's
14 collected from the airport and use that to augment
15 streams.

16 I have some concerns about the adequacy of the
17 amount of water that will be there, also the modelling
18 exercise on which that was based, and also have concerns
19 about the quality of the water that will be available for
20 augmenting the flow during the low-flow period in the
21 summer on those creeks.

22 Q. And do you have other general conclusions about the
23 port's low-flow planning process?

24 A. I pointed out in my prefiled direct testimony that, in my
25 experience at least, there has not been an example of a

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1 comparable use of stored storm water for flow
2 augmentation in a class double A stream, none that I know
3 of at least.

4 Q. And do you have some general conclusions you have
5 regarding water quality relating to the third runway
6 project?

7 A. Yes, I do. Storm water is the key to whether the port's
8 plans are going to result in violations of water quality
9 standards. And I am concerned that this stormwater issue
10 is a very complex one, it's difficult for even people
11 working in the field to agree on some of its dimensions,
12 and it's particularly difficult for people that are a
13 little bit outside of the inner circle, if you will, to
14 understand what's going on.

15 We have a standard that is written for the dissolved
16 form for metals, for instance, for metal contaminants in
17 the storm water, and a permit, on the other hand, that's
18 written in terms of the total recoverable. All these are
19 analytically different quantities in the storm water. We
20 have toxic substance limits that depend on more than one
21 parameter in order to ascertain whether a given water
22 body is in compliance or not. In other words, you can't
23 just look at the single number for a heavy metal, for
24 instance, you have to look at the accompanying hardness
25 value to tell how high the number should be, is the

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1 standard of performance.

2 There is a question about the analysis taking place
3 in the discharge itself versus in the receiving water
4 that the discharge goes into, which is complicated by a
5 discussion of how big the mixing zone should be allowed.

6 There are questions of pollutant frequency and
7 duration. In other words, the standards are written so
8 they state, you know, a certain amount should not be
9 violated more than so many times in a 24-hour period or
10 in a 4-day period. These questions have reduced
11 Ecology's regulators to the point of having to say that
12 they are not able to ascertain compliance in this
13 situation, and the analysis to do that can't be done.

14 On top of this complexity, the port is saying, let's
15 change the water quality standard by means of the water
16 effects ratio process, which is incorporated into the
17 water quality standards, so we can discharge at a higher
18 level than we would have been able to before without
19 violating the standard.

20 My last point is that Ecology even by admissions of
21 its own senior people has gone along with a monitoring
22 regime for stormwater quality that I maintain is
23 inadequate. And I will offer some examples of that
24 situation.

25 Q. So you have stated in your prefiled testimony that you

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1 believe that water quality standards are currently being
2 violated at the SeaTac Airport; is that correct?

3 A. Yes, I have.

4 Q. What is your basis for that?

5 A. The port's own records show a history of discharges that
6 exceed water quality standards. These occur in several
7 different classes of certainty, if you will. Some of
8 these are pretty cut-and-dried, unambiguous violations.
9 There are other cases where all the evidence certainly
10 seems to point to a violation. There are other cases
11 where you really can't tell because of the way the data
12 is collected or reported. And there are yet other cases
13 where the port and Ecology are unable to say that there
14 is reasonable assurance that the water quality standards
15 won't be violated.

16 Q. And can you give examples?

17 A. Yes. The 1996 edition of the port's NPDES permit
18 required it to study the effect of SeaTac storm water on
19 receiving streams in the SeaTac area, and the report that
20 resulted from that exercise was called stormwater
21 receiving environment monitoring report for NPDES permit,
22 has the number of the permit, dated 1997. Repeated
23 violations of water quality standards are documented in
24 that report and says that copper exceeds EPA and acute
25 state water quality criteria in the streams above the

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1 port discharges and streams below the port discharges and
2 in the discharges themselves. A dissolved copper value
3 of 74 micrograms per liter was measured at outfall SDN 1
4 which exceeds the criterion that applies at that time and
5 at that hardness value of 17 times. In other words, the
6 concentration in the discharge is 17 times the criterion.
7 The stream above the outfall was also in excess of that
8 copper criterion.

9 Table 22 of that report, which is listed in my list
10 of documents that I have relied upon, shows that in
11 Miller Creek the mean of nine samples is approximately 60
12 percent above the criterion. Of 30 samples from out-
13 falls, half the values are more than five times the
14 criterion, even with the effect of composite reporting.
15 What that does is suppress the effect of the stream
16 values, if you composite the numbers, then the fliers all
17 come down, low fliers come up and you have more of a
18 middle ground that represents all the numbers.

19 The downstream receiving water statistics in that
20 particular case I do not think are meaningful because of
21 this composite reporting. And this is one of the few
22 examples we have where outfalls and upstream stream
23 concentrations and downstream stream concentrations are
24 all reported in the same place.

25 Table 23 of that same document shows that in Des

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1 Moines Creek half of 12 samples are at least 12 percent
2 above the water quality standard. Of 40 different
3 samples from outfalls, half of them are at least 5.6
4 times the criterion, in other words, 560 percent larger
5 than. Of 56 downstream receiving water samples, half are
6 at least 44 percent above the criterion.

7 If the copper concentration in the receiving water
8 is above the water quality standard and the port's
9 outfalls discharging into that same receiving water are
10 above the water quality standard, the port stands in
11 direct violation of the water quality standards.

12 Another example is in the port's first dissolved
13 oxygen deicing report which was completed in 1999, there
14 are a number of metals concentrations that were
15 represented in that report that are above the prevailing
16 criterion that applied in the receiving waters.

17 A third example comes from the port's annual
18 stormwater monitoring report for 2001 as a summary of the
19 data over a period of several years there. The NPDES
20 composite sampling data shows a scatter of many
21 concentrations above the water quality criterion
22 essentially no matter what hardness you assume, even if
23 you assume as much as 100 milligrams per liter of
24 hardness in the water, the criterion is still quite a bit
25 below the values that you find scattered above that.

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1 Q. I'd like to ask just to have you reference the exhibits
2 here. May I approach. You've been talking about a
3 stormwater receiving report, and I'm putting in front of
4 you Exhibit 426, which is in the black deposition
5 exhibits volume.

6 A. Yes.

7 Q. Is that the receiving water report that you were just
8 discussing?

9 A. Yes.

10 Q. And I'll have you take a look also at Exhibit 584.

11 MS. COTTINGHAM: As long as we are stumbling
12 over ourselves, let's make sure that the original
13 versions of all of the exhibits don't get routed around
14 and misplaced here.

15 THE WITNESS: Those tables 22 and 23 are on
16 pages, respectively, 38 and 39, if that would help.

17 MR. YOUNG: Of which?

18 THE WITNESS: Of the stormwater receiving
19 report, 426.

20 Q. And I'll have you also take a look at Exhibit 6. Well,
21 it's not down here.

22 MR. POULIN: It's a deposition exhibit.

23 MS. OSBORN: Does anyone know where Deposition
24 Exhibits 1 through 28 are? We're missing a volume here.

25 MR. STOCK: Would it be possible to stop the

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1 clock?

2 MS. COTTINGHAM: You may stop the clock. I
3 notice this earlier, as volumes went from that table
4 elsewhere so --

5 MS. OSBORN: It's the first deposition exhibit
6 binder.

7 MS. COTTINGHAM: Before we start the clock
8 again, what I am going to suggest is that we get a copy
9 of an original stamp and perhaps someone over the next 24
10 hours could stamp the originals so they don't get --
11 maybe I'll give it to Andrea.

12 Start the clock and we'll go back.

13 MS. OSBORN: Thank you.

14 Q. And I've placed in front of you Exhibit 6, which is out
15 of the first volume of deposition exhibits. Is that the
16 2001 annual stormwater monitoring report you just
17 referenced?

18 A. Yes, it is.

19 Q. And just very briefly, what's the information contained
20 in there that you just testified about?

21 A. The information in that document is NPDES composite
22 sample data 9-1-94 to 6-3-01. It is roughly pages 100
23 and so on.

24 MR. YOUNG: What is the exhibit number on
25 that?

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THE WITNESS: Exhibit 6.

Q. And I'm going to have you take a look at Exhibit 1128, which is in the yellow binder, Volume 10.

MR. PEARCE: What was the exhibit number in Volume 2?

MS. OSBORN: I don't think we used Volume 2. I was mistaken.

MS. COTTINGHAM: What exhibit number?

MS. OSBORN: I thought it was -- it's not what I said, so -- the deicing study, is that in a separate spot?

MS. COTTINGHAM: That is 1128.

MR. STOCK: Miss Cottingham, I'm worried about our crucial minutes ticking away and the original exhibit provided by the port isn't in the volume. Can we stop the clock to get a copy in front of the witness or maybe an adjustment at the end of the day?

MS. COTTINGHAM: Why don't you stop the clock while we figure out why that volume doesn't have --

I will tell you what, this is a really good opportunity for us to perhaps stop the questioning of Dr. Willing that would allow you to continue in the morning.

Before we adjourn for the day, you are available to come back tomorrow for testimony?

THE WITNESS: Yes, ma'am.

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1 MS. COTTINGHAM: Why don't you tell me how
2 much time is remaining on the clock.

3 MR. POULIN: The time elapsed on the
4 appellant's clock is two hours, 41 minutes, 43 seconds.
5 The time elapsed on respondent's clock, two hours, seven
6 minutes, eight seconds.

7 MS. COTTINGHAM: Okay. Shall we talk about
8 the order of witnesses for tomorrow?

9 MR. PEARCE: Could I raise one thing before
10 Mr. Willing packs. Mr. Willing is obviously reading from
11 a paper. I would ask that he either not read and not use
12 that paper, or that he provide us with a copy of it
13 pursuant to Evidence Rule 609. A witness can certainly
14 use a paper to refresh his recollection, if that's what
15 he is doing, but then we have a right to it under
16 Evidence Rule 609, to take a look at it and cross examine
17 him.

18 MS. COTTINGHAM: Do you have a response to
19 that?

20 MS. OSBORN: Tomorrow we will have Mr. Willing
21 testify from his memory without using notes.

22 MR. PEARCE: Could we have the portion that he
23 used today?

24 MS. COTTINGHAM: Are you using your own
25 personal notes or are you reading from your prefiled

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1 testimony?

2 THE WITNESS: Basically a digest of my prefiled
3 testimony. It's everything that's in --

4 MS. COTTINGHAM: Could you make a copy of what
5 he read from today and distribute it to the parties?

6 MS. OSBORN: Yes, we will do that.

7 MS. COTTINGHAM: So, with that in mind, ACC's
8 list and order of witnesses for tomorrow will be --

9 MR. STOCK: The order of witnesses will be we
10 will finish with Dr. Willing and then have Greg Wingard
11 followed by Dr. Kavazanjian who is coming from
12 California, and then Dr. Strand.

13 MS. COTTINGHAM: And then you will rest, with
14 the exclusion of rebuttal witnesses.

15 MR. STOCK: Yes, and David Garland and --

16 MS. COTTINGHAM: Are you going to call David
17 Garland?

18 MS. OSBORN: We're not calling Garland.

19 MR. STOCK: We are seeking to exclude him.

20 MS. OSBORN: That's the end of our case.

21 MR. STOCK: And the deposition designations.

22 MR. EGLICK: And whatever direct testimony we
23 may elicit from witnesses called by the other side as
24 we're questioning them, so -- because we had established
25 in the prehearing we could do that.

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1 MS. COTTINGHAM: Right, exactly. So then who
2 as between the port and Ecology will then go? Excuse me,
3 Mr. Poulin, do you plan to call independent witnesses?

4 MR. POULIN: CASE does not intend to call any
5 direct witnesses.

6 MS. COTTINGHAM: Okay. Who as between the
7 port and Ecology is going to go first?

8 MR. YOUNG: Ecology.

9 MS. COTTINGHAM: And what order of witnesses
10 are you going to call tomorrow?

11 MR. YOUNG: Kevin Fitzpatrick, Ed O'Brien, Dave
12 Garland.

13 MS. COTTINGHAM: And that will take you
14 through tomorrow? Are those the only witnesses you're
15 going to call?

16 MR. YOUNG: At that point the order becomes
17 more difficult because of availability.

18 MS. COTTINGHAM: We did agree in the
19 prehearing order that you would give the for-sure list
20 for the next day and a tentative order for the following
21 day, so if we could get --

22 MR. YOUNG: So you want for --

23 MS. COTTINGHAM: For Friday.

24 MR. YOUNG: After that it would be Chung Yee
25 and Ching-Pi Wang.

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1 MR. PEARCE: That just came off your prefiled.
2 I don't know if things have changed.

3 MR. YOUNG: The only thing that has changed is
4 Kelly Whiting not around, so we have to move him. And
5 then after Ching-Pi Wang it would be Katie Walter and
6 Eric Stockdale.

7 MS. COTTINGHAM: So let me ask you a question.
8 If at the end of tomorrow, if by three o'clock tomorrow,
9 you're finished with, depending on the outcome of my
10 ruling on the motion in limine, but if you're through
11 with Garland, will you be able to call Yee and Wang? Are
12 they close enough by?

13 MR. YOUNG: I believe they are, yes.

14 MS. COTTINGHAM: So we could proceed down your
15 list on Friday.

16 MR. YOUNG: Yes, that would be my expectation.

17 MS. COTTINGHAM: I don't think we need to know
18 from the port who you plan to call tomorrow because
19 you're not going to get the opportunity.

20 MR. PEARCE: I wish we could get there, but I
21 am afraid not.

22 MS. COTTINGHAM: I would appreciate if
23 Mr. Stock and Mr. Young could go out in the hallway,
24 there's a flip chart, and if you could do the order list
25 like this so that we can have it for tomorrow, just put

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1 it up here.

2 And with that, unless there's anything else for the
3 good of the order, we will stand adjourned.

4 MS. OSBORN: The Garland motion you indicated
5 you will rule tomorrow morning or at noon tomorrow; is
6 that correct?

7 MS. COTTINGHAM: I'll do it before Mr. Garland
8 is called. Is he here in town?

9 MR. YOUNG: In Bellevue.

10 MS. COTTINGHAM: I will try and issue a ruling
11 first thing in the morning, but he won't be called until
12 after lunch, I assume. You can shift the order around
13 perhaps.

14 MR. YOUNG: We have got four ACC witnesses,
15 so --

16 MS. COTTINGHAM: Knowing before the noon hour
17 is acceptable to getting him down here?

18 MR. YOUNG: Should be.

19 MS. COTTINGHAM: Okay. We won't call him
20 without his presence here, how about that.

21 [Laughter]

22 MS. COTTINGHAM: And with that, we stand
23 adjourned.

24 (Hearing adjourned at 5:00 p.m.)

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C E R T I F I C A T E

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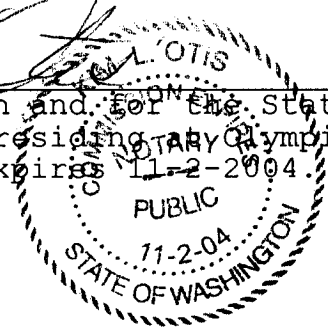
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COUNTY OF THURSTON)

I, Kim L. Otis, a duly authorized Notary Public and Certified Court Reporter in and for the State of Washington, residing at Olympia, do hereby certify:

That the annexed and foregoing Transcript of Proceedings, consisting of pages 3-0001 through 3-0228, was reported by me and later reduced to typewriting by means of computer-aided transcription; that said transcript as above transcribed is a full, true and correct transcript of my machine shorthand notes of said proceedings heard on the 20th day of March, 2002, before the Pollution Control Hearings Board.

WITNESS MY HAND AND OFFICIAL SEAL this 29th day of April, 2002.

Kim L. Otis
Notary Public in and for the State of Washington, residing in Olympia. My commission expires 11-2-2004.


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