

Commission of Inquiry into the Decline of
Sockeye Salmon in the Fraser River



Commission d'enquête sur le déclin des
populations de saumon rouge du fleuve Fraser

Public Hearings

Audience publique

Commissioner

L'Honorable juge /
The Honourable Justice
Bruce Cohen

Commissaire

Held at:

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701 West Georgia Street
Vancouver, B.C.

Monday, June 13, 2011

Tenue à :

Salle 801
Cour fédérale
701, rue West Georgia
Vancouver (C.-B.)

le lundi 13 juin 2011

APPEARANCES / COMPARUTIONS

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No appearance	Rio Tinto Alcan Inc. ("RTAI")
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No appearance	Seafood Producers Association of B.C. ("SPABC")
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Tim Leadem, Q.C.	Conservation Coalition: Coastal Alliance for Aquaculture Reform Fraser Riverkeeper Society; Georgia Strait Alliance; Raincoast Conservation Foundation; Watershed Watch Salmon Society; Mr. Otto Langer; David Suzuki Foundation ("CONSERV")
No appearance	Area D Salmon Gillnet Association; Area B Harvest Committee (Seine) ("GILLFSC")

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No appearance	West Coast Trollers Area G Association; United Fishermen and Allied Workers' Union ("TWCTUFA")
No appearance	B.C. Wildlife Federation; B.C. Federation of Drift Fishers ("WFFDF")
No appearance	Maa-nulth Treaty Society; Tsawwassen First Nation; Musqueam First Nation ("MTM")
No appearance	Western Central Coast Salish First Nations: Cowichan Tribes and Chemainus First Nation Hwlitsum First Nation and Penelakut Tribe Te'mexw Treaty Association ("WCCSFN")
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APPEARANCES / COMPARUTIONS, cont'd.

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No appearance	Laich-kwil-tach Treaty Society Chief Harold Sewid, Aboriginal Aquaculture Association ("LJHAH")
No appearance	Musgamagw Tsawataineuk Tribal Council ("MTTC")
No appearance	Heiltsuk Tribal Council ("HTC")

TABLE OF CONTENTS / TABLE DES MATIERES

	PAGE
PANEL NO. 43	
DOUGLAS HILL (Affirmed)	
In chief by Ms. Baker	4/49/50/52/56/61
Cross-exam by Mr. Timberg	65
Cross-exam by Ms. Rowbotham	75/77
Cross-exam by Mr. Leadem	80/93
ROBERT GRACE (Affirmed)	
In chief by Ms. Baker	3/33/48/50/51/53/60/61/62
Cross-exam by Ms. Rowbotham	77/78
Cross-exam by Mr. Leadem	80/92/93
Cross-exam by Ms. Brown	95/98
JANICE BOYD (Affirmed)	
In chief by Ms. Baker	2/5/30/32/33/59/61/62/63
Cross-exam by Mr. Timberg	64/66/67/72
Cross-exam by Mr. Leadem	81/82/87/92/94
Cross-exam by Ms. Brown	94/96
Cross-exam by Mr. Timberg (cont'd)	100
MICHAEL HAGEN (Affirmed)	
In chief by Ms. Baker	2/5/29/31/33/34/60/62
Cross-exam by Mr. Timberg	64/66/67
Cross-exam by Mr. Leadem	81/86
Cross-exam by Ms. Brown	96/99

EXHIBITS / PIECES

<u>No.</u>	<u>Description</u>	<u>Page</u>
PPR15	Policy and Practice Report, Municipal Wastewater, Pulp and Paper and Mining Effluents, May 24, 2011	1
1021	<i>Curriculum vitae</i> of Michael Hagen	2
1022	<i>Curriculum vitae</i> of Janice Boyd	2
1023	<i>Curriculum vitae</i> of Robert Grace	3
1024	<i>Curriculum vitae</i> of Douglas Hill	4
1025	Regulatory Information Submissions System (RISS) Overview	12
1026	National Assessment of Pulp and Paper Environmental Effects Monitoring Data: Findings from Cycles 1 through 3	22
1027	Improving the Effectiveness and Efficiency of Pulp and Paper Environmental Effects Monitoring: A Smart Regulation Opportunity, December 2005	25
1028	Website printout "Smart Regulation Initiative for Environmental Effects Monitoring, Environment Canada's Response to Working Group's Report"	25
1029	National Assessment of Cycle 4 Data from the Pulp and Paper Environmental Effects Monitoring Program, January 30, 2009	26
1030	Upper Fraser River Environmental Effects Monitoring (EEM) Cycle Five Interpretive Report, March 2010	28
1031	Hagen et al, Environmental Response to Decreased Dioxin and Furan Loadings from British Columbia Coastal Pulp Mills	32
1032	Summary Review of Performance of Metal Mines Subject to the <i>Metal Mining Effluent Regulations</i> in 2009, September 2010	40
1033	Metal Mining Environmental Effects Monitoring Review Team Report, August 2007	44
1034	National Assessment of Phase 1 Data from the Metal Mining Environmental Effects Monitoring Program	46
1035	Permit and cover documents for Cariboo Pulp and Paper Company	49
1036	Permit and cover documents for Gibraltar Mines Ltd.	50
1037	Compliance Activity Tracking Sheet-Mining (Cariboo Region)	58

EXHIBITS / PIECES

<u>No.</u>	<u>Description</u>	<u>Page</u>
1038	Clean, Safe Water-Implementing Sustainable Practices in the Pulp and Paper Industry, A 10-year Path to Success	73
1039	BC Pulp and Paper Mills Maps - Update to Figures 1 and 2 in Colodey et al	74
1040	Holmes, Review of Thompson River Partnership Monitoring Report, Nov 30 2010	79
1041	Health Canada, Environmental and Workplace Health, Effluents from Pulp Mills using Bleaching - PSL1	90
1042	Genetic Toxicity of Pulp Mill Effluent of Juvenile Chinook Salmon (<i>Oncorhynchus Tshawytscha</i>) Using Flow Cytometry	90

Vancouver, B.C./Vancouver
(C.-B.)
June 13, 2011/le 13 juin 2011

1
2
3
4
5 THE REGISTRAR: The hearing is now resumed.

6 MS. BAKER: Thank you, Mr. Commissioner. Today we're
7 dealing with effluents from pulp and paper
8 operations and mines, metal mines in the province.
9 We have four witnesses here from B.C. and Canada:
10 Mr. Doug Hill and Mr. Bob Grace, Ms. Janice Boyd
11 and Mr. Mike Hagen, and perhaps we can start with
12 having these witnesses sworn.

13 THE REGISTRAR: Good morning. Can you just turn your
14 microphones on, please. Thank you.

15
16 DOUGLAS HILL, affirmed.

17
18 ROBERT GRACE, affirmed.

19
20 JANICE BOYD, affirmed.

21
22 MICHAEL HAGEN, affirmed.

23
24 THE REGISTRAR: Would you state your name, please.

25 MR. HILL: Douglas Hill.

26 THE REGISTRAR: Could you speak up and into the mike.

27 MR. HILL: Sorry. Douglas Hill.

28 THE REGISTRAR: Thank you.

29 MR. GRACE: Robert Grace.

30 MS. BOYD: Janice Boyd.

31 THE REGISTRAR: Thank you.

32 MR. HAGEN: Michael Hagen.

33 THE REGISTRAR: Thank you. Counsel.

34 MS. BAKER: Thank you. Mr. Commissioner, I'd like to
35 start by marking the Policy and Practice Report
36 that was prepared for this section of the
37 hearings. It includes Pulp, Paper, Mining and
38 also Municipal Wastewater, which will be dealt
39 with on Tuesday and Wednesday. So this report was
40 dated May 24, 2011 and I'd like that marked,
41 please, as the next policy and practice report.

42 THE REGISTRAR: That will be PPR number 15.

43 MS. BAKER: Thank you.

44
45 PPR15: Policy and Practice Report, Municipal
46 Wastewater, Pulp and Paper and Mining
47 Effluents, May 24, 2011

2
PANEL NO. 43
In chief by Ms. Baker

1 EXAMINATION IN CHIEF BY MS. BAKER:

2
3 Q I'll start with you, Mr. Hagen. Could you have
4 put Mr. Hagen's c.v. up, please, it's at Tab 1.
5 Thank you. Is that your c.c., Mr. Hagen? It
6 should be on the screen in front of you.

7 MR. HAGEN: Okay.

8 Q That's your c.v.?

9 MR. HAGEN: That is my c.v., yes.

10 MS. BAKER: Okay, thank you. I'll have that marked,
11 please.

12 THE REGISTRAR: Exhibit number 1021.

13
14 EXHIBIT 1021: *Curriculum vitae* of Michael
15 Hagen
16

17 MS. BAKER:

18 Q Thank you. And I'll just review a couple of
19 points from it. From 1992 to the present you've
20 been with Environment Canada in the Natural
21 Resources Sector; is that right?

22 MR. HAGEN: Yes, that's correct.

23 Q Okay. And you began working with the ***Pulp and***
24 ***Paper Mills Regulations*** in 1996, right through to
25 2002?

26 MR. HAGEN: That is correct, yes.

27 Q Okay. And you have then transferred into
28 responsibility for mines in the province in 2002
29 and would have been the Regional Coordinator under
30 -- for EEM under the mines regulations since then?

31 MR. HAGEN: Yes, that is correct. I could clarify one
32 point, though. In 1992 the EEM Regional
33 Coordinator was Alan Colodey, and in about 1996 Al
34 became Section Head and at that time I became the
35 EEM Regional Coordinator. I was assisting Al
36 prior to that.

37 Q Thank you.

38 MR. HAGEN: Janice also became a coordinator at that
39 time.

40 Q Thank you. I'll move next to Ms. Boyd. And your
41 c.v. is in Tab 34. Is this your c.v.?

42 MS. BOYD: Yes.

43 MS. BAKER: I'll have this marked, please.

44 THE REGISTRAR: Exhibit number 1022.

45
46 EXHIBIT 1022: *Curriculum vitae* of Janice
47 Boyd

June 13, 2011

1 MS. BAKER:

2 Q And you have been with the Environment Canada
3 since quite a ways back, but I'll just focus on
4 your time working with the pulp regulations.
5 Since 1996 you've been involved in administering
6 the pulp regulations; is that right?

7 MS. BOYD: That's correct.

8 Q And as --

9 MS. BOYD: Sorry, the Environmental Effects Monitoring
10 part of the pulp mill regulations.

11 Q Thank you. You're the EEM Coordinator, or you've
12 been an EEM Coordinator since what time?

13 MS. BOYD: It was about '96/'97 there was a transition.

14 Q Okay. And you've been doing it ever since?

15 MS. BOYD: Yes.

16 Q Okay, thank you. And your work is restricted,
17 then, to pulp and paper, and Mr. Hagen looks after
18 mines, that's the separation?

19 MS. BOYD: That's correct.

20 Q All right. Thank you. I'll next move to Mr.
21 Grace, and your c.v. is at Tab 35; is that right?

22 MR. GRACE: Yes, that's my c.v.

23 MS. BAKER: Thank you. Can I have that marked, please.

24 THE REGISTRAR: Exhibit number 1023.

25

26 EXHIBIT 1023: *Curriculum vitae* of Robert
27 Grace

28

29 MS. BAKER:

30 Q And you're in the Environmental Protection of the
31 Ministry of the Environment, unless it's changed
32 in the last couple of weeks.

33 MR. GRACE: No, we stayed the same.

34 Q Okay, good. And you started your career with the
35 province as a Waste Management Technician for
36 Pollution Prevention in 1976?

37 MR. GRACE: That's correct.

38 Q And in 1984 you became an Environmental Impact
39 Assessment Biologist for the Division in Kamloops?

40 MR. GRACE: Yes.

41 Q And you've been there since 1984 doing that work?

42 MR. GRACE: I did have a few short stints as Acting EQ
43 Section Head.

44 Q Okay. And part of your work as an Environmental
45 Impact Assessment Biologist is to conduct and
46 supervise water quality and biological and
47 physical monitoring for the Division in the

1 Thompson-Nicola area?

2 MR. GRACE: That's correct, and also in the Fraser
3 area, basically from Boston Bar, not including
4 Boston Bar, up to about Watson Creek.

5 Q And in that work you look at impacts from both
6 pulp and paper mills and mines; is that right?

7 MR. GRACE: That's correct, and anything else that we
8 deal with.

9 Q Okay, thank you. And then lastly Mr. Hill. Mr.
10 Hill's c.v. is at Tab 2. Is that your c.v.?

11 MR. HILL: Yes, it is.

12 MS. BAKER: Could I have that marked, please.

13 THE REGISTRAR: Exhibit number 1024.

14
15 EXHIBIT 1024: *Curriculum vitae* of Douglas
16 Hill
17

18 MS. BAKER: Thank you.

19 Q And you have an Engineering degree from UBC, Mr.
20 Hill?

21 MR. HILL: Yes.

22 Q And you've been the Head of the Environmental
23 Management Section at the Province in Williams
24 Lake since 2002?

25 MR. HILL: Yes, for the Cariboo Region.

26 Q And prior to that from 1998 to 2002 you were a
27 Senior Environmental Protection Officer in that
28 region?

29 MR. HILL: Yes.

30 Q Okay. And you are responsible for provincial
31 environmental management activities in the region,
32 in that role; is that right?

33 MR. HILL: Yes.

34 Q And in your prior work, and perhaps today, you are
35 also involved in negotiating terms and conditions
36 of permits?

37 MR. HILL: Yes.

38 Q And that would include -- and your work includes
39 both pulp mills and mining, mining activities?

40 MR. HILL: Yes. We deal with two pulp mills in Quesnel
41 and three operating mines in the region.

42 Q Thank you. My questions will start with questions
43 for Environment Canada. In these hearings we've
44 learned about the **Fisheries Act** and s. 36 of the
45 **Fisheries Act**, and I just wanted to identify that
46 there's two regulations under that, under s. 36 of
47 the **Act** which are of interest for today's hearing.

1 The first one is the **Pulp and Paper Effluent**
2 **Regulations** and the second is the **Metal Mine**
3 **Effluent Regulations**. I could direct that to you,
4 Mr. Hagen?
5 MR. HAGEN: Yes, that is correct.
6 Q Thank you. And the **Pulp and Paper Effluent**
7 **Regulations** came in first; is that right?
8 MR. HAGEN: The **PPER** were promulgated in 1992.
9 Q Which is prior to the mines regulation?
10 MR. HAGEN: And the **MMER** came into effect in 2002.
11 Q Okay. Ms. Boyd, I want to talk to you about pulp
12 to start, and I've got a couple of corrections to
13 make in the PPR on this front. So my first
14 question to you is how many mills are there on the
15 Fraser system?
16 MS. BOYD: There are seven mills.
17 Q Okay. And in our PPR we've got the wrong number
18 in there, so I just want to take you to that. If
19 you can turn to page 67, paragraph 182 identifies
20 that there's ten --
21 MS. BOYD: Oh, this one.
22 Q It should be on the screen in front of you.
23 MS. BOYD: Oh, okay.
24 Q Thank you. That's fine. So paragraph 182
25 identifies ten. So that should be seven?
26 MS. BOYD: That should be seven, correct.
27 Q Okay.
28 MS. BOYD: There's two in Prince George, two in
29 Quesnel, there's two in near Vancouver and the
30 Lower Mainland instead of five.
31 Q Okay. And the one near Kamloops.
32 MS. BOYD: That's correct.
33 Q Okay. And in the -- if we go to the footnote for
34 that paragraph, footnote 355, just to confirm. So
35 Northwood Pulp Mill and Prince George Pulp and
36 Paper Mills-Canfor Ltd., those are correct?
37 MS. BOYD: That's correct.
38 Q And those are the ones near Prince George. And
39 the next two that are near Quesnel are Quesnel
40 River Pulp and also Cariboo Pulp and Paper
41 Company?
42 MS. BOYD: Mm-hmm.
43 Q Is that right?
44 MS. BOYD: That's correct. I guess I was just going to
45 correct --
46 Q Mm-hmm.
47 MS. BOYD: -- just make a comment on the Prince George

1 and -- Prince George mills are two mills side-by-
2 side in one pipe, so we count them as one.
3 Q The Northwood and Prince George?
4 MS. BOYD: No, the Prince George pulp mills, there's
5 two, Prince George and Intercon.
6 Q Oh. I see. So Prince George Pulp and Paper
7 Mills-Canfor Pulp Limited Partnership, that's two
8 mills with one effluent discharge?
9 MS. BOYD: Sorry, Canfor, it's Canfor Prince George
10 Intercon Pulp Mills. They sometimes just
11 collectively call them Prince George Mills.
12 Q Okay.
13 MS. BOYD: Sorry, for the (indiscernible - overlapping
14 speakers).
15 Q That's fine. We want to be clear, so thank you.
16 Then we just looked at Cariboo, so the next one is
17 Cellulose Fibres-Domtar Pulp and Paper, that is
18 the one near Kamloops, that's correct?
19 MS. BOYD: That's correct. The name is actually
20 shorter now, just Domtar Products Inc. will be
21 sufficient.
22 Q Okay.
23 MS. BOYD: A recent name change.
24 Q Okay. And then we have written down here:
25
26 ...five mills operate near Vancouver.
27
28 Well, I'll just go through those. You've already
29 said there's two. So I'll just make that
30 correction. And there's Norampac Burnaby-Cascades
31 Canada, that's correct?
32 MS. BOYD: Yes, that's correct.
33 Q And then the next one, Buckeye Canada, is that
34 wrong?
35 MS. BOYD: Buckeye can come out. That's not a pulp
36 mill under the regs.
37 Q Okay. And the Kruger Products, we have indicated
38 that -- first of all, Kruger is one of the ones
39 near Vancouver?
40 MS. BOYD: That's correct.
41 Q And we have indicated that it has three locations;
42 is that wrong?
43 MS. BOYD: It just has one pulp mill location.
44 Q Okay.
45 MS. BOYD: The others might be a furnish source, like
46 trees.
47 Q Okay, thank you. And then paragraph 183 of the

1 PPR identifies mills on the shores of the Strait
2 of Georgia and other marine areas. And I
3 understand that Gold River is not correct, that
4 should be taken out?

5 MS. BOYD: Yes. It was -- it was closed by 1998.

6 Q Okay. And then also Squamish and Elk Falls
7 closed. I understand Squamish is correct in
8 closing in 2006.

9 MS. BOYD: That's correct.

10 Q But Elk Falls actually closed in February '09; is
11 that right?

12 MS. BOYD: That's correct.

13 Q Okay, thank you.

14 MS. BOYD: But announced permanent closure in 2010.

15 Q Okay. Now, the mills that are identified in
16 paragraph 182 as we've corrected it, are those
17 mills all subject to the **PPER**?

18 MS. BOYD: Yes.

19 Q And this question could go to either Ms. Boyd or
20 Mr. Hagen. In 1992 when the new regulations came
21 in, this is the **PPER** that we're talking about,
22 what were the significant changes from the
23 previous regulations or scheme which governed pulp
24 effluent in the province, or in the country?

25 MS. BOYD: I was just going to take it for the pulp and
26 paper.

27 Q Okay.

28 MS. BOYD: The significant regulation that before that
29 regulation came in, there was less than ten
30 percent of the mills that were covered under the
31 regulation. And so this mill brought in all the
32 mills that discharged to an aquatic receiving
33 environment came under the regs, so essentially
34 all the mills across Canada.

35 It also significantly reduced the effluent
36 loads from that -- from the mill effluents in
37 terms of measuring suspended solids and measuring
38 biochemical oxygen demand, which is a relative
39 measure of the oxygen demand that that effluent
40 has on the system to break down.

41 It also required what is called a non-acutely
42 lethal effluent. It's a bioassay test, and that
43 meant that in doing rainbow trout in -- rainbow
44 trout fry in a 100 percent effluent, ten of them
45 are put in a tank and they have to live for those
46 four days, at least five of them live is what the
47 pass is, but generally all of them live these

1 days, after the regulations. Hopefully that's
2 clear.

3 Q Were there changes to regulation of dioxins and
4 furans?

5 MS. BOYD: There were two regulations that came in at
6 the same time that the 1992 **Pulp and Paper**
7 **Effluent Regulations** came in. And those basically
8 curtailed the release of dioxins and furans into
9 the receiving environment. The other addition I
10 forgot to note for the pulp and paper was the
11 requirement of an environmental effects monitoring
12 program to verify that these load limits were
13 adequate, and it's the first time in a regulation
14 that they have this verification in a national
15 reg.

16 Q Okay. And can I summarize the monitoring
17 components of the regulation as including
18 identification of the -- well, it prescribes the
19 biochemical oxygen demand limits, it prescribes
20 the limits of suspended solids, and also addresses
21 acutely lethal effluent. There's that first
22 component, correct?

23 MS. BOYD: Correct.

24 Q And then the next component is the requirement for
25 environmental effects monitoring, as you've just
26 described, and as we'll get into in some detail.

27 MS. BOYD: Yes, that's correct.

28 Q Okay.

29 MS. BOYD: There are other monitoring -- there are
30 other parameters in monitoring, monitor that those
31 were the -- the core parameters that you noted
32 were what have limits.

33 Q And you are the Environmental Effects management,
34 or Monitoring, excuse me, Coordinator, and what is
35 contained in that role, like, what do you do in
36 that role?

37 MS. BOYD: I advise the mills as required so that they
38 can meet the regulations of the Environmental
39 Effects Monitoring Program. I review all of their
40 submissions as required under the regulation and
41 make sure that they come in as required and
42 contain what's required. I provide that data to
43 the national office so that they can wrap up the
44 data into a national analysis so that we can work
45 towards determining if the regulations are
46 adequate, or whether we still see effects in the
47 receiving environment.

1 Q Do you ever attend at the mills to review
2 compliance?

3 MS. BOYD: Not for -- well, yes, the short answer is
4 yes. We do go out in the field to a select number
5 of mills to verify that they are undertaking the
6 program as prescribed in their design. I was also
7 thinking if I do attend the mills with Enforcement
8 who are looking at compliance from the effluent
9 discharge perspective.

10 Q Okay.

11 MS. BOYD: But they are lead in that.

12 Q And now this may not be an environmental effects
13 monitoring role, but are you also involved in
14 assessing applications for effluent discharge
15 authorizations?

16 MS. BOYD: I will prepare them, but there is a
17 designated Authorization Officer who would sign
18 those. But if I would receive the applications
19 and make a recommendation on what to authorize.

20 Q And your region is all of B.C.; is that right?

21 MS. BOYD: That's correct. I guess it's B.C. and
22 Yukon, but we only have mills in B.C.

23 Q Okay. And do you have any staff that assist you
24 in these responsibilities?

25 MS. BOYD: No.

26 Q All right. Just for reference, not to make
27 corrections this time, but for reference, if we
28 can turn to paragraph 167 of the PPR, which is on
29 page 61. We've summarized here the basic parts of
30 the regulation as I just identified with you
31 orally, and I just wanted to note that:

32
33 The [regulation] prescribes certain
34 deleterious substances in pulp and paper mill
35 effluent...

36
37 And those are -- that's under s. 3 of the
38 regulation; is that right?

39 MS. BOYD: Yes, that's correct.

40 Q And it includes --

41 MS. BOYD: (Indiscernible - overlapping speakers), yes.

42 Q -- acutely lethal effluent, so that's considered a
43 deleterious substance?

44 MS. BOYD: That's correct. So failing a 96-hour LC50
45 test with rainbow trout.

46 Q Okay. And the BOD matter, and that's the
47 biochemical oxygen demand. Can you explain what

- 1 that is and how is that a deleterious substance?
2 MS. BOYD: Well, it's -- what it defines in the
3 regulations is a limit at which they impose on
4 mills. So below that they don't consider that a
5 deleterious substance; above that is. But it's
6 essentially the organic matter that is -- it's a
7 measure of the demand of oxygen in the receiver
8 for that to break that down. So the higher that
9 is, the more that you're taking from the oxygen in
10 the system itself.
- 11 Q Okay. And then the last thing that's just
12 prescribed as a deleterious substance are
13 suspended solids?
- 14 MS. BOYD: Yeah, that's -- it's again, well, solid
15 and/or organic matter that again will have --
16 there's in some cases, it can cause a smothering,
17 and in some cases it has chemicals that are
18 attached to it that also bring contaminants into
19 the receiving environment.
- 20 Q Okay. And then page or paragraph 168 on the next
21 page of the PPR, just as a summary of the
22 regulation, describes the deleterious substances
23 that I've just reviewed with you, it prohibits the
24 discharge of acutely lethal effluent. It sets out
25 limits for BOD and TSS, which is total suspended
26 solids; is that right?
- 27 MS. BOYD: That's correct.
- 28 Q And these quantities are determined by a formula
29 that's set out in the regulation, as well as some
30 other conditions. So it's not simply a this
31 amount per millilitre, it's a formula that's
32 created?
- 33 MS. BOYD: It's a formula, so it's almost like a per
34 ton of product. So there's a formula that's
35 defined in the regulation. Each year the load
36 limits are set based on what's called the
37 reference production rate, and the reference
38 production rate is the highest 90th percentile in
39 the last three years.
- 40 Q Okay. And that regime sets out the authorized
41 discharges under the regulation, and anything
42 other than outside of those authorized limits is
43 considered, or could be considered an offence?
- 44 MS. BOYD: Yes.
- 45 Q Okay.
- 46 MS. BOYD: Unless they have an authorization that --
47 there's ability to also have an authorization that

- 1 may be different from s. 14, which is the standard
2 that most mills use.
- 3 Q All right. Can a more stringent monitoring of
4 these deleterious substances be required of a
5 mill?
- 6 MS. BOYD: Yes, there is capacity within the ***Pulp and***
7 ***Paper Effluent Regulations*** to have special -- I
8 don't know if it's still called "special
9 regulation", but within that, like, for example,
10 in the pulp and paper regs right now we have Part
11 2, which applies to one mill. So there's special
12 -- there's special limits for that particular
13 mill.
- 14 Q Is that the only mill where there's been a special
15 number set?
- 16 MS. BOYD: Yes.
- 17 Q Is that the Port Alberni mill?
- 18 MS. BOYD: That's correct.
- 19 Q Okay. And how often are the -- I take it, sorry,
20 that each mill needs to monitor in accordance with
21 the regulation these discharges, and I'm not even
22 sure how to describe them, but these parameters?
- 23 MS. BOYD: That's correct. It's defined in Schedule 2
24 in the reg when.
- 25 Q and how often are the results of that monitoring
26 reported to Environment Canada?
- 27 MS. BOYD: They're reported monthly, and they're
28 required to be reported within 30 days of the end
29 of a given month.
- 30 Q And how often do they actually have to do the
31 monitoring?
- 32 MS. BOYD: It depends on the parameter. Suspended
33 solids is daily; flow is daily; biochemical oxygen
34 demand is three times per week; the acutely lethal
35 effluent is tested once per month, and the Daphnia
36 magna toxicity test is once per week. Sorry, and
37 then there's pH and conductivity which are also
38 measured daily, and flow, if I didn't say that one
39 already.
- 40 Q You did. Thanks.
- 41 MS. BOYD: And production, sorry.
- 42 Q In Tab 4 of the Commission's documents is a
43 summary which outlines a system for reporting
44 which is called the Regulatory Information
45 Submissions System. It should be at Tab 4 of the
46 Commission documents. All right. And this, can
47 you explain what this system is, just in a general

1 overview sense?

2 MS. BOYD: It's an electronic database that mills can
3 enter their ***Pulp and Paper Effluent Regulations***
4 data into. This, for pulp and paper it doesn't
5 include the environmental effects monitoring data,
6 only the effluent data.

7 Q So the information that we have just been
8 describing is entered into this electronic system.

9 MS. BOYD: That's correct.

10 MS. BAKER: Could I have this marked, please, as the
11 next exhibit.

12 MS. BOYD: Exhibit number 1025.

13
14 EXHIBIT 1025: Regulatory Information
15 Submission System (RISS) Overview
16

17 MS. BAKER:

18 Q And this RISS system is also used under the mining
19 regulation; is that right?

20 MS. BOYD: That's correct.

21 Q And does this system, is it used to assess
22 compliance with the deposit limits under the
23 different regulations?

24 MS. BOYD: Primarily the inspectors and enforcement
25 will be using it for -- they will monitor the
26 compliance in there. I may look at the data
27 sometimes if I see something, because if I'm using
28 the data so I have access to it, as well. But
29 they are the primary users to monitor compliance
30 for their mills.

31 Q Okay. So this is the tool that's used to enforce
32 compliance essentially, or the initial stage of
33 enforcing it.

34 MS. BOYD: I think, yes, I was going to say the
35 inspectors going on site have to enforce
36 compliance, but definitely it's a tool that helps
37 them.

38 Q Okay. And has that electronic system improved
39 compliance, do you know?

40 MS. BOYD: That would be an enforcement question, but
41 to qualify it would -- it puts information at
42 their fingertips better, because it will come in
43 and then once it's into the system, then they can
44 -- the inspectors can look at it right away and
45 there are queries that allow them to pull up
46 specific violations. They'll say, you know, you
47 can ask if a given mill has exceeded limits, or it

- 1 will pull up that information. It's designed so
2 that it makes it easier for the inspector to see
3 if a violation occurs.
- 4 Q And are the results of that system or is the
5 system itself provided to the province to assist
6 in doing its work?
- 7 MS. BOYD: The short answer is the province would get
8 the same data, and actually more, because usually
9 they're more in the permits, but I don't believe
10 they have access, per se.
- 11 Q So the province gets the raw data, but they don't
12 get access to the electronic system that the data
13 is stored in; is that correct?
- 14 MS. BOYD: Theirs would be an electronic system also,
15 the province's.
- 16 Q But there's not a sharing of -- this kind of
17 monitoring data is not a shared database between
18 the province and Canada?
- 19 MS. BOYD: I don't believe it is right now, but there
20 is, I think that they're looking into options for
21 that, particularly as we extend the RISS system.
22 Like it started in Ontario and then it came to
23 B.C. and the Atlantic provinces. Quebec has a
24 different but similar system because there's a
25 provincial agreement and there are a couple of
26 provincial agreements for Alberta and
27 Saskatchewan. So there may be looking into an
28 option that could allow that, that sharing, but we
29 do get the same data already and both
30 electronically.
- 31 Q Do you get the data that's collected by -- with
32 reference to the provincial limits, which may be
33 different from the Canadian limits? Does all that
34 information come to you, as well?
- 35 MS. BOYD: We have copies of all the permits, so we
36 know what the limits are.
- 37 Q And does the monitoring data that's done in
38 relation to the provincial permits get forwarded
39 to Environment Canada, or do you just receive the
40 results that are required under the pulp
41 regulation?
- 42 MS. BOYD: That would be an enforcement question, but I
43 know that we -- they do receive -- they have
44 received monitoring data in the past. I'm just
45 not sure in what form it comes to them any more.
46 It used to come in hardcopy.
- 47 Q All right. I'm going to move to environmental

1 effects monitoring now. What does the -- you
2 touched a little bit on this in your introductory
3 answers, but can you just explain what the purpose
4 of EEM is?

5 MS. BOYD: The fundamental is to use science and verify
6 in the receiving environment that the load limits
7 that we put on the 1992 regulations were adequate
8 to protect all receiving environments for fish,
9 fish habitat, and use the fish resources. It was
10 -- like before we focused on end-of-pipe measures
11 to just measure when loadings dropped, but this
12 was an actual verification in the receiver that
13 those limits worked. So we're now working through
14 the process of evaluating the data that we've
15 collected for pulp and paper, and we're further
16 along in pulp and paper than we are for metal
17 mining, so we're coming up with our sixth cycle of
18 data. So we're about at the stage where we can
19 make that determination. But the fundamental is
20 then you can judge whether there needs to be
21 regulatory changes, although we have actually
22 evolved the program so that we get more
23 information and working towards fixing effects
24 that have been observed already.

25 Q Okay. And who does the monitoring?

26 MS. BOYD: The mills or the facilities for the mines
27 and the mills do the monitoring.

28 Q And you had said earlier that at times your
29 officer, you will go out to check that it's being
30 done correctly. Is that the EEM monitoring that
31 you will verify?

32 MS. BOYD: That's correct. Yeah.

33 Q And I understand that the components of EEM are
34 biological monitoring studies which include a fish
35 survey, and also a benthic invertebrate community
36 study, so those two components; is that right?

37 MS. BOYD: Yes. And also fish survey, and it's
38 prescribed in the regulation which they need to
39 do. Like, they may not need to do a fish survey,
40 for example, if they're not a chlorinated
41 bleaching mill and they don't meet the trigger
42 conditions. They don't require it. Similarly for
43 fish and benthic invertebrates for pulp and paper,
44 there are measurements. If your one percent
45 effluent, for example, is less than 250 metres
46 from the outfall you don't require a fish survey.
47 If it's less than 100 metres from the outfall, you

1 don't require a benthic survey. These didn't come
2 in from the start. They evolved in the program.
3 So after Cycle 1, we introduced the fish survey
4 exemption. For one reason it wasn't practical to
5 measure fish in that short distance because
6 they're moving around, and (2) it seemed unlikely
7 that there would be effects in that short
8 distance. And there were also some safety
9 concerns with just trying to measure the fish in
10 that -- in that small area.
11 Q Okay. But from a conceptual point, there's a fish
12 survey --
13 MS. BOYD: Yes.
14 Q -- and there's a benthic survey, those are both
15 biological studies that are done as part of EEM
16 with --
17 MS. BOYD: That's right.
18 Q -- adjustments made as you've described.
19 MS. BOYD: That's right. And a fish tissue survey, if
20 it's triggered.
21 Q And then also there's sublethal toxicity tests, as
22 well?
23 MS. BOYD: That's correct.
24 Q Okay.
25 MS. BOYD: I mean I guess I would just add that there
26 are, once you look at that data, that may take
27 you, if you see effects, to other phases in the
28 biological monitoring where you would find effects
29 and you go into the phase of investigating those
30 effects and investigating solutions.
31 Q Sure. Well, let me take you through it kind of
32 piece-by-piece, and then maybe we can go through
33 that in some detail. So first looking at the fish
34 survey, what -- that's first of all, as you
35 described, that's intended to assess effects on
36 fish themselves, right?
37 MS. BOYD: Yes.
38 Q And how is that -- how is that assessment done?
39 How is the assessment of effects done?
40 MS. BOYD: The mill or the mill's consultant, they look
41 at the common resident species, the ones that
42 would be exposed to effluent, and they target --
43 they target two. And sometimes two species,
44 abundant species aren't possible, so there may
45 only be one. But they find a fish species that's
46 basically living in the receiving environment in
47 the exposure area, and they measure core

- 1 parameters in the fish and exposure in reference
2 area and compare if there's a statistical
3 difference between the two.
- 4 Q Okay. And a reference area being an area that
5 doesn't have a pulp mill associated with it, but
6 has the same fish?
- 7 MS. BOYD: Yeah. Hopefully it's like upstream, you try
8 and do an upstream/downstream, or there may be
9 conditions if, like, for example, an invertebrate
10 species is used for a fish, as defined under the
11 **Fisheries Act**, it may be a gradient design. So
12 you're at the furthest, you go from a higher
13 exposure area to a lower no exposure.
- 14 Q Okay. And then the benthic survey, how is that --
15 that's done to assess effects on fish habitat as
16 opposed to fish?
- 17 MS. BOYD: Yes. It's benthic invertebrates or what the
18 fish may feed on. So the same idea of comparing
19 in a reference and exposure area, and there's core
20 parameters that are measured and compared to
21 determine if there's a statistical difference, and
22 high statistical gradient.
- 23 Q How often are the fish and benthic survey data
24 submitted to Environment Canada?
- 25 MS. BOYD: It's either every three years or every six
26 years, but initially they're on a three-year cycle
27 and they do the comparisons and evaluate the
28 effects parameters. If there is no effects in two
29 consecutive cycles, then they get -- they reduce
30 their monitoring to every six years.
- 31 Q Okay.
- 32 MS. BOYD: But if they have effects, then they maintain
33 that for years to move forward into investigation
34 of cause.
- 35 Q Okay. And what about sublethal toxicity tests?
36 What is that?
- 37 MS. BOYD: Sublethal toxicity tests include
38 invertebrate and plant species now. They
39 originally included fish, but what we found over
40 four cycles of data that from the improvements
41 that the mills made in their effluents we weren't
42 getting a response out of the fish anymore, so it
43 wasn't a valuable parameter to use any longer. So
44 that was dropped. It was a recommendation that
45 was put forward in the Smart Regulations Report
46 which was looking at the effectiveness of the
47 program in 2005.

1 Q And how often are the sublethal toxicity tests
2 conducted -- or how often are they conducted and
3 how often are the results communicated to
4 Environment Canada?

5 MS. BOYD: They're conducted twice a year and they're
6 reported within three months of completing the
7 test. Although there is a condition for once per
8 year if they're not depositing effluent less than
9 120 days of the year.

10 Q Now, there's a study design, is that right, that's
11 prepared for each mill to set up the study for EEM
12 or environmental effects monitoring?

13 MS. BOYD: Not necessarily -- well, each mill is
14 required to prepare one, but they may do it
15 jointly, such as in the Upper Fraser mills, the
16 Prince George and Quesnel mills do a joint study,
17 so they prepare their document together, but it's
18 all -- it's all in one, but they need the
19 requirements for individual mills.

20 Q And who designs this study, is it -- is
21 Environment Canada involved in designing the
22 study?

23 MS. BOYD: Well, the regulations lay out the
24 requirements and we also have technical guidance,
25 but the mill and the mill's consultants prepare
26 the document.

27 Q Do you review it once it's...?

28 MS. BOYD: Yes, we review it, and we're often involved
29 in an earlier stage just in consultation or we
30 have what's called local -- a local monitoring
31 committee. So we usually meet to discuss a
32 previous result to discuss the proposed design
33 before they submit a final design, just to look
34 at, make sure that they meet the requirements and
35 that they're on the right track.

36 Q And who participates in the local monitoring
37 committee?

38 MS. BOYD: It depends on a particular mill and where
39 the interest is, but fundamentally it includes
40 Environment Canada, and it used to include
41 Fisheries and Oceans, but the core governments,
42 Environment Canada and B.C. Ministry of
43 Environment, for example, and on a local
44 monitoring committee with Bob for the Kamloops
45 mill. And then it can also include ENGOs,
46 environmental groups or First Nations, depending
47 on the interest at a given mill.

1 Q Okay. The RISS system that we looked at earlier,
2 the electronic database, does that database
3 reflect the EEM data coming from the mills?
4 MS. BOYD: It's not for -- RISS doesn't include EEM
5 data for pulp mills, but it does include some EEM
6 data for metal mines.
7 Q Okay.
8 MS. BOYD: Which Mike can clarify.
9 Q Yes. We'll talk about mining, I think, once we
10 get through pulp.
11 MS. BOYD: Yes.
12 Q There's a lot of things to keep priorities right
13 here.
14 MS. BOYD: Yeah, yeah. Yeah, I'm sorry.
15 Q That's okay. Is there a compliance element to the
16 EEM monitoring, for example, would Enforcement
17 ever be involved in the EEM monitoring program?
18 MS. BOYD: Well, they could be. We would refer any
19 problems to them, but we haven't had problems to
20 refer to them at this stage.
21 Q And what, would they be problems with exceeding
22 limits or would they be problems with failing to
23 report data, or failing to use appropriate
24 methods, or what?
25 MS. BOYD: It would be either failing to report the
26 data or using appropriate methods, because the
27 limits are within the non-EEM part of the
28 regulation.
29 Q Okay. Now, as you said, this regulation has been
30 in longer than mining, and there's been some
31 national assessments of the data which I want to
32 review with you. After the first three cycles
33 there was a national assessment done and that is
34 in Tab 15.
35 MS. BOYD: Yes. Well, I don't have it on the screen,
36 but I have it in front of me.
37 Q Okay. Tab 15.
38 MS. BOYD: Oh, I have it on the screen.
39 Q All right. Okay. And so what were the first
40 three cycles -- this was looking at the three
41 cycles all across the country, if I understand it
42 correctly.
43 MS. BOYD: That's correct.
44 Q And what was the -- what was being looked at in
45 those first three cycles? What was the
46 expectation?
47 MS. BOYD: I guess I should clarify. This wraps three

1 cycles together, but we actually do a review after
2 every cycle, both of the data and how the program
3 was working so that we could -- like, for example,
4 after Cycle 1, which is the first time this had
5 been done in a national reg, so there were a lot
6 of problems and kinks to work out. So we actually
7 made the three-year cycle a four-year cycle, by
8 changing it by one year, just so that we could
9 take that time to do it, but we ultimately changed
10 it back to three.

11 So after Cycle 1, in doing this extensive
12 review, we amended the requirements and how the
13 study design worked so we could get good data in 2
14 and 3. So that actually -- so Cycle 1 was more
15 about getting the program working, the design
16 working properly. And then I think they used what
17 data they could from Cycle 1, but it was more like
18 preliminary sampling. And then Cycles 2 and 3 had
19 good sets of data that we could see trends in on
20 the core effects that we were seeing out of the
21 present mill pulp and paper effluent.

22 Q Okay. If I can ask you to look at the "Abstract".
23 There's just a couple of high level kind of
24 questions that I want to review with you. I don't
25 want to go into the report in a lot of detail.
26 But if you can turn to the "Abstract", which is on
27 Roman numeral iii, Can 5.

28 MS. BOYD: Okay.

29 Q And about seven lines down there's a sentence that
30 begins "The national average response", it begins
31 sort of the right-hand side of the paragraph.

32 MS. BOYD: Oh, right.

33 Q Okay.

34
35 The national average response pattern
36 measured for fish in both Cycles 2 and 3 was
37 one typically associated with nutrient
38 enrichment overlaid by metabolic disruption.
39 That is, exposed fish have consistently shown
40 evidence of increased food availability or
41 increased food absorption (fatter, faster
42 growing, with larger livers) together with
43 disruption of allocation of resources to
44 reproduction (smaller gonads).

45
46 So first of all, is that an observation that is
47 relevant to the mills in B.C.?

1 MS. BOYD: What we do is we look at them on an
2 individual basis. So there are definitely some
3 mills that show enrichment. Less so that show
4 what's metabolic disruption, and all that is is
5 just changing where they're putting their energy.
6 So they're putting less energy into reproduction
7 is essentially what the concern is. And then
8 there are mills that show no effects. And some
9 mills that don't require EEM any more because they
10 come within the exemption. So we have a mixed --
11 mixed results in B.C., but we're basically -- the
12 intent is to take the data that -- the national
13 data, so you get enough data to really look at
14 what the pulp mill effects are, and probably it's
15 harder to look on a region-by-region basis, so we
16 just look at what our individual mills say versus
17 the national results.

18 Q All right. So the -- there were mills in B.C.
19 that showed the responses that are identified in
20 the passage I just read?

21 MS. BOYD: yes. But more, more enrichment than the
22 smaller gonads.

23 Q Okay. And then the next line reads:

24
25 The average response for benthic invertebrate
26 communities in both Cycles 2 and 3 was
27 indicative of eutrophication, ranging from
28 mild to more pronounced, partly depending on
29 habitat type. More specifically, benthic
30 invertebrate communities exposed to pulp mill
31 effluent have commonly exhibited increases in
32 abundance, together with some combination of
33 increases, decreases or no change in taxon
34 richness, depending on the degree of
35 eutrophication.
36

37 Is that also indicative of the B.C. mills?

38 MS. BOYD: In some cases, but what we see here in B.C.
39 mills also is there was historical impacts, like
40 particularly on coastal mills, where you may have
41 had more smothering from fibre mats, but teasing
42 that apart, you're starting to see recovery
43 because of the fundamental changes in the mill
44 process or treatment. So we do see some
45 enrichment, but where it may have been more severe
46 was more historical, and then we tend to see
47 recovery. But there are some present day

1 enrichment mills causing enrichment also.

2 Q Okay. So the -- those two observations, the
3 enrichment that you see with the fish, and also
4 with the benthic community, are those of concern
5 to Environment Canada in B.C.?

6 MS. BOYD: I guess the short answer is we're not
7 concerned just because the way the process is
8 working, we're working towards solutions. Where
9 we started with, you know, the pulp mill
10 regulations and the EEM program, and hopefully
11 it's okay to use "EEM" just because it's ingrained
12 in my brain for 15 years now, but I'll try to be
13 careful with my acronyms. But we worked through
14 the process of trying to get good data, so that we
15 could determine if we have adequate regulations.
16 And then in the 2004 amendments to the regulation,
17 we added a component of investigating cause. So
18 if we saw effects in the mills, then there's a
19 requirement now to investigate that cause. And
20 then in the most recent -- well, at least the 2008
21 amendments, yes, in the most recent cycle we
22 introduced an investigation of solution.

23 So we're moving to the paths, we are seeing
24 some effects still in the receiving environment
25 from current pulp mill effluents but we have ways
26 of -- of working towards solutions to that. And I
27 don't know if you want me add to the investigation
28 of solution part.

29 Q No, I'm going to go to that as we move through the
30 review, so...

31 MS. BOYD: Okay, sure. Yes, sorry.

32 Q What -- were any steps taken, then, with respect
33 to the regulation following this national review
34 of Cycles 1 through 3?

35 MS. BOYD: Yes. Like that, and the step was we had
36 what was called a Smart Regulation Initiative,
37 which allowed some policy senior management people
38 in federal government, and industry, and there
39 were ENGOS and First Nation participants, to look
40 at the program and see what further needed to be
41 improved. And so they came up with
42 recommendations focusing on these two core
43 national results that were coming up, how we could
44 move towards focusing better on those, on fixing
45 those effects that we're still seeing in pulp mill
46 effluent.

47 MS. BAKER: Okay. Let me, before we move to that, let

22
PANEL NO. 43
In chief by Ms. Baker

1 me mark this national review that we've been
2 looking at as the next exhibit.
3 THE REGISTRAR: Exhibit number 1026.

4
5 EXHIBIT 1026: National Assessment of Pulp
6 and Paper Environmental Effects Monitoring
7 Data: Findings from Cycles 1 through 3
8

9 MS. BAKER:

10 Q I'm going to come to that smart regulation --

11 MS. BOYD: Okay.

12 Q -- document right now, but just one last question
13 before we leave this. Turning to CAN number 7,
14 page number 7, so it's Roman numeral iv in the
15 "Abstract", an "Executive Summary". In the fourth
16 paragraph it reviews some of the observations that
17 we just talked about, and it does say in the
18 centre of this paragraph that:

19
20 This metabolic disruption --

21
22 - which you said hasn't been showing up in B.C.
23 very much -

24
25 -- may include some aspect of endocrine
26 disruption associated with problems in
27 producing sufficient sex steroid hormones.
28

29 Do you see that line?

30 MS. BOYD: Yes.

31 Q Is that something that has been observed in B.C.?
32 And it's particularly on the Fraser system.

33 MS. BOYD: We have, I guess, we're at -- the short
34 answer is we're not seeing that in the -- we're
35 not seeing that trend very well. But I guess I
36 should also qualify on the marine side we've had
37 difficulty in evaluating fish species effectively
38 because the marine is just, you know, it's open,
39 it's an open ocean. And so it's hard to tell,
40 it's hard to do effective fish surveys, because
41 they were more designed for freshwater. And we
42 also have deep diffusers. But there is current
43 study that has -- that is going on right now, to
44 look at -- to focus on that particular effect and
45 how we can come up with a better tool to evaluate
46 it in the mills. And that's a large joint study
47 that involves FP Innovations - PAPRICAN, which is

1 the industry research arm, and some of our
2 Environment Canada sciences and some of academia,
3 too, and the mills are able to use this -- this
4 project to meet some of their investigation of
5 cause requirements under the regulation. And it
6 allows this -- a larger funding pool to better
7 evaluate where there are -- there may be endocrine
8 disrupting effects.

9 Q Okay. And when is that project expected to be
10 completed?

11 MS. BOYD: I think, well, they've -- they started in
12 Cycle 4, I'm not sure of the exact target date,
13 but they -- yeah, I could say, I mean, they're
14 kind of doing it in phases and coming up with
15 tools and trying to find causes. So there's
16 different components to the study. But offhand
17 I'm not sure where their target date is right now.
18 But within cycle 6, the cycle 6 is -- it could be
19 a three or six-year cycle for a given mill.

20 Q When we talk about the different cycles in these
21 national reviews, is it the assumption that
22 they're always a three-year cycle? Is that how
23 they're being measured, so it would be nine years
24 or ten years since the regulation came into effect
25 is when you did that national survey?

26 MS. BOYD: Yeah, Cycle 4 would have been 2003 to 2004,
27 and then Cycle 5 was -- wait a second, I'm
28 starting to lose track. We started Cycle 6 in
29 April 1st, 2010, so Cycle 5 was 2007 to 2010, and
30 Cycle 4 was 2004 to 2007.

31 Q Okay, thank you.

32 MS. BOYD: Sorry.

33 THE COMMISSIONER: Ms. Baker, could I just ask you for
34 the purposes of the record, the witness is saying
35 things like "we did something", or "they are doing
36 something". I don't know who "we" is and I don't
37 know who "they" are.

38 MS. BOYD: Good point.

39 MS. BAKER: Okay.

40 MS. BOYD: If I say "we", and I'll try and catch
41 myself, I generally mean Environment Canada. I
42 have to try and make sure, though, the distinction
43 in conducting the Environmental Effects Monitoring
44 Program, the mills are responsible for conducting
45 it. We evaluate the information. But there's
46 also, I guess, a "we" part in terms of evaluating
47 the information, the "we" is Environment Canada as

1 the regulator, and "we" in terms of trying to
2 improve the tools.

3 The study that I was just talking about for
4 the investigation of cause small gonads study is
5 probably more of a "they" in that it's -- some of
6 our Environment Canada research scientists, but
7 it's also the research arm of the mill, and it's
8 helping -- it's a tool for the mills to meet their
9 -- part of their requirement under the regulation.

10 MS. BAKER: Hopefully that explains it and I'll try and
11 listen for those as we go through.

12 MS. BOYD: And I'll try and do better.

13 MS. BAKER:

14 Q Tab 27 of the Commission documents is the report
15 of the Smart Regulation Review, or however you
16 want to describe it. This is what you were
17 talking about when you were talking about the
18 Smart Regulation Review?

19 MS. BOYD: That's correct.

20 Q Okay. And this was, as it clearly sets out in its
21 title, done to improve the understanding and
22 improve the effectiveness and efficiency of pulp
23 and paper environmental effects monitoring. You
24 indicated that this came as a result of different
25 stakeholders wanting to understand how the --
26 understand and assess the operation of the
27 regulations?

28 MS. BOYD: Yes. I mean, as we went along -- we,
29 Environment Canada, wanted to improve the -- how
30 the program was working. This provided the most
31 recent, I guess, opportunity, and it involved
32 multiple stakeholders who were interested in the
33 environmental effects from pulp mills. And so it
34 was the next opportunity to try and improve how
35 the program worked and to get -- and make sure we
36 were getting the right results.

37 Q And were changes made to the regulation following
38 that review?

39 MS. BOYD: Yes, there was recommendations made in here.
40 There were changes made to the regulations. There
41 were upgrades, improvements made to the technical
42 guidance, and there's still some ongoing, or in
43 progress, I guess I should say.

44 MS. BAKER: In Canada's list of documents, Mr. Lunn,
45 could Canada's list of documents Tab number 1,
46 just have that handy. If we can first mark this
47 review document that we've just got on the screen

25
PANEL NO. 43
In chief by Ms. Baker

1 before you take it off.

2 THE REGISTRAR: That will be Exhibit 1027.

3

4 EXHIBIT 1027: Improving the Effectiveness
5 and Efficiency of Pulp and Paper
6 Environmental Effects Monitoring: A Smart
7 Regulation Opportunity, December 2005

8

9

MS. BAKER:

10 Q And then Tab 1 of Canada's documents sets out a
11 printout from the website, which shows the
12 response to the Smart Regulation Initiative; is
13 that right?

14 MS. BOYD: That's correct.

15 MS. BAKER: We'll have that marked please.

16 THE REGISTRAR: Exhibit 1028.

17

18 EXHIBIT 1028: Website printout "Smart
19 Regulation Initiative for Environmental
20 Effects Monitoring, Environment Canada's
21 Response to Working Group's Report"

22

23 THE COMMISSIONER: So that's Canada...

24 MS. BAKER: Canada number 1.

25 THE COMMISSIONER: Canada 1.

26 MS. BAKER:

27 Q You have talked about investigation for cause.
28 Did that happen after Cycle 3, so and did it
29 relate to this Smart Regulation Review?

30 MS. BOYD: It was put into the regulation in 2004,
31 which occurred prior to the Smart Regulation
32 Initiative, which was in 2005. But what it did,
33 one of the recommendations regarded having this
34 larger joint study so that industry and Canada,
35 the research side, to try and work out this one,
36 the core effect, one of the core effects that was
37 being observed and that was the smaller fish
38 gonads or reduced reproduction.

39 Q Okay. So in 2004 specific approach was added to
40 the regulation which required people to
41 investigate cause, so where you would see an
42 effect which showed up under Cycles 1 through 3,
43 then there would be an opportunity for that
44 proponent or mill owner to investigate the cause
45 of that effect; is that right?

46 MS. BOYD: That's correct. It's a requirement, so if
47 they see -- they confirm an effect on two

1 consecutive cycles, then there's a requirement in
2 the reg to investigate that effect.

3 Q And have any studies been completed yet?

4 MS. BOYD: Yes. There were studies completed in Cycle
5 4, starting in Cycle 4.

6 Q Did any B.C. mills have to conduct investigative
7 cause investigations?

8 MS. BOYD: They did, but what we discovered in some of
9 them that it related to an historical effect.

10 That's not the case in all, because some were
11 moving into investigation of solutions, for
12 example. So mills with enrichment. But more on
13 the coastal mills tend to have -- there had been
14 historical effects because there was -- because of
15 the treatment or lack of treatment in place at the
16 time.

17 Q If you can turn to Tab 16 of the Commission's list
18 of documents. All right. And this document is
19 the same kind of assessment that we saw earlier.
20 This deals with assessment of Cycle 4 data; is
21 that right?

22 MS. BOYD: That's correct.

23 MS. BAKER: I'll have this marked, please.

24 THE REGISTRAR: Exhibit 1029.

25

26 EXHIBIT 1029: National Assessment of Cycle 4
27 Data from the Pulp and Paper Environmental
28 Effects Monitoring Program, January 30, 2009

29

30 MS. BAKER:

31 Q Thank you. And in this study were the same
32 conclusions that were observed with respect to
33 Cycles 1 through 3 seen, that you still had
34 increased growth rate and relative liver size and
35 decreased gonad size?

36 MS. BOYD: Generally speaking it was the same trend,
37 but an interesting shift was that there was a
38 shift in the small gonads, and part of that was
39 determined more likely to be because a component
40 of the mills were now in this joint study, so they
41 weren't out in the field measuring, they were part
42 of this joint study to evaluate the cause of the
43 effects. So it seemed to suggest that we were on
44 the right track in moving forward at that to focus
45 on the reduced reproduction.

46 Q So the mills that had the most serious effects in
47 Cycles 1 through 3 weren't actually assessed in

1 this phase 4 document.

2 MS. BOYD: Yes, that's correct.

3 Q Because they'd moved off to another study.

4 MS. BOYD: That's correct.

5 Q Okay. And was there anything of particular
6 significance to the B.C. mills, the Fraser River
7 mills in the Cycle 4 assessment?

8 MS. BOYD: I guess the short answer is some might not
9 have required EEM, if they had two consecutive
10 cycles of no effects, there were some mills that
11 actually did not require the EEM in Cycle 4.
12 Otherwise there were -- a lot of our investigation
13 of causes in Cycle 4, as I was saying, tended to
14 be trying to tease out what were historical
15 effects from present effects. And so they weren't
16 part of that joint study because they didn't
17 actually fit the criteria that were set to be part
18 of it.

19 Q But the seven mills that are on the Fraser system,
20 can you tell us which of them were going into an
21 investigative cause process, and which stayed on
22 the regular cycles?

23 MS. BOYD: The Weyerhaeuser mill -- sorry, old name.
24 Domtar Mill was on the track of investigating
25 cause and investigating solutions on a nutrient
26 scale, like a nutrient enrichment. But the -- the
27 Upper Fraser mills were having difficulty, we --
28 sorry, the mills were having difficulty
29 determining getting an adequate measure of the
30 reproductive parameter for the fish because the
31 species that was selected, which was a good
32 sentinel, which was large scale suckers, seemed to
33 -- but that they only spawned every other year.
34 So the fish looked like it was big enough but it
35 wasn't going to spawn that year, and you're trying
36 to sample your parameters on these fish just
37 before they're spawning.

38 So we haven't -- we hadn't got to the
39 investigation of -- an investigation of cause
40 phase there, because we were still working on
41 getting the adequate data for evaluating effects
42 on fish.

43 Q And would the Upper Fraser Mills include the
44 Prince George mills?

45 MS. BOYD: That's correct, yes.

46 Q And would it also include the Quesnel mills?

47 MS. BOYD: That's correct, those are the Upper Fraser

1 mills.

2 Q All right. And then in Cycle 5, there was this
3 introduction of a new concept, which is the
4 introduction of the investigation of solutions
5 component; is that right?

6 MS. BOYD: That is correct.

7 Q And what's the purpose of that?

8 MS. BOYD: I guess part of it was to address concerns
9 in our consultation process on the regs that
10 environmental groups and First Nations were
11 expressing that we hadn't -- we weren't addressing
12 effects. We were investigating the cause, but we
13 weren't addressing the solution. So this was
14 introduced in the regulation so that the next
15 phase after determining the cause, then they would
16 investigate a way to fix or to eliminate that
17 effect.

18 Q And are any of the B.C. mills at that stage? It
19 sounds like...

20 MS. BOYD: Yes, we have two that are doing that, that
21 are -- one's on the Fraser system, one isn't, but
22 two, it's for nutrient enrichment.

23 Q This is the Domtar?

24 MS. BOYD: Yeah, Domtar.

25 Q Okay. Now, the -- we do have the Interpretive
26 Report for Environmental Effects Monitoring for
27 the four mills in the Upper Fraser, and that was
28 released in March 2010. It's at Tab 13 of the
29 Commission's documents. So this shows as being
30 done for the Canfor Limited Partnership, Quesnel
31 River Pulp, Cariboo Pulp and Paper, but that's
32 actually four mills; is that right?

33 MS. BOYD: That's correct.

34 MS. BAKER: Okay. I'll have this marked, please.

35 THE REGISTRAR: Exhibit 1030.

36
37 EXHIBIT 1030: Upper Fraser river
38 Environmental Effects Monitoring (EEM) Cycle
39 Five Interpretive Report, March 2010
40

41 MS. BAKER:

42 Q Now, just it speaks for itself, and I'm not going
43 to, given our short time, I'm not going to go
44 through it in great detail. But I want to
45 understand a few things. Like, if you turn to
46 page 5-1, and I don't know what the PDF number for
47 that is, I'm sorry. So "Fish Tissue Analysis" --

1 whoops, there we go. "Fish Tissue Analysis" is on
2 page 5-1, and it indicates here that there was no
3 fish tissue analysis required. How was that
4 decision made?

5 MS. BOYD: It's based on the requirements in the
6 regulation. It stipulates that if dioxins and
7 furans in fish tissue exceed 15 picograms in the
8 muscle tissue, or 30 picograms per gram in the
9 liver, then it's required -- the mill is required
10 to conduct a fish tissue survey. Or if their
11 effluent exceeds -- if their effluent dioxins and
12 furans are measurable, then they are required to
13 do so. But generally the dioxins and furans regs
14 have eliminated the dioxins and furans, and so we
15 generally see no measureable dioxins and furans.

16 Q And when was the assessment done of fish tissue to
17 rule out that as a component, a regulatory
18 component for these mills? Would that have been
19 done on the first cycle, or the second cycle?

20 MS. BOYD: I'm trying to remember, sorry. Can I ask
21 Mike?

22 Q Yes.

23 MS. BOYD: Just because he was -- it was his mill at
24 the time, but I'm just thinking that they weren't
25 triggered in ever.

26 Q Certainly Mr. Hagen can answer this if it's -- if
27 he's got the information, absolutely.

28 MR. HAGEN: Yes, I can answer that. I'm just waiting
29 for the text to catch up a bit here, so I can see
30 what the question was.

31 Okay. I guess the question is response to
32 dioxin and furan monitoring, as we had a trend
33 monitoring program conducted all through the
34 1990s, which was about the time that Cycles 1 and
35 2 were being conducted. And there were no -- I
36 don't believe there were health advisory in the
37 Upper Basin of the Fraser River. There were
38 studies conducted. There were health advisories
39 issued in the Strait of Georgia for bottom fish
40 and for crab, and some of those they're still in
41 place.

42 I'm just checking to see if I've got the
43 question correct here. Perhaps you could rephrase
44 the question so that I can be clear on that.

45 Q Sure. I was -- Ms. Boyd had explained that they
46 weren't showing any fish tissue contaminant and I
47 asked when was that assessment done, because it

1 sounds like that is not -- no longer being done,
2 that there's no longer an analysis of fish tissues
3 to see if those contaminants are present. So when
4 was the last sampling done, and how can you rule
5 that out for the present.

6 MR. HAGEN: Okay. There is still sampling being
7 conducted in the Strait of Georgia for those mills
8 in the marine environment for Crofton and Harmac
9 and Port Mellon, and those are being conducted
10 every three years.

11 Q This is for the Quesnel and the Prince George
12 mills I'm asking about.

13 MR. HAGEN: I don't believe there is fish tissue
14 analysis going on in the Fraser Basin, that dealt
15 in the freshwater environment, no.

16 MS. BOYD: But ever, I don't think it ever was
17 triggered, that's...

18 MR. HAGEN: No, it was never triggered. No. The
19 monitoring was done under the National Lakes and
20 Monitoring Program initially, but to the best of
21 my knowledge it was never triggered under the EEM
22 provisions in the **PPER**.

23 MS. BOYD: Because it would have been below the limits.

24 Q Okay. It was below the limits always, is that
25 what you're saying?

26 MS. BOYD: Yes. Well, yeah, like once the regulations
27 came in, and they were under the regulations. I
28 don't believe they were ever triggered in to
29 having to do that, the dioxin and furan
30 monitoring.

31 Q All right. And then similarly on the following
32 page, which is 6-1, this is the "Benthic
33 Invertebrate Survey", it says that that is also
34 not being required for these mills, and how is
35 that assessment done?

36 MS. BOYD: That was done in the cycles before, so in
37 Cycles 2, 3 and 4, they would have looked at the
38 exposure and reference area and they would have
39 concluded that there were no effects in the core
40 benthic invertebrate parameters. So then in
41 response to what the regulations allowed, they are
42 able to not require another survey for six years.

43 Q Okay. So they're now on a six-year cycle for that
44 particular --

45 MS. BOYD: For that component.

46 Q Okay. So the only sampling that's being done
47 right now is the fish survey sampling; is that

1 right?
2 MS. BOYD: That's correct.
3 Q Okay.
4 MS. BOYD: And there is sublethal toxicity testing.
5 Q Right. And so was enrichment found in these
6 mills?
7 MS. BOYD: Yes, that was the general -- it was either
8 enrichment or there was no significant difference
9 in the core parameters but it was more of an
10 enrichment, notwithstanding the issues that we're
11 still trying to evaluate with the fishery
12 production.
13 Q All right. And is that why the mills are
14 undergoing the investigation of cause phase, or
15 are they in that...
16 MS. BOYD: These ones are still looking at the fish,
17 they were trying to evaluate the fish. They've
18 evaluated the other parameters for fish, but they
19 were having difficulty with the reproduction, so
20 that's where the -- this study was now focused.
21 Q Now, since the regulations were brought in has
22 there been an assessment by Environment Canada
23 generally about in particular looking at the
24 dioxin issue, has the control of dioxins been
25 effective since the regulations were brought in in
26 1992?
27 MS. BOYD: Yes. And I don't know if this might be a
28 better area for Mike, but the short is that it was
29 a significant drop in the dioxins and furans,
30 essentially 99 percent elimination from the --
31 basically the two, dioxins and furans regulations
32 under **CEPA**, but also the improvements that the
33 mills made under the **Pulp and Paper Effluent**
34 **Regulations** also contributed to those reductions
35 with better treatment.
36 Q All right. Mr. Hagen, you did a study, as well,
37 did you not --
38 MR. HAGEN: Yes.
39 Q -- with respect to dioxins and furans?
40 THE COMMISSIONER: Ms. Baker, would this be a good
41 place for the break?
42 MS. BAKER: I wonder if I -- I've got, like, one or two
43 questions and then I can finish pulp completely
44 and come back with mining. Would that be
45 possible? Okay.
46 Q So that study -- sorry, Tab 12 in the Commission's
47 documents. All right. You're the author of this

1 study that assessed the effects of --

2 MR. HAGEN: Yes, the lead author, yes.

3 Q And what was the general conclusion of that study?

4 MR. HAGEN: The general conclusion is essentially that
5 the measures brought in by the mills in response
6 to the regulatory package and the work they did
7 prior to that resulted in a 97 percent drop in
8 dioxin and furans or greater in effluent, and also
9 we measured a drop of 85 percent in crab or
10 greater, in other species of fish in the marine
11 environment. Talking about the environment here.
12 So all of those changes that the mills made in
13 their process resulted in significantly lower
14 levels in the environment that we measured.

15 MS. BAKER: I'll have that marked, please.

16 THE REGISTRAR: Exhibit 1031.

17
18 EXHIBIT 1031: Hagen et al, Environmental
19 Response to Decreased Dioxin and Furan
20 Loadings from British Columbia Coastal Pulp
21 Mills
22

23 MS. BAKER:

24 Q And I just want to finish up by asking about
25 concerns of significance currently in pulp mill
26 effluent and Fraser River sockeye, and I'll ask
27 you that, Ms. Boyd. What concern, or has
28 Environment Canada identified any concerns of
29 significance. We've talked about the enrichment
30 issue. Are there any other concerns of
31 significance with pulp mill effluent and Fraser
32 River sockeye?

33 MR. HAGEN: I'm just waiting for the caption to catch
34 up a bit.

35 MS. BOYD: Oh, was that to Mike? Sorry.

36 Q No, it was -- it was to you.

37 MR. HAGEN: It's real-time captioning, I'm relying on
38 this, but it takes a few seconds.

39 MS. BOYD: The short is that EEM per se doesn't
40 evaluate the sockeye. It's designed to look at
41 resident fish species. But I guess the potential
42 comparison is that the sockeye would only be in
43 the river for shorter periods of time, going up
44 through like past the mills when they're going up
45 to spawn, or coming down as smolts. So we target
46 the resident species because if we got no effects
47 by comparing the exposure and reference area, we

1 couldn't conclude that there were no effects
2 because they have less -- they were less exposed.
3 Q Are there any pulp mills discharging into rearing
4 lakes, rearing lakes for Fraser River sockeye?
5 MS. BOYD: Not to my knowledge.
6 Q Okay. And then on the PPR, paragraph 195, there's
7 a correction, I think to be made, page 71.
8 MS. BOYD: Could I just add on that --
9 Q Yes.
10 MS. BOYD: -- comment, just in -- Bob just suggested,
11 like, in Kamloops Lake, that would be one
12 potential. I didn't think they reared in there,
13 but then that would be a DFO question.
14 Q Okay.
15 MR. GRACE: Do you want me to elaborate?
16 Q Why don't I -- I want to get through this last
17 question with Ms. Boyd and I'll come back. I'll
18 just make a note to ask you that when I get to
19 those questions with you.
20 So paragraph 195, the last sentence of this
21 paragraph says:
22
23 The response of PBDEs to improvements in pulp
24 mill processes is not yet well understood.
25
26 Does Environment Canada understand that there are
27 PBDEs in pulp mill effluent?
28 MS. BOYD: The short answer is I recall seeing
29 something from our Environment Canada scientists
30 that suggested they didn't believe they were in
31 the pulp mill effluent, but I don't know what that
32 source is. The short of it is they may be, but
33 it's not an area that I know specifically.
34 Q Mr. Hagen, do you have anything, any other
35 information to assist there?
36 MR. HAGEN: What was the question?
37 MS. BOYD: Are you aware of the PBDEs in pulp mill
38 process.
39 MR. HAGEN: No, that's not my area, either, so I can't
40 really comment on that.
41 MS. BAKER: Okay, thank you. Those are my questions
42 for now, thank you.
43 THE COMMISSIONER: Thank you.
44 THE REGISTRAR: The hearing will now recess for 15
45 minutes.
46
47 (PROCEEDINGS ADJOURNED FOR MORNING RECESS)

(PROCEEDINGS RECONVENED)

1
2
3 THE REGISTRAR: The hearing is now resumed.

4 MS. BAKER: Thank you.

5
6 EXAMINATION IN CHIEF BY MS. BAKER, continuing:

7
8 Q Mr. Hagen, we're going to start talking about
9 metal mines now. First of all, how many mines,
10 metal mines on the Fraser system that are subject
11 to the **MMER**?

12 MR. HAGEN: Okay. We have seven mines that are
13 operating and in the Fraser basin, but just to
14 clarify, the **MMER** only regulates those mines that
15 are in commercial operation and are discharging
16 above a 50-cubic-metres-per-day threshold. Those
17 mines are the Huckleberry Mine on the Tahtsa Reach
18 of the far west end of the Nechako Reservoir, and
19 the Endako Mine at Fraser Lake, the Gibraltar Mine
20 at McLeese Lake, which is north of Williams Lake.
21 Those are all large open-pit operations. And a
22 small gold mine, very small, 120-tons per day,
23 Bralorne Mine, is also an **MMER** mine.

24 There are three operating mines that are not
25 subject to the **MMER** because they don't have a
26 discharge. But the Highland Valley Copper Mine
27 near Logan Lake, the Mount Polley copper open pit
28 near -- just south of Likely, and the QR Mine on
29 the Quesnel River. It's a small mine, I'm not
30 sure if it's actually open right now, but they do
31 plan to operate soon.

32 Now, there are also numerous operating
33 mineral and placer operations, and I'm not sure if
34 you want me to clarify that as well.

35 There are three mines that are listed as
36 metal mines in the PPR and I wonder if I should
37 just mention that those aren't metal mines,
38 according to us, or whether we can leave that.

39 Q Yes. Let's go to the PPR and deal with that. If
40 you can turn to page 75, please, of the PPR. So
41 first of all, paragraph 201 indicates that there's
42 six, but you've said there's seven, because you
43 have added the Bralorne mill into the list?

44 MR. HAGEN: Yes, add Bralorne to that list.

45 Q Okay. And Bralorne is located where?

46 MR. HAGEN: Bralorne is located at Bralorne, it's just
47 south of Gold Bridge on the Bridge River system.

1 Q Okay. And what is mined at Bralorne?

2 MR. HAGEN: Bralorne is an underground gold mine.

3 Q And there's a similar correction that should be
4 made at paragraph 265 on page 100, that should be
5 seven. And you would say that there's four that
6 are subject to the **MMER**, including --

7 MR. HAGEN: Yes, Bralorne is also subject to the **MMER**
8 at this time.

9 Q And was there something else you wanted to
10 correct? I thought you said that there were some
11 mines listed as metal mines that you didn't agree
12 with.

13 MR. HAGEN: This is actually in reference to Table 3-7,
14 which is appended at the back of the PPR. In that
15 table there are a couple of mines mentioned as
16 metal mines. One of them is Wingdam, which is on
17 Lightning Creek, downstream of Wells Barkerville.
18 The other is Keithley Creek north of Likely.
19 Those are placer operations. You don't consider
20 them mines.

21 Q Okay. Just to be clear, you're talking perhaps
22 about a technical report, rather than the PPR; is
23 that right?

24 MR. HAGEN: I'm not sure.

25 Q Okay.

26 MR. HAGEN: I'm talking about Table 3-7. It may well
27 be the technical report, because I haven't been
28 able to find that table again.

29 Q Yes.

30 MR. HAGEN: So, yes, you're probably correct on that.
31 I also wanted to mention Craigmont is listed
32 as a metal mine. It actually was a metal mine, a
33 copper open-pit mine that closed in 1983. And
34 just to clarify it's still in operation, reworking
35 the tailings of that facility, but we do not
36 consider it a mine. They're processing magnetite
37 out of the tailings, but it's not a mine under the
38 **MMER**.

39 Q Do any of the **MMER** mines that you've talked about,
40 Gibraltar, Huckleberry, Endako or Bralorne, do
41 they drain effluent into rearing lakes, sockeye
42 rearing lakes?

43 MR. HAGEN: Rearing lakes? Yes, I believe Endako has
44 discharges into a creek that drain into the
45 Francois Lake, and they also have discharges drain
46 into the Endako River, which subsequently drains
47 into Fraser Lake, and I'm not aware if those are

- 1 rearing lakes, but they are downstream lakes from
2 Endako.
- 3 Q Okay. And Highland Valley Copper, why is that not
4 an **MMER** mine?
- 5 MR. HAGEN: Highland Valley Copper is in a dry area and
6 they have a water deficit, so all the water in
7 their tailings pond is recycled to the mill, and
8 they don't have a discharge and they have not
9 triggered themselves into the **MMER**.
- 10 Q I understood that there was discharges into
11 Witches Brook at Highland Copper; is that not
12 right?
- 13 MR. HAGEN: I'm not familiar with that. It could be.
14 You know, I shouldn't speculate, so I'm not sure.
15 But they have informed us that they do not have a
16 discharge, and our inspectors have been on site
17 and they confirmed that, to the best of my
18 knowledge.
- 19 Q Are all the closed and abandoned mines in the
20 Fraser River known to Environment Canada?
- 21 MR. HAGEN: Short answer is probably not. There are a
22 considerable number of closed and abandoned mines
23 in the Fraser Basin. I am aware of 15 reasonably
24 large closed operations, and I know that there are
25 at least 12 more that are slightly smaller. I'm
26 not sure how much detail you would like me to go
27 in for that. Do you want me to discuss some of
28 these larger closed operations?
- 29 Q Well, first I want to ask you if abandoned mines
30 or mines that were closed prior to the **MMER** being
31 brought in are subject to the **MMER**.
- 32 MR. HAGEN: No, they're not. The **MMER** only applies to
33 mines that are operating. So mines that were
34 operating in 2002 were captured by the **MMER**.
- 35 Q Okay. And the conditions for a mine to be subject
36 the **MMER** is that they -- you indicated the
37 discharge amount, but they also have to discharge
38 into waters frequented by fish; is that right?
- 39 MR. HAGEN: That's correct, yes.
- 40 Q And if a mine becomes subject to the **MMER**, for
41 example, if at some point in its history it has
42 effluent discharge of 50 cubic metres a day, is it
43 then forever more subject to the **MMER**, even its
44 discharge limit -- or discharge averages go down?
- 45 MR. HAGEN: It is, yes. If a mine closes, it may apply
46 for a recognized closed mine status, which gives
47 the mine three years after they close to -- they

1 continue their monitoring for tree years and
2 conduct one more EEM program, and at that time
3 they may be a recognized closed mine, then subject
4 to the general prohibition of the **Fisheries Act** s.
5 36(3), but no longer subject to the **MMER**.
6 Q Okay. So for any mines that are not subject to
7 the **MMER** for whatever reason, because they were
8 closed or abandoned before the regs came in, or
9 because they go through a closing process under
10 the regulation, what does -- how does Environment
11 Canada become involved in dealing with discharges
12 from those, if there are any discharges?
13 MR. HAGEN: If there are any discharges from those
14 closed mines, then, well, they are still subject
15 to s. 36(3) of the **Fisheries Act** and our
16 inspectors may visit and sample there to see if
17 there's a problem.
18 Q Okay. Now, the **Metal Mining Effluent Regulations**
19 were modeled in large part on the pulp regulations
20 we've just been discussing with Janice Boyd,
21 right?
22 MR. HAGEN: Yes, that is correct. They are alike in
23 many things.
24 Q Okay. So perhaps you can simply tell us what the
25 differences are between the two sets of
26 regulations.
27 MR. HAGEN: Well, the essential difference is probably
28 that metal mining has a slightly different --
29 again for monitoring cycles, there's two aspects
30 of that. One that mines may be captured at any
31 time, so they tend to be out of step with each
32 other. Each mine will go through its phase on a
33 three-year cycle, to determine if there are
34 effects, and confirm the effects that they have
35 found, or confirm that they don't find effects.
36 If a mine does two cycles -- two phases, and does
37 not find or confirm effects on fish or benthos or
38 fish survey parameters, then they may do their
39 subsequent cycles in six years after that.
40 However, if they do find effects, and confirm
41 effects, then they're triggered into an extent
42 monitoring survey which is on a two-year cycle and
43 subsequent to that investigation of cause, like
44 again on a two-year timetable. So that's one
45 major change. There are differences in the way
46 the receiving environment effluents
47 characterization is conducted and reported. There

1 are some differences in the way the sublethal
2 toxicity is reported. But the philosophy and the
3 structure of the program is largely similar.
4 Q In the pulp regulation discussion we heard about
5 the investigation of solution stage. Is that
6 something that is contained in the mining
7 regulation?
8 MR. HAGEN: As I'm aware, at this point we have not had
9 that discussion yet, no.
10 Q All right. But the investigation of cause
11 component in the mining regs?
12 MR. HAGEN: Many metal mines now are moving into a
13 third phase and a fourth phase, and investigation
14 of cause is something that they will need to do.
15 So we are providing guidance and working out a way
16 for mines to note to do without that.
17 Q And what -- is there fish tissue sampling done
18 under the mining regs?
19 MR. HAGEN: Yes, the fish tissue survey is required if
20 any mine has a detectable mercury in their
21 effluent above threshold, and if they do detect
22 mercury in their effluent, then they're required
23 to sample mercury in fish tissue in the
24 environment.
25 Q The parameter of monitoring, the actual parameters
26 that are to be monitored are set out, and I think
27 a document that might be easiest to show this is a
28 document that I'm going to come to a little bit
29 later, but I'll introduce it now, and that's the
30 Summary Review of Performance of Metal Mines,
31 which is a very long document and we've just
32 included some excerpts relevant to the Fraser
33 System. So if you can just turn to the very back
34 of that excerpt, any of these pages relevant to
35 the mines will be fine, so you could turn to page
36 90, for example.
37 THE COMMISSIONER: Which tab are you at?
38 MS. BAKER: It's on the screen, so tab --
39 MR. LUNN: Tab 10.
40 THE COMMISSIONER: Tab 10, thank you.
41 MS. BAKER:
42 Q Tab 10, page 90, would be an example. If you turn
43 that so we can see it. The parameters that are
44 set out in the column on the left, right down to
45 -- let's just stop at the Rainbow Trout line. So
46 the parameters from the top, arsenic, I think that
47 the top one is, I could be wrong, down to "Flow",

- 1 those are set out in the regulation as parameters
2 to be measured in the effluent?
- 3 MR. HAGEN: Okay. What we're looking at here is the
4 parameter list, on the left column is the list of
5 deleterious substances from Schedule 4, and pH
6 range, and flow must be monitored weekly. The
7 acute lethality test, the **MMER** has the same
8 prohibition of acute lethality as the **PPER** does,
9 so we have that. And *Daphnia magna* is required to
10 be sampled.
- 11 Q Okay. How were those parameters determined, do
12 you know?
- 13 MR. HAGEN: These parameters are actually the ones that
14 were listed in the old **MMLER**, and before the **MMER**
15 were -- while the **MMER** were being developed prior
16 to 2002 we had a process called the AQUAMIN
17 process, which was a review of parameters, which
18 were in the old **MMLER**, and the decision was made
19 at that time just to incorporate the same
20 parameters into the **MMER**.
- 21 Q Okay. So in terms of compliance, the mines are
22 required to sample everything that's set out in
23 the parameters list on the schedule set out in the
24 regulation.
- 25 MR. HAGEN: Yes. The -- all mines are required to
26 sample these parameters weekly. There are
27 provisions in the regulations that if some of
28 these are non-detect, or at a very low level,
29 after a certain amount of sampling, 12 months or
30 whatever the period would be for the parameters,
31 the mine may reduce the frequency of monitoring
32 for some of these.
- 33 Q And these parameters are set nationally, is that
34 right, so these would be required for all mines in
35 the country.
- 36 MR. HAGEN: These are national level parameters, yes.
- 37 Q Okay. And so they're not necessarily reflective
38 of particular contaminants expected from an
39 individual mine.
- 40 MR. HAGEN: No, they're not. We -- it's a national
41 regulation, so the requirements are the same for
42 all mines.
- 43 Q Okay. Can additional parameters be required by
44 Environment Canada to be monitored at an
45 individual mine?
- 46 MR. HAGEN: Additional parameters are not required for
47 individual mines because it's not specified in the

1 regulation. We do have mechanisms where we may
2 recommend that additional parameters be monitored
3 and reported, but that's not a requirement, it's a
4 recommendation.

5 Q And does -- does Environment Canada work with the
6 province on developing additional parameters for
7 the sites that may be part of the --

8 MR. HAGEN: Yes, we do. We do.

9 Q -- the provincial system?

10 MR. HAGEN: Yes, we do. We have the same local
11 monitoring committee scheme with -- that Janice
12 spoke of, we have that for metal mines. So the
13 province, ourselves, and the mines and any
14 stakeholders that may be involved can discuss
15 which parameters should be part of the mine
16 monitoring program, so that all requirements are
17 met.

18 Q Okay. And the monitoring results from these
19 parameters that we see on the screen, those are
20 reported through RISS system, the same as the pulp
21 results?

22 MR. HAGEN: They are, yes.

23 Q Okay. And is the database treated the same way as
24 we discussed with respect to pulp for enforcement
25 purposes?

26 MR. HAGEN: Yes, it is.

27 MS. BAKER: Okay. I should mark this document that we
28 have in front of us as an exhibit. I'll come back
29 to it, but given that we've spent some time on it,
30 if we can have this marked, the Summary Review of
31 Performance of Metal Mines.

32 THE REGISTRAR: Exhibit 1032.

33

34 EXHIBIT 1032: Summary Review of Performance
35 of Metal Mines Subject to the *Metal Mining*
36 *Effluent Regulations* in 2009, September 2010
37

38 THE COMMISSIONER: While you're at it, Ms. Baker, just
39 on this table that you introduced, page 90, just
40 all of the tables that are at least in this tab, I
41 think all of them have "NMR", which means "no
42 measurement required", with the exception of the
43 table you introduced at page 90, which has, I
44 think, "ND" or do I have that correctly.

45 MR. HAGEN: Yeah, that will refer to the part of the
46 requirement I mentioned where if a mine fulfilled
47 certain requirements, their measurements are very

1 low, non-detect. For example, then they may go
2 onto a reduced monitoring frequency. So instead
3 of having to monitor every month, or every week,
4 and report a monthly average, they may be
5 monitoring quarterly. So during those months when
6 they don't monitor because they have achieved a
7 lower frequency of monitoring, we have that "NMR",
8 no measurement required, because they're on a
9 reduced frequency.

10 THE COMMISSIONER: Thank you.

11 MS. BAKER: Thank you.

12 Q And this document that we've just marked as
13 Exhibit 1032, is this published every year, this
14 summary document?

15 MR. HAGEN: This document is intended to be published
16 every year. It's published out of our Mine
17 Processing Division in Ottawa and their resources
18 may limit whether they actually do publish it
19 every year, but it's their document. So I know
20 they do try to do that.

21 Q That's the intention.

22 MR. HAGEN: That's the intention, yes.

23 Q Okay. And it's made public, this document is; is
24 that right?

25 MR. HAGEN: It's a public document, yes.

26 Q And if -- I take it if a mine has agreed to do
27 additional parameter monitoring on a
28 recommendation from Environment Canada, that
29 wouldn't actually show in this, this just sets out
30 the national required parameters?

31 MR. HAGEN: That is correct, yes. This document just
32 shows the basic requirements of deleterious
33 substance monitoring.

34 Q Okay. I'd like to move now to environmental
35 effects monitoring for mines. And we've covered a
36 few things already, so I won't need to deal with
37 them. But one thing we talked about with pulp was
38 reference sites, so that to do an examination of
39 effects, they would look at a reference site and
40 then the exposed site, and do a comparison. Is
41 that the same for metal mines?

42 MR. HAGEN: Yes, that is -- that is the same for metal
43 mining. It is a key concept in EEM that we
44 compare a exposed area to a reference area, and if
45 there are differences between exposed and
46 reference, that is our effect.

47 Q And are there -- we heard with the pulp that they

1 look for an upstream and a downstream site. Is
2 that a challenge for mines?

3 MR. HAGEN: It is indeed a big challenge in many cases.
4 The ideal situation would be a mine or a mill
5 discharging into a river. You use the downstream
6 of the diffuser as the exposed area, and upstream
7 as the reference area. But many mines, if they
8 discharge to headwater creeks, there is no
9 upstream. So it's a challenge to find appropriate
10 reference areas in that case.

11 Q Has that affected any of the results that have
12 been obtained under the program?

13 MR. HAGEN: It may challenge the interpretation of the
14 results, yes. If you are using a reference creek
15 that is in a different watershed, for example,
16 it's a challenge to filter out what might be
17 habitat effects or habitat reasons to explain the
18 effects. It may not -- if we have a difference
19 between a reference and exposed, is it the
20 effluent or is it a habitat issue. So that is one
21 question that we need to look at.

22 Q The parameter, effluent parameter monitoring is
23 published in this national document. Is there --
24 is there a similar publication of EEM results for
25 individual mines?

26 MR. HAGEN: Individual mines, as for pulp and paper,
27 issue interpretive reports each cycle, so that
28 data is in their individual interpretive reports.

29 Q And are those interpretive reports made available
30 on a website or another public way that access can
31 be made to those documents?

32 MR. HAGEN: Those interpretive reports are not
33 available electronically, but they are available
34 in Departmental library, for example.

35 Q All right. And how often are those interpretive
36 reports done, every three years?

37 MR. HAGEN: Well, as I explained, every three years for
38 the first two phases and then subsequent to that
39 would possibly be every two years if the mine is
40 triggered into a extent magnitude survey or an
41 investigation of cause survey.

42 Q Has there been any results to date from metal
43 mines -- interpretive reports for metal mines in
44 the province that show significant impacts on fish
45 from metal mine discharge? I'm talking here about
46 the Fraser River mines.

47 MR. HAGEN: Okay. You're speaking specifically of

1 Endako, Huckleberry and Gibraltar, that have
2 conducted EEM programs. Gibraltar has not yet
3 issued their first cycle interpretive report. I'm
4 expecting that next month. So I can speak to
5 Huckleberry and Gibraltar. And just to keep it
6 short, the Huckleberry results through their first
7 two surveys could not confirm that there were
8 effects on fish or benthos in that -- in the area
9 that they were sampling. So their third cycle
10 will be a -- they changed their final discharge
11 location, so this third cycle which they will be
12 doing this summer will be to double-check to see
13 if there were or were not effects.

14 Gibraltar, or rather Endako had conducted two
15 surveys and they are finding effects on both
16 benthos and fish, young of the year fish, they
17 conducted a juvenile rainbow trout survey of the
18 fish survey. Their general capsule summary of the
19 effects on benthos, they're finding an enrichment
20 effect, and in fish they tend to be finding an
21 inhibitory effect on rainbow trout, although
22 that's in some respects. In other respects it
23 seems to be enrichment and there's uncertainty
24 there whether it is a habitat issue or perhaps a
25 temperature issue with the water being a little
26 bit warmer.

27 Q And what is an inhibitory effect?

28 MR. HAGEN: An inhibitory effect would be depressed or
29 lower enrichment or a lower abundance or a
30 richness of benthic invertebrates, or in fish
31 endpoints, slower growth, less condition, smaller
32 sized at age would be inhibitory.

33 Q And Bralorne was another **MMER** mine you indicated
34 earlier. Has it just reopened or commenced
35 operations, why is there no reports for it yet?

36 MR. HAGEN: Bralorne, I'm just wondering what do I say
37 about Bralorne. There's a little bit of a dispute
38 there, whether they are actually are subject to
39 the **MMER** at this point. And they have not
40 submitted an interpretive report at this point.

41 Q But they have been in operation for some time?

42 MR. HAGEN: They operated for a couple of years in the
43 early 2000s and then they closed, and now they've
44 just reopened, and I think poured their first gold
45 bar just last month. So they've only just started
46 under that particular round of commercial
47 operation.

1 Q Similar to the pulp regulations, after the first
2 cycle of mining regulations, there was a review
3 done of the first cycle reports; is that right?

4 MR. HAGEN: That's correct, Just as the pulp and paper
5 regs have reviewed each cycle, to check to see
6 what's working, what's not working, we did that
7 with metal mining, as well.

8 Q All right. And that is at Tab 8, it's dated
9 August 2007.

10 MR. HAGEN: Yes.

11 Q Is this the document?

12 MR. HAGEN: Yes, this is the Metal Mining Environmental
13 Effects Monitoring Review Team Report.

14 MS. BAKER: Okay. I'll have that marked, please.

15 THE REGISTRAR: Exhibit 1033.

16

17 EXHIBIT 1033: Metal Mining Environmental
18 Effects Monitoring Review Team Report, August
19 2007
20

21

21 MS. BAKER:

22 Q All right. And if I can just turn to the
23 recommendations that were made, and these begin,
24 or they're summarized in the "Executive Summary"
25 beginning at Roman numeral iv. I'm just going to
26 ask you about a couple of these, there's many
27 recommendations. Go to the next page, please,
28 Recommendation number 11. Recommendation 11
29 indicates that the -- this is reflecting what we
30 had talked about earlier, that the site-specific
31 variables are not presently recorded in RISS; is
32 that right?

33 MR. HAGEN: Okay. I'm not as familiar with RISS as
34 some of us are, but I know that the RISS system
35 has been enhanced, updated over the last couple of
36 cycles and I believe they are including some of
37 these further recommendations. yes.

38 Q Okay. Number 15, so the next page, Recommendation
39 15 indicates that:

40

41 Both electrical conductivity and selenium
42 should be added to the list of required
43 effluent and water quality variables...
44

45

Has that been done?

46 MR. HAGEN: Some of these recommendations require an
47 amendment to the **MMER** and I do know that the

1 national EEM office is proceeding with this
2 regulatory package which would include
3 recommendations such as Recommendation 15.

4 Q So your understanding is that there is a proposal
5 to amend the regulation to include both electrical
6 conductivity and selenium as required parameters?

7 MR. HAGEN: Yes.

8 Q Okay. Number 20. Number 20 says that:

9
10 Regional coordinators should verify that
11 steps were taken by mines to ensure that
12 method detection limits (MDLs) recommended in
13 the Guidance for the Sampling and Analysis of
14 Metal Mining Effluents are attained when
15 reporting results.

16
17 What is this -- what's the issue here, and what's
18 been done about it?

19 MR. HAGEN: I have two comments about Recommendation
20 20. One is that one of the things we noticed
21 earlier on was that the method detection limits
22 for mercury were not being met, or we were pretty
23 close to the actual detection limits, the
24 detection limit was close to the threshold that we
25 were using to monitor compliance. So we
26 recommended that that be made more stringent. And
27 I have also noted that the recommendation -- the
28 recommended method detection limits in Schedule 3,
29 I believe, column 4, may be revised. some of them
30 were incorrect, so we have to do a bookkeeping
31 amendment to fix that.

32 Q And then Recommendation 23 says:

33
34 As the status quo is considered unacceptable,
35 Environment Canada should consider changes to
36 sublethal toxicity testing within the EEM
37 program.

38
39 What is that about?

40 MR. HAGEN: This was with reference to sublethal
41 toxicity, and this was the one recommendation out
42 of the 40 that was somewhat, I want to know if I
43 should say controversial, but the metal mine EEM
44 Review Team consisted of stakeholders and
45 industry, from environmental groups and from
46 government agencies, and each of these
47 stakeholders had different perspective of what

1 would be suitable in the program. So the one area
2 of disagreement within that team was the sublethal
3 toxicity. So we're still discussing that and
4 we're still working on what the move forward
5 should be.

6 Q What was considered -- why does it say the status
7 was considered unacceptable? What was
8 unacceptable about it?

9 MR. HAGEN: Well, I guess the essential thing to say
10 would be mine operators, for example, would like
11 to drop the fish test, whereas the environmental
12 groups would support keeping it. So we have that
13 kind of debate going on.

14 Q So for now it stays in as it is?

15 MR. HAGEN: For now it's still status quo, but the
16 options are being further assessed.

17 Q Okay. Tab 9 of the Commission's document list is
18 a December 2007 National Assessment of Phase 1
19 Data. How is this document different from the one
20 we were just reviewing?

21 MR. HAGEN: How does this document differ from the
22 Review Team document? Okay. This is the national
23 assessment which is conducted by the National EEM
24 Office. It's analogous to the national
25 assessments for pulp and paper that you discussed
26 with Janice. There's only been one so far. A
27 second one is -- it's complete, in translation,
28 and should be issued very shortly. So this
29 National Assessment of Phase 1 Data just looks at
30 the data and comes up with a national overview of
31 what the parameters are saying, what the
32 monitoring has suggested the effects are from
33 mining effluents.

34 MS. BAKER: Okay. I'll have that marked, please.

35 THE REGISTRAR: Exhibit 1034.

36
37 EXHIBIT 1034: National Assessment of Phase 1
38 Data from the Metal Mining Environmental
39 Effects Monitoring Program
40

41 MS. BAKER:

42 Q Were B.C. mines part of this national assessment?

43 MR. HAGEN: Yes, benthos data was included in the
44 national assessment, but when this national
45 assessment was done, a look at that data was taken
46 to ensure that the data were comparable on a
47 national basis. So fish tests in B.C. tended to

- 1 be non-lethal, juvenile fish surveys, and those
2 kinds of surveys were not included in the national
3 assessment, so (indiscernible - rapid speech) of
4 the fish, no, for B.C.
- 5 Q So to the extent effects on fish are described in
6 this report, do those have any relationship to
7 B.C., the status of fish in B.C., if our data
8 wasn't included in the report?
- 9 MR. HAGEN: Well, the national assessment would
10 indicate general trends, in any event. So if you
11 look at the site-specific results, it might be
12 different, even if the data had been included in
13 the national assessment.
- 14 Q Has there been any subsequent study -- oh, I think
15 you actually answered this already, when you said
16 this is the only one so far.
17 Have in this document it reports --
- 18 MR. HAGEN: Yes, there was a second assessment and it's
19 ready to be released very shortly.
- 20 Q Yes, sorry. Yes. This report does indicate some
21 effects on fish and on benthic invertebrates, and
22 that's set out in the "Executive Summary" at Roman
23 numeral iii. And I'll just -- at the very last
24 paragraph it says that for fish there were
25 significant reductions in condition and relative
26 liver size. And for benthic invertebrates it
27 shows significant reductions in density and taxon
28 richness. So with respect to both those trends,
29 is that something that has been seen on the mines
30 in B.C. in the Fraser system?
- 31 MR. HAGEN: Yes. This is a national scale conclusion.
32 So if you look at these results site specifically
33 in the Fraser system, the Huckleberry situation
34 would not support that because they have not
35 tended to find effects there. Endako capsule
36 results so far show both inhibition and enrichment
37 effects. So again the national level conclusion
38 will include the results like that, but it won't
39 necessarily explain exactly what's happening at
40 that site specific location. So Endako just
41 differs a little bit.
- 42 Q Okay. And what about Gibraltar?
- 43 MR. HAGEN: And Gibraltar has not issued their first
44 EEM interpretive report yet, so I don't know what
45 their results have found.
- 46 Q Okay. We heard from Ms. Boyd that she's the only
47 EEM Coordinator for pulp in B.C. How many mining

1 EEM Coordinators are there?

2 MR. HAGEN: Okay. We've got -- well, I'm the Metal
3 Mining Environmental Effects Monitoring Program
4 Coordinator for British Columbia mines, but we do
5 have a person in Yukon who covers the Yukon mine,
6 he's the EEM Coordinator for the -- for Yukon.

7 Q Do you have any staff that work under you?

8 MR. HAGEN: No.

9 Q Do you visit the mines yourself to see if they are
10 complying or working within the regulation?

11 MR. HAGEN: Yes, I do do conduct site visits on
12 occasion. The purpose of a site visit is to
13 essentially become more familiar with the area.
14 It helps to gain insight into what the results
15 are, and also to observe the environmental
16 consultants as they do their monitoring program.
17 Different consultants may be doing things in a
18 different way. So if you observe what they're
19 doing, you have a better idea of how that -- the
20 results may be interpreted or gain some insight
21 into different practices that way.

22 Q All right. And the document that we marked
23 earlier as Exhibit 1032 sets out compliance rates
24 across the country. Do you know what the rate of
25 compliance is for mines in B.C. with **MMER** regs?

26 MR. HAGEN: It's not really something that I follow
27 closely, but my impression is that the B.C. mines
28 are generally in compliance with most of the
29 parameters, or if they're not, it's usually a
30 relatively minor issue.

31 Q And what about reporting under the regulation. Is
32 that -- are the mines generally compliant with
33 sending in their data?

34 MR. HAGEN: They are, yes.

35 Q Okay. Thank you. I'm going to move now to some
36 provincial witnesses. Mr. Grace, you're an
37 Environmental Impact Biologist for the province.
38 What is that -- what are your responsibilities as
39 an Environmental Impact Biologist?

40 MR. GRACE: Well, there's two major parts to that job.
41 One is to conduct my own monitoring programs,
42 basically design them, conduct some of the
43 monitoring often with others to help, and tabulate
44 and assess the data and write reports. Probably
45 what's more relevant today is also do a lot of
46 impact assessment work, that involves review of
47 consultants reports both under the **Environmental**

1 **Assessment Act** under permits, and other
2 legislation, provincial legislation.

3 Q All right. And you had a comment that I deferred
4 you to make, which related to Kamloops Lake and
5 whether it was a rearing lake. What did you want
6 to add there?

7 MR. GRACE: Sure. Janice and I are involved in a
8 Thompson River monitoring partnership group, over
9 the last seven years, and as part of that we meet
10 annually and we have presentations from various
11 people. A couple of years ago we did have a
12 presentation from a DFO research scientist, who
13 had done studies on Kamloops and Mabel Lakes that
14 showed that there was some rearing of sockeye in
15 Kamloops Lake.

16 Q Thank you. Now, permitting of mines and mills in
17 B.C. is down under the **Environment Management Act**?

18 MR. GRACE: That is correct.

19 MS. BAKER: Okay. And we have a couple of permits just
20 for reference purposes that I'd like to mark, put
21 in the record, and the first one is at Tab 18, and
22 this is a mill permit for Cariboo Pulp and Paper.
23 It's got the cover documents and then the actual
24 permit begins in a few pages, there.

25 THE REGISTRAR: Exhibit 1035.

26
27 EXHIBIT 1035: Permit and cover documents for
28 Cariboo Pulp and Paper Company
29

30 MS. BAKER:

31 Q You recognize this permit, or you recognize it as
32 a permit issued under the **Environmental Management**
33 **Act**?

34 MR. GRACE: Yes, it's a permit issued under the
35 **Environmental Management Act** for Cariboo Pulp and
36 Paper located in Quesnel.

37 Q Thank you. And I have also a permit for
38 Gibraltar, which is a mine, and that's at Tab 20.
39 It should be the next -- there we go. Sorry, Mr.
40 Hill, this is -- you recognize this as a permit
41 for the Gibraltar Mine?

42 MR. HILL: Yes, that's an effluent discharge permit for
43 Gibraltar Mine.

44 MS. BAKER: Okay. So we'll have that marked, please.

45 THE REGISTRAR: That will be Exhibit 1036.
46
47

50
PANEL NO. 43
In chief by Ms. Baker

1 EXHIBIT 1036: Permit and cover documents for
2 Gibraltar Mines Ltd.
3

4 MS. BAKER:

5 Q All right. And turning first to the mill permit,
6 so this permit sets out the discharge limits, or
7 the discharge monitoring requirements, I should
8 say, and that's at page 8 of 13 of the
9 (indiscernible - background noise), so if you can
10 probably move down seven more pages on the screen
11 that should show us. Yes. All right. So the
12 permit sets out the exact parameters, or the
13 frequency, I should say, for monitoring.

14 "Authorized Discharges" are set out at page 3.

15 THE COMMISSIONER: So which tab are you on now?

16 MS. BAKER: The same tab, at page -- sorry, it's Tab
17 18, and page 3 sets out the authorized discharges.

18 MR. LUNN: Is that 3 or 13?

19 MS. BAKER: Yes.

20 Q That's correct?

21 MR. HILL: Sorry, me?

22 Q That's correct?

23 MR. GRACE: Sorry, I didn't catch your question.

24 Q This is the -- sets out the authorized discharges
25 under section 1?

26 MR. HILL: Yes, the first section of permits generally
27 set out the authorized discharges.

28 Q And then the monitoring frequency was the page I
29 had referred to earlier, which is page 12.

30 MR. HILL: The monitoring frequencies, et cetera, would
31 be in section 3 of the permit.

32 Q And then for Gibraltar, we should go there, as
33 well. The discharge limits are set out at page 2
34 -- well, it starts at section 1 on page 1, but
35 moves over, the actual table of discharges is on
36 page 2.

37 MR. HILL: Yes, that section there, 1.1.3 pertains to,
38 specifically to the discharge of effluent to the
39 Fraser River.

40 Q Okay. How are the conditions of permit
41 determined? So the different parameters that are
42 authorized as discharges and the monitoring
43 requirements, how are those determined? I'll ask
44 that to Mr. Hill.

45 MR. HILL: Well, generally speaking, the permit
46 discharge parameters would -- that an applicant
47 would apply for would be based on best available

June 13, 2011

1 technology numbers that might come from guidelines
2 documents, for instance. Then where would be an
3 assessment of whether or not they can attain or
4 the ambient guidelines. So and then from that
5 process there may be a need to come up with lower
6 numbers to ensure that ambient guidelines are met.
7 Q Mr. Grace, Mr. Hagen described the mines in the
8 Fraser system that are subject to the **MMER**. Are
9 there additional mines that you're aware of on the
10 Fraser system? Not mines subject to the **MMER**, but
11 just other mines?
12 MR. GRACE: Other mines. There are closed mines.
13 Q Okay.
14 MR. GRACE: I don't know of any other actively
15 operating mines.
16 Q Okay. And Mr. Hagen also answered some questions
17 about whether all the closed and abandoned mines
18 in the Fraser River Watershed are known. Do you
19 have anything to add there, do you have any other
20 information?
21 MR. GRACE: I suspect there's a lot of mines, closed
22 mines in the province, many of them a hundred
23 years old that we wouldn't be aware of them all.
24 Q Is it possible they would be discharging into the
25 water system?
26 MR. GRACE: Possible. We do know of several that we --
27 that are -- have become concerns that we've dealt
28 with.
29 Q Okay. And how do you deal with those mines, then,
30 that are closed or abandoned, that are of concern?
31 MR. GRACE: If they're orphan mines, which means that
32 there's no longer a company that has the -- has
33 liability for the mine, then we would have to
34 carry that all out by the government. If there's
35 still a mining company associated with that mine,
36 then we can approach them to correct matters, do
37 more monitoring, whatever.
38 Q Okay. Mr. Hagen also talked about Highland Valley
39 Copper. Is -- have you been to that mine site?
40 MR. GRACE: Many times.
41 Q And is it the case that there's no discharge?
42 MR. GRACE: It's -- I guess it depends on your
43 definition of what is a discharge, and Mike would
44 be the expert as far as the **MMER** goes. There are
45 several areas of the mine. It's basically an
46 amalgamation of four historical mines, and some of
47 the mining areas are now closed, and they have

1 discharges of seepage. There is no discharge from
2 the tailings pond directly, but there are seepage
3 systems under the -- below the tailings ponds that
4 are allowed to discharge to the environment, both
5 at the Highmont tailings pond site and the
6 Bethlehem site. But neither of those mining areas
7 are operational -- well, I take it back. The
8 Highmont was closed, but with the increase in
9 copper and moly prices, they actually reopened the
10 two open pits at Highmont, and first they drained
11 them, they were actually making them fishery
12 lakes, and so they drained them, took out the
13 rainbow trout and transplanted them to other water
14 bodies and re-mined the system. So the mine pits
15 themselves are active, but all the milling and
16 tailings pond are in the existing Highland Valley
17 Cooper mill.

18 Q And are there discharges from that?

19 MR. GRACE: There are again some seepages allowed to
20 discharge to the Witches Brook and to Dupuis
21 Creek. The issue there was that, I mean, the mine
22 would probably like to collect all that water
23 because it is a water short area, but what that
24 means is then you basically dry up your stream and
25 cause aquatic habitat loss. so we're trying to
26 ensure that relatively good quality water is
27 allowed to go down into that system and maintain
28 flows, maintain the fishery that's in there, or
29 the fish that in there, as well as the moose
30 habitat, wetlands, et cetera.

31 Q Are the fish that's in that creek sockeye salmon?

32 MR. GRACE: No. There's a fish barrier many kilometres
33 downstream.

34 Q Okay. And I guess this question is for Mr. Hill.
35 Does the province have a standard set of
36 parameters like we were looking at with federal
37 regulations that are monitored for every mill or
38 mine, or are they determined on a site-specific
39 basis?

40 MR. HILL: The monitoring parameters are determined on
41 a site-specific basis.

42 Q And how do you ensure consistency of environmental
43 protection when you do that on a site-specific
44 basis? What is the -- how do you know you've
45 identified and set the right limits to protect the
46 environment?

47 MR. HILL: Well, the monitoring parameters would be

1 generally be broader than just the ones that are
2 regulated. And as was mentioned earlier, when you
3 get metals, you get the entire suite of metals
4 that the lab is able to produce. And then the
5 environmental effects monitoring, biological
6 monitoring toxicity testing will also help to
7 identify if there was some other parameters that
8 might be causing a concern.

9 Q Do you work with Environment Canada
10 representatives to determine the parameters for
11 the site?

12 MR. HILL: When an application is made to us, it has
13 been referred to Environment Canada for their
14 input. And if they had some specific additional
15 parameters that they would want to see included in
16 a permit, that would be expected to be a part of
17 the application and we would include that in the
18 permit.

19 Q And, Mr. Grace, are the provincial biologists like
20 yourself involved in determining parameters in the
21 permits?

22 MR. GRACE: Yes, that's one of our main jobs when we
23 assess a permit application.

24 Q And what information do you use in providing that
25 advice?

26 MR. GRACE: Generally it would -- maybe I should step
27 back a bit. If it's a new mine, it would first
28 have to undergo the environmental assessment
29 process. And as part of that there would be a
30 fairly substantial environmental impact study done
31 before the mine actually is developed. Using that
32 data plus data that the mine would provide on
33 predicting metal levels in any effluents or
34 seepage, we can use that to assess potential
35 impacts from those. And it would also identify
36 metals of concern and other parameters, such as if
37 they use process chemicals, we may want to monitor
38 that, as well.

39 Q What's done with respect to endocrine-disrupting
40 chemicals from pulp mills?

41 MR. GRACE: Specifically with endocrine-disrupting
42 compounds, it's not really been something that
43 we've addressed much before. I mean, certainly if
44 they're a metal, then they're caught up in the
45 metal sampling.

46 Q And if they're not a metal?

47 MR. GRACE: I don't think it's been addressed up till

1 now.

2 Q If a biologist finds a concern in the monitoring
3 data, can recommended changes be made to the
4 permit? Can they recommend changes to the permit?

5 MR. GRACE: Yes, definitely we assess the reports that
6 are submitted by the mines and their consultants,
7 and as a result of that if there's an issue of,
8 you know, some metal that we think is a problem,
9 we could either change the monitoring program, or
10 alter the permit limits for the discharge, both
11 up, you know, either you're increasing or
12 decreasing.

13 Q And has that actually happened?

14 MR. GRACE: Many times.

15 Q Okay. And what do you do to assess the
16 effectiveness of the permit conditions? We've
17 heard about the environmental effects monitoring
18 that the federal regulatory program is doing. Do
19 you have a similar program in B.C.?

20 MR. GRACE: Our environmental effects monitoring
21 programs are very site specific. There is some
22 general talk between all the various environmental
23 impacts assessment biologists, but especially with
24 mines there's a lot of complexity and variability
25 in their impacts. The type of ore they're mining,
26 the type of waste rock that they may be in, the
27 type of mill process, and the environment itself
28 can be very different. You could be in a
29 headwater stream, an alpine area, or you could be
30 in a valley bottom where there's, you know,
31 discharge might be to something quite large.
32 There's also some areas where hardness is very
33 low, or in our area, hardness tends to be
34 relatively high. That can impact the impact of --
35 yes, I've got to use it twice, that can alter the
36 impact of the metals, they tend to be less toxic
37 with higher hardness.

38 Q So it's done on a site-specific basis. Is there a
39 process similar to what we've heard about as an
40 investigation of cause process that we've heard
41 with the federal regulations, or do you have this
42 reference site and exposed site comparison
43 concept?

44 MR. GRACE: Yes, we typically try and set up our
45 systems, I mean, environmental effects monitoring
46 is pretty much standard. The best situation is an
47 upstream/downstream situation. If that's not

1 possible, then you would look at finding a nearby
2 reference site that's as close as possible to what
3 you think an upstream site would be. The other
4 thing, which is also much better, is if you can
5 get a before disturbance and an after disturbance
6 situation, which is called BACI, which is
7 before/after; control/impact type of monitoring
8 program. And that way, if there is a difference
9 between your control and your impact site, you can
10 compare that to the before mine situation where
11 maybe that was something naturally that was
12 occurring and not a part of the mine, or
13 conversely, the two sites, upstream and downstream
14 were very similar before the mine, and now there's
15 a difference. So it makes your assessment much
16 more clear and easier to identify issues.

17 Q How many mines on the Fraser would have -- would
18 there be that would give you that ability, where
19 you'd have data to say this is what it looked like
20 before, and this is what it looks like now.

21 MR. GRACE: Well, Highland Valley Copper was developed
22 in the mid-'60s, so that was before our group was
23 even around. So we don't have a lot of pre-
24 discharge data there. The more recent mines we do
25 get a lot of pre-discharge monitoring, used
26 typically as part of the **Environmental Assessment**
27 **Act** process, or even just under exploration. We
28 have several well-developed exploration areas that
29 we actually have permits for, because they have
30 open pits and mine adits, and then have a
31 discharge. So I guess that could be considered a
32 post-mine monitoring, but often they'll -- often
33 the mines now will start monitoring even before
34 they come and talk to us, because they know they
35 have to.

36 MS. BAKER: All right.

37 THE COMMISSIONER: We'll take the break, Ms. Baker.

38 MS. BAKER: Mr. Commissioner, would we be able to come
39 back a little bit early before 2:00 today?

40 THE COMMISSIONER: I'll aim for ten to. I don't know
41 if I can make that, but I'll aim for that.

42 MS. BAKER: Okay, thank you.

43 THE REGISTRAR: This hearing is now adjourned until
44 1:50.

45
46 (PROCEEDINGS ADJOURNED FOR NOON RECESS)
47 (PROCEEDINGS RECONVENED)

1 THE REGISTRAR: The hearing is now resumed.

2 MS. BAKER: Thank you.

3

4 EXAMINATION IN CHIEF BY MS. BAKER, continuing:

5

6 Q I'll start again with you, Mr. Hill. How often is
7 monitoring data submitted to the province? I
8 should ask you, both mines and mills, if they are
9 the same. If they're different, you can tell us
10 which is which.

11 MR. HILL: The frequency of reporting generally
12 reflects the frequency that the sampling has to be
13 done. Pulp mill reports in our region are
14 generally submitted monthly and the mines are
15 submitting quarterly.

16 Q Is there a requirement in permits for mines or
17 mills to report non-compliance where they've done
18 monitoring and they've found that their mill or
19 their mine is not compliant with the permit. Are
20 they required to report specific non-compliance
21 to the Ministry?

22 MR. HILL: This isn't consistently done, but there are
23 some permits have a clause that requires reporting
24 of non-compliance. That's a new thing that's been
25 incorporated in some of the permits. All the
26 permits would have a clause that requires
27 reporting of emergencies, unauthorized discharges
28 and equipment malfunctions.

29 Q On the permits that you've negotiated, have you
30 ever included a term that the mine or the mill
31 must report non-compliance?

32 MR. HILL: Not to date, no.

33 Q For mines, quarterly results are submitted to the
34 province. That could result in quite a time lag
35 before the province would know there had been
36 exceedence. It could be 60 to 90 days if an
37 exceedence happened early in the quarter. Is that
38 a concern to you?

39 MR. HILL: Yes, potentially. We get a lot of
40 monitoring reports submitted to us with a lot of
41 data in there, and if it's not brought to our
42 attention, there may be a short lag before a non-
43 compliance is addressed.

44 Q And why do you have a quarterly reporting for
45 mines and a monthly reporting for mills? Why are
46 mines not reporting on a monthly basis?

47 MR. HILL: Most of the data collected is on a quarterly

1 or annual frequency and only some of the data is
2 on a monthly basis for the mines.

3 Q And why is that?

4 MR. HILL: Well, it's just generally that receiving
5 environment data for the creeks and the
6 groundwater are monitored at a quarterly frequency
7 and the actual discharge point is monitored more
8 frequently.

9 Q Okay. Why do you not have a more frequent
10 monitoring requirement for mines, then, in the
11 receiving environment?

12 MR. HILL: That's just the general practice. I guess
13 it would depend on -- for instance, groundwater
14 would be slower to respond to some kind of input
15 than other sources that you monitor.

16 Q But the mines would discharge into flowing water
17 as well as groundwater, surface water as well as
18 groundwater.

19 MR. HILL: Sorry, I couldn't hear what you said.

20 Q The mines would discharge into surface water in
21 addition to groundwater, right?

22 MR. HILL: Well, most of the mines don't have a direct
23 discharge. As Bob mentioned, they have maybe non-
24 point discharges, seepage from pits, et cetera,
25 and so they wouldn't all have direct discharges to
26 surface water.

27 Q They may not all, but certainly mines do discharge
28 into surface water.

29 MR. HILL: Yes, some do, yeah, and those are covered --
30 the ones that -- are covered by the metal mine
31 effluence rate.

32 Q Okay. Wouldn't it be helpful to have those data
33 from those mines reported on a more frequent basis
34 than every quarter?

35 MR. HILL: I suppose so. I guess we have to start to
36 balance it at some point, where we could have them
37 report daily or we could have them report weekly
38 or -- you know, I guess it's a convenience for
39 staff to get all the data for all the sites
40 submitted in one package. As I mentioned, we do
41 get a lot of data that comes in, and with
42 workloads, it's hard to get through all of that
43 stuff immediately.

44 There are clauses being developed for
45 reporting of non-compliance and it would be
46 helpful if there was some kind of a provincial-
47 wide policy that gave some direction as to how we

1 were to deal with developing clauses for reporting
2 of non-compliance. It's so far only been included
3 in some of the more recent permits, and there's a
4 number of different ways that that clause has been
5 drafted, so we haven't landed on one consistent
6 clause for reporting of non-compliance.

7 Q You heard today about the RISS electronic database
8 for recording monitoring results that the federal
9 government maintains. Were you aware of that
10 database?

11 MR. HILL: No, not previously.

12 Q Would that database provide the province with
13 useful information in its work?

14 MR. HILL: I don't know. I'm not familiar with what's
15 in that database, so I couldn't tell you. We do
16 have a system called EMS that is a repository for
17 monitoring data, and generally the labs that are
18 doing the analysis for the companies are
19 submitting the data straight from the lab to EMS
20 and I believe to the federal system as part of
21 their service that they provide.

22 Q Does the Ministry keep a record of compliance
23 activities in relation to permits?

24 MR. HILL: We have a spreadsheet that we use to record
25 when inspections at sites are done, when
26 monitoring report reviews are done, and that's
27 maintained by the Environmental Protection
28 Officers that do that work.

29 Q And we have an example of that at Tab 33 in the
30 Commission's documents. This is what you're
31 talking about?

32 MR. HILL: Yes, it is. That would be an example.

33 MS. BAKER: Could I have that marked, please?

34 THE REGISTRAR: Exhibit 1037.

35

36 EXHIBIT 1037: Compliance Activity Tracking
37 Sheet-Mining (Cariboo Region)

38

39 MS. BAKER:

40 Q And this will record not simply prosecutions but
41 all types of compliance work that is done in
42 relation to permits; is that right?

43 MR. HILL: Yeah, that's right. It records inspections,
44 so under the column where it says "Activity",
45 there's the "MDR" which is "monitoring data
46 review", and then there's "INS" which is
47 "inspection".

- 1 Q This is a question for both Mr. Hagen or Ms. Boyd
2 and the provincial witnesses. What information is
3 shared between the agencies? We've heard today
4 about some discussions on identifying relevant
5 parameters for the permits. What other results
6 are shared, or what other data is shared between
7 the province and the federal government on these
8 two different industries and their effluent
9 discharges?
- 10 MR. HILL: Well, I guess I'll go first. In my
11 experience, it's generally the larger reports and
12 the actual data is being reported, as mentioned
13 earlier, to the two separate databases.
- 14 Q So when you say the larger reports, would that be
15 like an interpretive report under the Metal Mines
16 Regulation?
- 17 MR. HILL: Yeah, the interpretive report or annual
18 reports that -- the mines that aren't covered by
19 MMR that have to submit annual reports under the
20 provincial permit.
- 21 Q So annual reports prepared by the province would
22 be shared with Environment Canada, and
23 interpretative reports prepared under the Metal
24 Mine Regs would be shared with the province?
- 25 MR. HILL: No, the annual reports are prepared by the
26 permit holder, usually with their own staff or
27 consultants. That's the annual reports I'm
28 referring to.
- 29 Q Under the provincial Regs?
- 30 MR. HILL: Under the permits.
- 31 Q Under the permits, the provincial permits.
- 32 MR. HILL: Yes, under the provincial permits.
- 33 Q What about enforcement actions? Is that
34 information on enforcement shared between the
35 province and the federal government?
- 36 MR. HILL: I can't answer that. The Conservation
37 Officer Service does enforcement for B.C. Ministry
38 of Environment. We do -- we, the Environmental
39 Protection Officers do the inspections and review
40 data. If they're to recommend enforcement action
41 be taken, that would be turned over to the
42 Conservation Officers. I'm not sure how they
43 share information with their counterparts in DFO
44 or Environment Canada.
- 45 MS. BOYD: I was just going to add to that. We do
46 actually -- I have been party to where, for pulp
47 and paper issues, if there have been -- there may

1 be a provincial direction for something, and there
2 may have been federal direction. We have met and
3 exchanged information in sometimes trying to
4 develop a combined strategy, but it is more like
5 the enforcement groups. But we do that, there is
6 sharing of information.

7 And there is also, for pulp and paper, we do
8 share the interpretative reports, the design
9 reports, the submissions that are given to the
10 mills.

11 MR. HAGEN: I could also say that permits that are
12 issued will be sent to us generally and we may
13 recommend that some parameters be included or some
14 items be included in the permit. We can offer
15 some feedback on provincial permits, and the
16 province, as a courtesy, may also quote federal
17 regulations in their permits. That was just
18 another method by where the operator may be able
19 to get a better idea of requirements being
20 satisfied for both our levels of requirement.

21 MR. GRACE: We also have a specific instance where we
22 have multiple dischargers in the Kamloops area,
23 and we got together a group of dischargers and
24 government agencies to share our data, share our
25 work and with DFO, Environment Canada, provincial
26 agencies and local government, municipalities that
27 have discharges, regional district, First Nations
28 and other interested parties.

29 THE COMMISSIONER: Do I understand in British Columbia,
30 if a party wishes to explore or create a mine or
31 develop a pulp mill, they would essentially have
32 to deal with the province, perhaps Environment
33 Canada, Department of Fisheries and Oceans, and
34 then at the local level as well; is that correct?
35 There's no one-stop shopping in British Columbia
36 for those who are engaging in an activity that
37 might impact upon environmental issues; is that
38 correct?

39 MR. GRACE: As far as I'm aware, although I know they
40 provincially were trying to -- we've developed a
41 new organization, Forest, Lands and Natural
42 Resources Operations where they're trying to get
43 together almost all of the provincial agencies
44 that deal with that sort of thing, land use. For
45 some reason, environmental protection wasn't
46 included in that, but we still work very closely
47 with all those agencies.

1 Q You know, these questions are again directed to
2 both sets of witnesses. I'll start with maybe the
3 federal witnesses can answer first. Does the
4 federal EEM address cumulative effects of the
5 introduction of mining and pulp effluents into the
6 freshwater system?

7 MS. BOYD: The short answer is not yet. I have to say
8 not yet because I'm hopeful. But after pulp and
9 paper, we saw the need to try and consider other
10 discharges, but in enacting the regulations and
11 introducing the environmental effects monitoring,
12 we now start with pulp and paper. We've brought
13 in mining ten years later, and now we're at the
14 stage of introducing municipal wastewater
15 regulations with the intent to include EEM.

16 So there's potential to be able to go in that
17 direction. I think we can get there, and I think
18 even some of our research scientists and some of
19 academia, in particular one fellow, Dr. Kelly
20 MunKittrick, who was actually part of the original
21 EEM program development, has an idea of how you
22 can move towards cumulative effects monitoring
23 across -- where he's kind of gone from province to
24 province and looking at that aspect. So I think
25 we should go in that direction.

26 Q In the province, is there any process to assess
27 cumulative effects from mines and mills generally?

28 MR. GRACE: I don't know if we approach it in quite
29 that way. I mean, we look at all impacts. I
30 don't know if we really think of it as being
31 cumulative as just being the impacts of the mine
32 or the pulp mill. I've never really understood
33 the term. I mean, I understand it in theory, but
34 I don't understand in practice how you'd -- I
35 mean, it seems like any time you monitor, if
36 you're downstream of two discharges, that will be
37 a cumulative impact.

38 Q Has any work been done by either --

39 MR. HILL: I was going to add something to what Bob
40 said.

41 Q Sorry, yes?

42 MR. HILL: It may be something considered in an
43 environmental assessment process rather than in
44 the individual permits. There is a cooperative
45 federal/provincial trend monitoring stations on
46 the Fraser River that would be able to track
47 changes over time that might be from cumulative

1 effects.

2 Q Has any work been done by the province or by
3 Environment Canada to assess these effluent
4 discharges on migratory salmonids? Do you want to
5 start with the federal?

6 MR. GRACE: Yeah, okay, go ahead.

7 MS. BOYD: The short answer is no, we have not targeted
8 migratory -- the salmon, just for the very reason
9 that they are migratory and our focus is on the
10 resident fish which we expect would be exposed
11 more than the migratory fish.

12 Q But you haven't done any assessment to see what
13 happens as migratory fish move through different
14 discharges in their life cycle?

15 MS. BOYD: Right. No. Not to my knowledge.

16 Q And the province?

17 MR. GRACE: Basically the same thing. I mean not only
18 do we not try to look for sockeye or salmon in
19 general because they are migratory, there are a
20 lot of species that are resident that are exposed
21 for their entire life cycle that would be much
22 more likely to be impacted, such as rainbow trout.
23 But even rainbow trout aren't necessarily the best
24 species to monitor because they are also
25 migratory, at least within the freshwater system.

26 We often look for species that are much more
27 resident territorial and don't tend to move as
28 much, and often looking at sculpins or longnose
29 dace or chub.

30 MR. HAGEN: If I could add, just in the environmental
31 assessment process for new projects, if there is a
32 potential impact on migratory salmon or there's a
33 potential for a discharge of a new project in
34 salmon-bearing creeks, then that is certainly an
35 issue that would be looked at very seriously and
36 if there are potential high-risk impacts on that
37 resource, it would certainly upset the conclusion
38 drawn during the environmental assessment process
39 for that project.

40 Q And would such an assessment address the impacts
41 on a migratory fish as it moves through the river
42 and is exposed to different pulp mills through its
43 life, and different mine discharges through its
44 life, and different other effluents through its
45 life cycle, so that sort of not maybe sub-lethal
46 combining effect as it moves through the different
47 discharges? Has that been looked at by

1 Environment Canada?

2 MR. HAGEN: No, that is not what we're looking at in
3 environmental effects monitoring. We're looking
4 at particular mines or mills and doing an EEM
5 program. Remember, we're assessing the adequacy
6 of the regulations here, so the presumption would
7 be that a resident fish would be more highly
8 affected by a mill or a mine's effluent.

9 I can say possibly in the future if those
10 effects are unacceptable on resident fish, then we
11 could certainly move on to look at their impacts
12 on the transient species, but that would be a
13 question of what to do later on, and that's not
14 really been addressed yet.

15 Q Is there - and this is for the panel at large - is
16 there a way that cumulative impacts could be
17 assessed differently or better to better
18 understand impacts on sockeye in the Fraser
19 system?

20 MS. BOYD: I think the short answer is yes.

21 Q Do you have any suggestions in that respect?

22 MS. BOYD: I guess just even for starters trying to
23 bring some of the different groups working on,
24 like (indiscernible - coughing) organizations and
25 then obviously government, research science,
26 together to try to come up with some kind of a
27 strategy that would do that. I think it's an area
28 that we might have shied away from more just
29 because it's a difficult task to try and do. I
30 think it's just something we've got to move in
31 that direction.

32 I guess I should add for the environmental
33 effects monitoring, we have actually -- the upper
34 Fraser mills did use juvenile chinook which over-
35 winter in the Fraser and that was, in part,
36 because we were having difficulty in getting the
37 mature large-scale sucker, although it probably
38 didn't work as well as we had hoped, but we did at
39 least try to use that species.

40 Q Anything the provincial witnesses would like to
41 add to that? No?

42 MS. BAKER: All right. Thank you. Those are my
43 questions.

44 Canada is the first up, and Mr. Timberg has
45 indicated that he will try to be done in half an
46 hour. If he can do it any less, that would be
47 great.

1 MR. TIMBERG: It's Tim Timberg, and my colleague, Hugh
2 MacAulay for Canada. If we could, Mr. Lunn, start
3 with the PPR number 15. I have a series of
4 questions for our witnesses regarding a number of
5 the paragraphs. If we could start with page 6,
6 paragraph 5.
7

8 CROSS-EXAMINATION BY MR. TIMBERG:
9

10 Q I'm wondering if it's important to - if you have
11 any comment - to clarify the statement in the PPR
12 that:
13

14 ...millions of litres of effluent into the
15 habitats of Fraser River sockeye salmon on a
16 daily basis...
17

18 Do we need to clarify that statement?

19 MS. BOYD: I guess one of the things I just thought
20 would be helpful, would be a bit more context, I
21 think factually it may be correct, millions of
22 litres, point sources, toxics, accumulative --
23 biocumulative and persistent substances, but I
24 guess given the relative change in discharges, say
25 over a level of 20 years, like for example,
26 significant increases in pulp mill loadings, and
27 from the toxicity perspective now requiring non-
28 accumulative lethal effluent, I just think it
29 would help to have more context.
30

31 Also, on a daily basis, the Fraser sockeye
32 wouldn't necessarily be in the river, like they
33 would be like passing through. So it's just
34 context for like versus on a day-to-day basis what
35 the time periods are and some of the relative
36 improvements in the river. I just think it would
37 be helpful.

38 Q Okay. Mr. Hagen?

39 MR. HAGEN: I think, yes, I've got maybe four points
40 that might be helpful. With respect to effluent
41 discharges in general here, one of them might be
42 is that some discussion in the PPR and the
43 technical report for that talking about the amount
44 of effluent that is discharged from mines, and the
45 numbers reported there are generally the permit
46 maximum and I'd just like to point out that very
47 often the actual discharge from the mine is
considerably lower than what they may be permitted

1 to discharge. So that means you keep in mind it's
2 quite often that a mine needs the water and they
3 recycle that water from their tailings ponds back
4 to the mill and they use that water in their
5 process. So in fact Highland Valley Copper does
6 not have a discharge because they're using that
7 water, so supernatant water may be actually quite
8 a bit less than they're permitted to discharge.

9 I just wanted to mention Gibraltar's
10 discharge is actually an intermittent one. They
11 do not charge (sic) between November and April
12 during the winter low flow. That may be something
13 that the province can speak to as a management
14 action to try to manage that effluent discharge
15 for more favourable environmental impact.

16 Also we had some discussion about the
17 Highland Valley Copper, whether they had an
18 effluent discharge or not. I just want to clarify
19 one of the reasons for the apparent discrepancy
20 between provincial recognizing discharges and
21 federally. We do not -- the MMER have very
22 explicit definitions of what effluent is, and if
23 the effluent, for example, is emanating from a
24 closed part of the operations area, which was
25 closed when the MMER was promulgated in 2002,
26 then we would not consider that an effluent so
27 that could explain discharges from the closed
28 Bethlehem pit or Highmont pit's tailing pond.
29 They're not effluent under the MMER.

30 Also we may have a situation such as Highland
31 Valley Copper. I'm not sure if they're actually
32 discharging their aquifer water, dewatering around
33 the pit, but they're not doing that -- they're
34 talking now that they -- a possibility a mine is
35 entitled -- in fact we prefer them to discharge or
36 divert clean water around their operations area,
37 so that water does not enter into the operations
38 area and that water would be a clean water
39 diversion and is not an effluent.

40 So there's a couple of items like that here.

41 Q Thank you. Mr. Gill or Mr. Grace, did you have
42 anything to add to that? You were lobbed a few
43 questions there.

44 MR. HILL: Well, just one thing that maybe I could add
45 to that is perhaps, in terms of context, what's
46 needed is an inventory of the actual discharges of
47 the different contaminants of concern from the

1 different sources and what proportion of the
2 concentration of those substances, those
3 discharges represent in the river.

4 Otherwise, the comment there in number 5 and
5 number 6 there, you know, are fairly generic
6 otherwise.

7 Q Okay. Thank you. If we could then move to page
8 11 to paragraph 18. Ms. Boyd or Mr. Hagen, do you
9 agree with the statement that s. 36(3) does not
10 oblige DFO or Environment Canada to take any
11 positive steps?

12 MS. BOYD: I guess just it would be useful to clarify
13 that it could be argued that not depositing a
14 deleterious substance into waters frequented by
15 fish in itself is a positive step. Also, before
16 you get to prosecuting, there are tools that the
17 enforcement officers have available to them that
18 can work to bring a discharge or a facility into
19 compliance before going to prosecution. So I just
20 wanted to bring out those. I think those are
21 useful to include.

22 Q Okay, thank you. Mr. Hagen, are you satisfied?
23 If we could then move to page 65, paragraph
24 176. The question here is does this description
25 accurately reflect how the Department of Fisheries
26 and Oceans, Environment Canada and Health Canada
27 work together on dioxin and furan monitoring?

28 MR. HAGEN: Yeah, just to clarify how this is actually
29 working at that time, we have three agencies each
30 with their own mandate to deal with various parts
31 of this issue. So we work cooperatively in this
32 program. So it was actually Health Canada that
33 would review the data that was collected.

34 The data that was collected on dioxin and
35 furan levels in fish and sediment, Environment
36 Canada had the mandate to issue directives to
37 require the operators to collect that information.
38 That information would be sent to DFO who would
39 get a health assessment recommendation from Health
40 Canada regarding the significance of those levels,
41 whether they're a danger to human health or not.

42 Then under their mandate, DFO could issue a
43 closer or a health advisory or whatnot for a
44 particular area. So our three agencies have
45 separate issues or separate mandates that we could
46 bring into play on this and cooperatively try to
47 manage that issue.

- 1 Q Thank you. If we could then move to page 70,
2 paragraph 193. Is this statement --
- 3 MS. BOYD: Oh, I think this one has been corrected.
4 This was the --
- 5 Q I just wanted to clarify if this -- did we correct
6 that this morning?
- 7 MS. BAKER: No, I forgot to change that one.
- 8 MR. TIMBERG: Okay.
- 9 Q So could you comment on the statement that there
10 are 139 coastal B.C. pulp and paper mills. Should
11 that read 10?
- 12 MS. BOYD: In that period it should be 10.
- 13 Q So it should not read 139 mills, it should be 10
14 mills.
- 15 MS. BOYD: No. That might just have been confused with
16 -- it's probably roughly the number of mills in
17 Canada. It's just a typo, okay.
- 18 Q Thank you. And if we could look at paragraph 196.
19 Does the effluent testing focus only on acute
20 toxicity?
- 21 MS. BOYD: For pulp mills?
- 22 Q Or tend to focus primarily on acute toxicity.
- 23 MS. BOYD: For environmental effects monitoring, it's
24 got sub-lethal toxicity testing included as well.
25 So for the non-EEM part, it's on acute toxicity
26 using rainbow trout, 96L or LC50 (sic) and daphnia
27 magna toxicity test, but for sub-lethal -- for
28 environmental effects monitoring, it's got the
29 sub-lethal toxicity testing.
- 30 Q Okay.
- 31 MS. BOYD: It's conducted twice a year as Wendy had
32 noted this morning.
- 33 Q Thank you. If I could then move to page 75,
34 paragraph 203. Mr. Hagen, does the Huckleberry
35 mine discharge to the Fraser River basin?
- 36 MR. HAGEN: I'll just clarify this. The Huckleberry
37 mine discharging to Tahtsa Reach on the Nechako
38 Reservoir and of course the Nechako Reservoir had
39 two discharge points to the Kemano Diversion and
40 through the area on the east side. So
41 Huckleberry mine discharges to Tahtsa Reach and
42 the flow in that Reach is primarily towards
43 Kemano. So I don't know that you would be able to
44 say that there would be much of Huckleberry on the
45 Fraser River.
- 46 It's kind of a grey area when you've got two
47 discharge points there now.

1 Q Thank you. If we could then turn to page 79,
2 paragraph 217. Mr. Hagen, do we need to clarify
3 anything about the comments here about the
4 tailings pond and how it's described here?

5 MR. HAGEN: Okay. We talked about this and I can't
6 quite remember what we wanted to clarify. I think
7 I addressed that already. Supernatant discharge
8 from a tailings impoundment may not be as much of
9 that water as you might anticipate, because we've
10 got three cycles back to the mill.

11 Q Okay. Thank you. And then paragraph 273 at page
12 102. Do we need to clarify the statements in this
13 paragraph with respect EEM programs, biological
14 monitoring and their requirements?

15 MR. HAGEN: We just wanted to clarify that the
16 requirement for a fish survey is present in all
17 mine and all mills environmentally-set monitoring
18 programs. There is an exemption that is available
19 from mines or mills whose effluent is less than
20 one percent concentration in the environment
21 within 250 metres of their final effluent
22 discharge point.

23 What that means is that beyond the 250-metre
24 distance, if effluent was less than one percent,
25 then a fish survey exemption can be granted. This
26 is essentially because the difficulty of
27 conducting a fish survey in such a small area when
28 fish are transient or mobile, in and out of a
29 plume that's that small, the presumption is that
30 there would be no effect when the plume is so
31 small.

32 But for most mines, for example, very few
33 mines would have an effluent dilution zone of one
34 percent that is less than 250 metres. Gibraltar
35 is one of them.

36 Q Thank you. And then my last question with respect
37 to the PPR is at paragraph 266, just a bit above
38 at page 100. This paragraph lists three
39 conditions that are required, and are there other
40 conditions or comments that should be added to
41 help clarify this paragraph?

42 MR. HAGEN: We just wanted to clarify that the
43 conducting of an environmentally-set monitoring
44 program is a condition of deposit within the
45 regulations, both PPER and MMER.

46 Q Thank you. And if we could just turn to page 74
47 of the PPR, there's a map there that may help us

1 with this next conversation. Mr. Hagen, earlier
2 this morning, there was a discussion about the
3 knowledge that exists regarding historic mines
4 that are now closed.

5 What is your confidence with respect to the
6 knowledge of the location of closed mines?

7 MR. HAGEN: Yes. I would like to clarify that.

8 There's a fair bit known about closed mines in
9 British Columbia. The Ministry of Mines in
10 particular have the database called MINFILE which
11 is an excellent resource for looking at which
12 mines have operated in the past. It goes back
13 over 100 years. There's quite a number of
14 projects listed in there.

15 I personally am familiar with that. There
16 are least -- there are 15 closed mines that
17 processed more than 100,000 tonnes of material in
18 the Fraser Basin. We would expect that the larger
19 operations would probably have some more
20 significant impact, or potentially more
21 significant impact. But we looked at the larger
22 operations, 15 greater than 100,000 tonnes in
23 material processed during their lifetime. I'm
24 also aware there's at least 12 more that processed
25 5,000 tonnes or more.

26 When it comes down to the much smaller
27 operations, lower than that, this is something
28 that very likely -- the information about that is
29 likely in MINFILE. It can be found, but I don't
30 have it at my fingertips so to speak.

31 Regarding closed mines, I would like to
32 mention most of these mines we're familiar with.
33 We know that they don't have an impact, or they do
34 have an impact (indiscernible - overlapping
35 voices) --

36 Q Are there any concerns about mines that are
37 closed, or do you have any specific mines that --

38 MR. HAGEN: These are mines that are closed.

39 Q Right.

40 MR. HAGEN: For example, the Samatosum mine north of
41 Kamloops, that was a very small open pit mine that
42 operated for a couple of years without a
43 discharge. Subsequent to its closure, it
44 generated some small acid rock drainage which is
45 under active management right now. That's about
46 the only closed mine that I'm aware of in the
47 Fraser Basin that has a problem that is being

1 managed.

2 Q Okay. Thank you. Are there any significant new
3 mines or new projects on the horizon that may
4 affect the Fraser Basin?

5 MR. HAGEN: Yes, we have a number of new projects that
6 are either in the EA process or in pre-
7 application. Some of these are quite large. We
8 mentioned the closed open pit copper mine, the
9 Kamloops, New Afton, or Afton and Ajax, they're
10 both in development to re-open and operate again.
11 New Afton, I think is very close to operating.
12 They've got all their permits and certificates
13 needed to operate an underground mine in the old
14 pit. The Ajax mine is just starting into the EA
15 pre-application process.

16 Another project is Harper Creek which is
17 north of Kamloops and that would be a fairly large
18 open pit operation that will be entering the EA
19 process shortly.

20 Q Okay.

21 MR. HAGEN: Chumahli -- Chumahli (phonetic) be a mine
22 southeast of Prince George is another fairly large
23 mine that will be --

24 Q Mr. Hagen, so -- Mr. Hagen? Oh, he can't hear me.
25 Mr. Hagen, so then as we've just discussed earlier
26 those new mines that are coming on, they'll be
27 going through an environmental assessment process;
28 that's fair to say?

29 MR. HAGEN: Yeah, they will be going through an
30 environmental assessment process.

31 Q Okay. Can you comment on placer mines and provide
32 us with a definition of that and whether they're
33 covered under the MMER?

34 MR. HAGEN: Okay. Placer mine operations are
35 essentially operations that will process river bed
36 sediment, fluvial sediments and filter out grains
37 of gold, usually, from that sediment.

38 Under the MMER they are not considered mines,
39 and we don't usually deal with placer operations
40 in my section, but I would like to point out that
41 some of these placer operations may have a very
42 significant impact on the environment. Certainly
43 historically that would have been the case.

44 Q Are there instances when a placer mine could be
45 covered by the MMER?

46 MR. HAGEN: In the instance where a placer mine, for
47 example, brings in a backhoe and starts to

1 evacuate bedrock and process that bedrock as ore,
2 then it would actually come into the definition of
3 an MMER mine.

4 Q Thank you. And do you have any knowledge about
5 the location of these placer mines in the Fraser
6 River Basin?

7 MR. HAGEN: Only generally. The central area for
8 placer operations now is probably the Quesnel
9 River and also the Lightning Creek area downstream
10 of the Barkerville/Wells area.

11 Q Thank you. And if we could then turn to a
12 document from Tab 9 that was entered this morning
13 as Exhibit 1034. This is the national assessment
14 of phase 1 data regarding metal mining. If we
15 could turn to page 12 and 13 at the same time.

16 MR. LUNN: And that's on the paper pages?

17 MR. TIMBERG: Oh, yes. Yes, that's that page and then,
18 yes, if we could go sideways, that would be great.

19 Q So this morning, Mr. Hagen, there was conversation
20 about an overall conclusion of some inhibitory
21 effects on fish from metal mining. I'd like you
22 to comment on the two graphs here with respect to
23 results of pulp and paper, as I understand the one
24 page, and the other one being -- yeah, so the one
25 there, this is the -- on the right we have the
26 results of the pulp and paper studies, and on the
27 left, we have the result of the metal mine studies
28 with respect to impact on fish.

29 With those two figures up, could you explain
30 the relationship between these two graphs?

31 MR. HAGEN: Yes, we thought these two diagrams here
32 would be a very helpful way of viewing what the
33 overall national assessment conclusions are when
34 we talked about national assessment reports. So
35 if you look at the diagrams, you'll see a vertical
36 line in the middle above zero there on the
37 horizontal axis. If the horizontal lines, one for
38 each parameter -- if those horizontal lines
39 intersect the vertical line, then the conclusion
40 would be no effect on that parameter, generally
41 speaking, of the national perspective.

42 So if you look at Figure -- well, pulp and
43 paper first, because we talked about that first --
44 Figure 5. We talked about a general stimulator
45 effect on fish, and you can see that on condition,
46 liver, weight at age, and age on the diagram are
47 to the positive side on the right side of that

1 vertical line. We talked about an inhibitory
2 effect on gonad size and again, that vertical line
3 for gonad is on the negative or the left side of
4 that vertical line.

5 So if you look at Figure 4, for three of
6 those fish parameters, the horizontal line
7 intersects the vertical line at zero, so we
8 conclude, generally speaking, no effect on a
9 national basis.

10 And for the record, the condition is to the
11 left so we've got an inhibitory effect on fish
12 from mining and it's interesting that the
13 direction is opposite for fish versus pulp and
14 paper.

15 Q Right. And Figure 4 is for metal mines and Figure
16 5 is for pulp and paper. Is there any -- can we
17 learn anything about these two graphs as to a
18 cumulative impact analysis?

19 MR. HAGEN: I think what they do tend to do is
20 illustrate how challenging it would be to do a
21 cumulative effect assessment. If you're bringing
22 in pulp and paper where you've got inhibitor -- or
23 stimulation versus metal mining, you've got
24 inhibition. Then you start asking what is the
25 effect if you've got these combined, is there an
26 added effect or synergetic effect or antagonistic
27 effect.

28 Then thirdly, if you start considering the
29 other discharges that are present in the basin
30 from urban effect, agriculture and municipal
31 wastewaters, I think it illustrates that
32 cumulative effect is a real challenge to do.

33 MR. TIMBERG: Thank you. If we could then move to --
34 in the interests of time, I'll keep moving on that
35 conversation. If we could go, then, to exhibit 2
36 of Canada's binder of documents. It's a 2002
37 document on clean safe water.

38 Ms. Boyd, can you identify this document for
39 us and explain whether this is a helpful document
40 for us to understand the work of the pulp and
41 paper -- regarding the pulp and paper industry.

42 MS. BOYD: The short answer is I guess it just gives a
43 quick summary after ten years of pulp and paper
44 being in place and - sorry - the pulp and paper
45 effluent regulations being in place, the updated
46 ones plus the two **CEPA** regulations which are also
47 listed on that document. It just gives a quick

1 snapshot that I think is effective just to see the
2 degree to which the mill effluent was improved.
3 It doesn't mean that we don't have room to go from
4 there, but I think it's good to show kind of the
5 relative change in those effluents.

6 MR. TIMBERG: Okay, thank you. If that could be marked
7 as the next exhibit.

8 THE REGISTRAR: Exhibit 1038.
9

10 EXHIBIT 1038: Clean, Safe Water-Implementing
11 Sustainable Practices in the Pulp and Paper
12 Industry, A 10-year Path to Success
13

14 MR. TIMBERG:

15 Q And, Ms. Boyd, earlier and just now we spoke about
16 studies being done on resident fish. Just for
17 clarity of the record, has there been any work
18 done on sockeye salmon as a resident fish?

19 MS. BOYD: Not as a resident fish for EEM because it
20 is, to us, not considered a resident.

21 Q Right.

22 MS. BOYD: It's just ones there, you know, essentially
23 exposed to the effluent on a daily basis is what
24 we're targeting for EEM.

25 Q Right. And then, in your opinion, does the pulp
26 and paper effluent today have an impact on Fraser
27 River sockeye salmon?

28 MS. BOYD: The short answer is that we don't know
29 because we don't design our studies for sockeye
30 salmon specifically, but I guess the intent is
31 that if we looked at resident species, that could
32 be used to compare with a species that's moving
33 through. So I guess we would consider they would
34 be less likely to be affected by it because of
35 that, being transient.

36 Q All right.

37 MS. BOYD: Migrating transient.

38 Q And if we could then move to document Tab 13 from
39 the Commission's list that was marked this morning
40 as Exhibit 1030. This is a study of the upper
41 Fraser River environmental effects.

42 Ms. Boyd, is this perhaps the best data that
43 we have on the upper Fraser River before us, this
44 paper?

45 MS. BOYD: Well, I guess I referred to that in terms of
46 the effects, results in discussions this morning.
47 Primarily because those are the largest mills on

1 the river.

2 Q Sorry, I'm aiming to move through my -- I've got a
3 short period of time.

4 MS. BOYD: Yeah, yeah.

5 Q If we could move to page 21 of 161, and if we
6 could look at this tab, Figure 2.2, can you
7 describe for the benefit of the Commissioner what
8 this figure tells us?

9 MS. BOYD: Well, I guess it's just a useful document to
10 just see what happened with -- this is just an
11 example of the Canfor Northwood mill and to show
12 how the changes in the loadings were effected by
13 the regulations coming in. If you see in kind of
14 a 1982 era, there was a sharp increase in your
15 suspended solids and biochemical oxygen demand and
16 that was actually the mill had an increase in
17 production. They had a major expansion.

18 But then when the regulations came into place
19 in 1992, the mill had actually started to ramp up
20 for those regulations and you can see where the
21 AOX, which can simulate the dioxins and furans as
22 well, but the sharp decrease from the regulations
23 in place, actually federal and provincial, and
24 also for the BOD and TSS. I just thought it was
25 something that quickly capture the scenario for
26 the changes in the regulation.

27 Q Thank you. If we could then move to Tab 10 of
28 Canada's list of documents. This is a map -- and
29 Ms. Boyd, do you know who created this map?

30 MS. BOYD: Well, Mike originally created the map and I
31 just keep changing it as mills change or the
32 status changes. But it's a useful summary of the
33 pulp mills in B.C. It shows the current names and
34 it shows the status of some of the closed mills
35 that are no longer PPR mills, and it updates the
36 Colodey, et al, 1999, which is -- I forget which
37 number it is on our documents. But the short of
38 it is an update to current mill names and status.

39 MR. TIMBERG: Thank you. If this could be marked as
40 the next exhibit.

41 THE REGISTRAR: Exhibit 1039.

42

43 EXHIBIT 1039: BC Pulp and Paper Mills Maps -
44 Update to Figures 1 and 2 in Colodey et al
45 1999, June 2011
46

47

MR. TIMBERG: If we could then have, Mr. Lunn, a

1 document marked this morning from Tab 15 of the
2 Commission's documents, Exhibit 1026 brought up.
3 Q There was a discussion regarding the abstract at
4 Roman numeral (iii) and a conversation ensued
5 with the word "eutrophication" being raised. I'm
6 wondering if we can just have a definition of what
7 eutrophication is.

8 MS. BOYD: I guess the short answer is just it's a
9 gradual nutrient enrichment of an area, so it
10 starts as oligotrophic and then gradually as
11 nutrients are added to the system, either
12 naturally or man-made contributions, it becomes
13 nutrient-enriched or eutrophic is the term.

14 MR. TIMBERG: Thank you. Those are all my questions.

15 MR. BAKER: Thank you. Ms. Rowbotham for the province
16 is next. She thinks she can finish in 20 minutes.

17 MS. ROWBOTHAM: Thank you. I'm Elizabeth Rowbotham for
18 the province and here's my colleague, Boris Tyzuk.
19 I have a few questions.
20

21 CROSS-EXAMINATION BY MS. ROWBOTHAM:
22

23 Q The first question, I'd like to go to PPR-15,
24 please, paragraph 65.

25 So, Mr. Hill, perhaps you can help me out
26 here. They say that, at paragraph 65:
27

28 In July 2004, the Environmental Management
29 Act ("EMA")...came into force. It combined
30 the former **Waste Management Act** and the
31 former **Environment Management Act** to create a
32 single statute governing environmental
33 protection and management in the Province.
34

35 In your view, is that correct or are there other
36 statutes and regulations governing environment?

37 MR. HILL: Yeah, there are other statutes that deal
38 with environmental matters such as **Water Act, Fish**
39 **Protection Act**, aspects of the **Mines Act**. Those
40 would be some examples.

41 Q Right. Thank you. With respect to paragraph 66,
42 the first sentence says that:
43

44 The **EMA** is less prescriptive than the former
45 **Waste Management Act**.
46

47 Do you think that's correct, or is it differently

1 prescriptive than the former **Waste Management Act**?
2 MR. HILL: I'm not exactly sure what's intended by
3 "prescriptive", but I could describe the change
4 that happened when there was a switch from the
5 **Waste Management Act** to the **Environmental**
6 **Management Act** in that that was previously all
7 waste discharges could not happen without a permit
8 from any type of business. Under the
9 **Environmental Management Act** there was a
10 regulation called the "Waste Discharge Regulation"
11 where different types of business were prescribed
12 along with some activities, particular types of
13 activities were prescribed for which discharges
14 were prohibited without a permit.

15 But there still remained a general provision
16 not to cause pollution whether you were prescribed
17 or not.

18 Q Thank you, Mr. Hill. And if we can go to
19 paragraph 70. Paragraph 70, it says that there is
20 no permit requirement:

21
22 No site-specific permit or other waste
23 discharge authorization is required for...

24
25 Activities, industries listed in Schedule 2. And
26 just for clarification, that presumes that there's
27 a code of practice in place, correct?

28 MR. HILL: Yes. If an activity or a business is
29 prescribed in Schedule 2, they may not discharge
30 without a permit or, in the alternative, if
31 there's a code of practice, they would register
32 and discharge under authority of that code of
33 practice.

34 Q Okay. Thank you. And I think at footnote 145,
35 the footnote states that:

36
37 A person is exempt from subsections 6(2) and
38 6(3) of the **Act** in relation to the discharge
39 to the environment of coarse coal refuse,
40 waste rock or overburden...

41
42 An effluent permit would still be required in
43 those circumstances; is that correct?

44 MR. HILL: Yes, and that provision existed as well
45 under the **Waste Management Act** regime. This
46 particular exemption just deals with the rock dump
47 piles, the rock itself. But if there was effluent

1 coming from that rock pile that was being
2 collected and released, then the requirements to
3 get a permit would still apply. The exemption is
4 just for the rock itself.

5 Q Thank you. And if we could turn to paragraph 288
6 of the PPR, please. It states here, paragraph 288
7 that:

8
9 Environment Canada observed in 2008 that the
10 provincial Ministry of Environment "has
11 significantly reduced its inspections of
12 mines, so it is no longer possible to conduct
13 coordinated site inspections."
14

15 Would you agree that the province has
16 significantly reduced its inspection of mines?

17 MR. HILL: In my experience in dealing with mines from
18 approximately late '90s to present, in the Cariboo
19 region we've maintained a fairly constant
20 frequency of inspections of the mines.

21 Q Thank you. My next question is still within the
22 PPR but it's paragraph 7. Mr. Grace, if you could
23 help me out here. I'll take you to the last
24 sentence of that paragraph. It states:

25
26 Municipal wastewater effluents are also a
27 source of...PBDEs, which are used as fire
28 retardant.
29

30 Is it more correct to say that municipal waste
31 water may be a transport mechanism rather than a
32 source?

33 MR. GRACE: Well, you're getting into definition there.
34 I mean, basically, PBDEs are found in most
35 combustible materials including in this room.
36 They tend to be very widespread. It's not
37 something that's put in there intentionally as in
38 bodily waste, but it does get in there 'cause it
39 just comes from everything, laundry, computer
40 screens.

41 Q Okay. Thank you. Mr. Hill, when dealing with
42 non-compliance issues with respect to permits, is
43 there a provincial regulatory requirement to
44 report all non-compliances or certain types of
45 non-compliances?

46 MR. HILL: Well, there is the spill reporting
47 regulation which requires that spills or any

1 unauthorized releases exceeding certain thresholds
2 must be reported in accordance with procedures in
3 that regulation.

4 Q So it may not be put out in a permit that all
5 exceedences, all non-compliance issues have to be
6 reported because the regulation will capture some
7 of the more significant ones that will have
8 significant short-term environmental effects.

9 MR. HILL: Yeah, the regulation would capture
10 significant unauthorized releases to the
11 environment and those would have to be reported
12 immediately.

13 Q And the consequences of failure to report those
14 types of instances?

15 MR. HILL: That's a violation. I can't quote you the
16 section, but it is a violation that we have on
17 occasion pursued.

18 Q It is considered an offence not to report in those
19 circumstances?

20 MR. HILL: That is correct.

21 MS. ROWBOTHAM: Mr. Lunn, if you could take me to the
22 province's document. This document is entitled
23 "Review of the Thompson River Partnership
24 Monitoring Program".

25 Q Mr. Grace, are you familiar with this document?

26 MR. GRACE: Yes, I am.

27 Q Can you provide me with a bit of background with
28 respect to this document?

29 MR. GRACE: Basically in 2003, the various agencies and
30 dischargers who are required to monitor the
31 Thompson River got together to combine and
32 integrate their monitoring so that they could take
33 advantage of not having to duplicate sampling at
34 the same place or times, same parameters, that
35 they could integrate their programs so that they
36 could do the same thing and maybe free up some
37 money to look at other issues.

38 The program was for six years. It was
39 partially part of the federal EEM process, but
40 also part of the city of Kamloops Liquid Waste
41 Management Plan. The original plan was to do
42 three years of monitoring before they changed to
43 the new city sewage treatment plant.

44 The plant wasn't built, although it's
45 currently in the process of being constructed. So
46 after the three years, we altered their discharge
47 to mimic what would happen after their new sewage

1 plant would be in force, and carried on for the
2 other three years.

3 So in 2010, we wanted to see -- that was the
4 end of that part of the program, so we wanted to
5 see, well, where should we go from here? We
6 thought that it would be good to have outside
7 experts assess our program and report out on it
8 and make recommendations. So this report is the
9 result of that assessment.

10 Q And from this report there were recommendations
11 made and are in the process of being considered?

12 MR. GRACE: Yes, we have an annual meeting, but we had
13 an extra meeting in the spring to go over the
14 report with all the various partners and discuss
15 all the recommendations in the report and whether
16 they -- it would be nice to do, should do, will
17 do. Also we need to coordinate all the various
18 monitoring partners as to what parts of the
19 program they would be doing, and also, because
20 there is money freed up, we also want to look at
21 new upcoming issues. In fact, there is discussion
22 about looking at merging contaminants and EDCs.

23 Q And is participation in this group voluntary?

24 MR. GRACE: Well, pretty much. We do have control over
25 the permittees, but we haven't actually told them
26 they must come and be part of this program. I
27 think it's just something that everybody
28 recognizes is a really good thing to do, and they
29 come there voluntarily.

30 Q And can you remind us who the participants are?

31 MR. GRACE: Well, there's the Domtar Pulp Mill, the
32 City of Kamloops Sewage -- well, the City of
33 Kamloops in general, mostly because of their
34 sewage plan, Kamloops Indian Band, DFO,
35 Environment Canada, the Thompson-Nicola Regional
36 District, Village of Ashcroft due they both drink
37 the water from the Thompson and discharge their
38 sewage to it, Cook's Ferry Indian Band,
39 Skeetchestn Indian Band.

40 MS. ROWBOTHAM: Thank you. May I have this marked as
41 an exhibit, please?

42 THE REGISTRAR: Exhibit 1039 (sic).

43

44 EXHIBIT 1040: Holmes, Review of Thompson
45 River Partnership Monitoring Report, Nov 30
46 2010
47

1 MS. ROWBOTHAM: May I just consult with my colleague a
2 moment? Those are my questions.

3 THE REGISTRAR: Oh, I'm sorry, that would be Exhibit
4 1040.

5 MS. ROWBOTHAM: Thank you.

6 THE COMMISSIONER: 1040?

7 THE REGISTRAR: That's right.

8 MS. BAKER: Thank you. Mr. Commissioner, if we're
9 taking an afternoon break, maybe we would want to
10 start now and come back with Mr. Leadem at five
11 after?

12 THE COMMISSIONER: All right.

13 MS. BAKER: Would that be okay?

14 THE REGISTRAR: The hearing will now recess until five
15 after.

16

17 (PROCEEDINGS ADJOURNED FOR AFTERNOON RECESS)

18 (PROCEEDINGS RECONVENED)

19

20 THE REGISTRAR: Order. The hearing is now resumed.

21 THE COMMISSIONER: Mr. Leadem.

22 MR. LEADEM: Good afternoon, Mr. Commissioner. For the
23 record, my name is Tim Leadem. I act as counsel
24 for the Conservation Coalition, a group of
25 environmental groups. And you know that you're in
26 the home stretch when I usually show up and then
27 my colleague, Anja Brown, for the First Nations
28 Coalition, will come after me.

29 Mr. Commissioner, I've been assigned, I think
30 I've got 35 minutes, and I certainly hope to
31 complete within that timeframe.

32

33 CROSS-EXAMINATION BY MR. LEADEM:

34

35 Q I'm going to take a wild stab here and ask you a
36 question that aside from your being together on
37 this panel, it's very likely that all four of you
38 have had very little to do with one another over
39 the years; is that a fair statement? Do you meet
40 regularly to talk about things?

41 MR. GRACE: I can't talk for Doug, but Janice and I
42 meet at least once a year face-to-face and
43 probably talk on the phone a dozen to 20 times a
44 year.

45 Q That's good. How about yourself, Mr. Hill?

46 MR. HILL: Well, I've met both of the federal folks
47 here, I don't know, probably at least 10 years

1 ago. I don't see them all that often, because the
2 kind of work I do doesn't have as much contact
3 with them as, for instance, maybe the enforcement
4 people in their group or the people in their group
5 that deal with permits.

6 Q Do you actually have formalized meetings where you
7 get together and discuss areas of common interest
8 from time to time?

9 MR. HAGEN: Well, in terms of metal mining, yeah, we do
10 have a local monitoring committee, and Bob would
11 have been on that committee. If we had mines in
12 the Kamloops area then we would have been
13 interacting that way. But generally speaking, I
14 have very good working relationships with my
15 provincial colleagues in different regions of the
16 province, and if I haven't interacted so much with
17 the Cariboo or with the southern regional people,
18 it's because there haven't been as many mines in
19 that area.

20 Q And Ms. Boyd?

21 MS. BOYD: I was just going to add to that, because
22 when you said that I kind of had a kind of a flash
23 from the past. I think we used to do it more. I
24 mean, we certainly, you know, with environmental
25 effects monitoring the area, or even just the
26 other side of the pulp and paper, we will get
27 together, particularly for working on a particular
28 mill or issue.

29 But we used to, as agencies, I do recall
30 times where there were gatherings where you would
31 go through like a series of issues. I don't know
32 if a part of that might have changed with, you
33 know, we went through a large restructuring the
34 last few years and that might have just
35 interrupted it, but it could be something we get
36 back to.

37 Q So would you all agree that it would be a good
38 thing for you to meet regularly in a formalized
39 way to talk about issues of common concern with
40 respect to the industries that you're regulating?
41 Would that be something that would be worthwhile?

42 MR. HAGEN: Well, I think, as a general statement, we
43 can say if there are issues to meet about then we
44 meet, and we do have extensive discussions with
45 each other if there are things to talk about.

46 Q Okay. I'm going to move on and talk about Fraser
47 River sockeye, specifically with respect to the

1 issues that bring you to this panel, and I'm going
2 to begin my discussion by examining with you
3 Exhibit 833 that's been marked in these
4 proceedings. And this is a federal document, it's
5 entitled, Late-run Sockeye at Risk: An Overview
6 of Environmental Contaminants in Fraser River
7 Salmon Habitat, and it's authored by Drs. D.I.
8 Johannessen and P.S. Ross.

9 Are either of the federal representatives
10 familiar with either of these two gentlemen?

11 MS. BOYD: I know the second author; I'm not familiar
12 with the first author.

13 Q All right. Peter Ross is --

14 MS. BOYD: Peter Ross.

15 Q -- is with Oceans Canada, I believe, and operates
16 out of Sydney.

17 MS. BOYD: He's with Oceans Canada, or I believe he's
18 with Oceans Sciences.

19 Q Okay. I'm going to ask you, and hopefully you've
20 had a chance to look at this, because it was one
21 of the documents that Commission Counsel suggested
22 that they might have you examine. If I could ask
23 you to turn to page 21 of the document, Mr. Lunn.
24 I think it's 33 on the pdf.

25 MR. LUNN: Thank you.

26 MR. LEADEM:

27 Q And there's a discussion, a short discussion under
28 3.3 Pulp and Paper Mills, and I want to continue
29 -- the authors spent some time to talk about the
30 number of mills and their locations, and then
31 continued on to the next page - if you could just
32 scroll it down slowly - there's a paragraph that
33 says:

34
35 All of the B.C. pulp mills fall under federal
36 legislation, which does not allow the release
37 of acutely toxic effluent and more recently
38 has severely restricted allowable dioxin and
39 furan releases.

40
41 And we talked a bit about that earlier in your
42 evidence. And then it goes, after the bulleted
43 items, about all of the good things that have
44 happened as a result of regulation to the pulp and
45 paper industry. It says:

46
47 Despite these significant improvements, there

1 are still concerns about contaminants in pulp
2 mill effluent.

3

4 It goes on to say:

5

6 The general toxicity test of the effluent is
7 for acute toxicity only, and does not test
8 for sublethal effects or chronic exposures.

9

10 So let me just stop there. This paper was
11 authored in 2002. Has that changed considerably
12 since that time, Ms. Boyd?

13 MS. BOYD: I guess the short of it is we had sublethal
14 toxicity testing in the environmental effects
15 monitoring program from the start of the -- when
16 the EEM was introduced in 1992. So we have had
17 sublethal toxicity testing in pulp mills since
18 then.

19 Q So there's some, but not, generally speaking, a
20 lot, is there?

21 MS. BOYD: Twice a year three tests, plus the two acute
22 tests in the --

23 Q The authors of this paper go on to suggest that:

24

25 ...while a number of the water quality
26 parameters are improved by the changes and a
27 number of well known contaminants are
28 significantly removed, there are a large
29 number of contaminants which are of more
30 recent concern and their response to mill
31 procedure changes is not well understood.

32

33 And then they go on to talk about:

34

35 Endocrine disruption is one of the major
36 known sublethal effects of pulp mill effluent
37 and may result from a combination of
38 endocrine disrupting compounds (EDCs) in the
39 effluent such as natural plant hormones,
40 heavy metals, chlorinated compounds, and
41 surfactants such as the alkylphenol
42 ethoxylates...

43

44 Do you agree with that statement, Ms. Boyd or Mr.
45 Hagen, or any member of the panel?

46 MS. BOYD: I would say that we, through our Environment
47 Canada researchers are also with academics and

1 some east coast -- DFO on the east coast. Maybe
2 DFO on this coast as well. But, you know, we have
3 recognized that there are still effects in pulp
4 mill effluent, and so we're still looking at what
5 the potential causes are, and I'd identified this
6 morning one study, for example, that where there
7 is -- they're looking at the reduced gonads size
8 in the fish, which is -- and that's an associated
9 effect of endocrine disrupting chemicals.

10 So within that study they're looking at
11 endocrine disrupting chemicals. I don't know
12 exactly which ones relative to what is listed
13 here, but the author there, Hewitt and Servos,
14 Mark Hewitt is one of the heads of that larger
15 joint study.

16 Q That's the first paper, that's the Hewitt and
17 Servos paper that you recognize?

18 MS. BOYD: Yes. I just recognize like the name Hewitt,
19 Mark Hewitt, and he is one of the people leading
20 the study.

21 Q So it goes on to say that:

22
23 Research has demonstrated a decline in the
24 concentrations of a large number of endocrine
25 disrupter compounds after secondary treatment
26 of the pulp mill effluent.

27
28 Do you know whether the pulp mills that you've
29 described in B.C. have secondary treatment?

30 MS. BOYD: Yes, they do.

31 Q All of them?

32 MS. BOYD: Every mill -- pretty much the 1992 regs
33 effectively made almost all mills go to secondary
34 treatments, but there are like, I think, one or
35 two, like the Kruger tissue mill has a treatment
36 and a process such that their acute lethality,
37 their BOD and TSS are under the limit prescribed.

38 Q The authors go on to say:

39
40 ...the study did not analyse for the
41 degradates of the chemicals tested. The
42 overall endocrine disrupting nature of the
43 effluent was therefore not comprehensively
44 evaluated.

45
46 So are you familiar with the fact that these
47 endocrine disrupters degrade and that it could be

1 the degradates that actually can be disruptive of
2 the endocrine system?

3 MS. BOYD: I'm probably not a good one to ask about
4 that, but I would say, just based on where they're
5 going with this larger joint study, for example,
6 not to mention other research, that they're
7 looking at those kinds of chemicals.

8 Q Okay. I want to now turn from that document to
9 another document. It's document number 1 from the
10 Conservation Coalition's documents, Mr. Lunn.

11 MR. LUNN: Thank you.

12 MR. LEADEM:

13 Q And hopefully you will recognize this document,
14 because it's a Health Canada document. Do you
15 recognize this document, Ms. Boyd or Mr. Hagen?

16 MS. BOYD: I was going to say I recognize it because I
17 was on the list, but I don't -- I can't remember
18 if I've seen it and I wasn't sure what the date
19 was --

20 Q Right.

21 MS. BOYD: -- because some of the phrases suggested it
22 was probably a few years back.

23 Q Okay. I pulled this off the website, so the date
24 in the upper left corner is the date I pulled it
25 off the website.

26 MS. BOYD: Right.

27 Q So it would be June the 7th of 2011. So I take it
28 from that, that it's current as of that date.

29 MS. BOYD: Oh. I'm just trying to remember where I
30 read that it suggested like recently regulations
31 in place and our pulp mill and our PPER and two
32 **CEPA** regs were in place in 1992, so that's what my
33 thinking -- and again, I can't tell if I've seen
34 it before, but if I have, it would have been a
35 long time ago. So that's why I'm just thinking it
36 might have been an older document.

37 Q Okay.

38 MS. BOYD: I don't know.

39 Q Well, let's see what we can draw from the
40 document. If I could ask you, through the benefit
41 of Mr. Lunn, to examine page 20 out of 27, Mr.
42 Lunn. There's a heading, 4.9.2 Chronic Effects,
43 and I find these words:

44
45 Unlike acute lethality, chronic toxicity
46 normally does not result in the immediate
47 death of an organism upon exposure to a

1 pollutant.
2

3 And then it carries on and there's a general
4 discussion about chronic effects. It says:
5

6 Chronic effects typically develop after
7 continuous, longterm exposure to low doses of
8 toxic material. In many instances, the
9 effects a pollutant may exert on the
10 individual organism, although subtle, may be
11 important to the continuance of the species,
12 e.g., reproduction, growth, or survival.
13

14 Do you agree with that statement, generally, Ms.
15 Boyd or Mr. Hagen?

16 MS. BOYD: Go ahead.

17 Q Just a general statement about chronic effects.

18 MR. HAGEN: I'm just reading over what you said just
19 here. Well, if you're referring to the difference
20 between acute lethality and chronic toxicity, then
21 yes, there's the well accepted difference there.
22 Acute lethality test will test if a species, the
23 test organism, will die on exposure. Chronic
24 toxicity normally looks at other effects,
25 reproduction or growth, and attempts to see if
26 exposure to a compound will inhibit that ability
27 to grow or reproduce. So you don't have a death
28 end point in any chronic test.

29 Q And if you follow through, the authors of this
30 Health Canada paper go on to describe some of the
31 chronic effects, and I'm just going to ask you to
32 agree or disagree with whether these are chronic
33 sublethal effects. The first one they've got
34 there is reproductive and life-cycle effects. Is
35 that something that you recognize as a chronic
36 effect or potential chronic effect caused by
37 effluent from a pulp mill?

38 MR. HAGEN: Generally speaking, if you're talking about
39 an inhibition of some life studies -- life stage
40 or an effect on growth, an effect on reproduction,
41 then that's a chronic effect, yes.

42 Q Right. And then carrying on in the paper, the
43 next bold heading is Biochemical and Physiological
44 Changes. These are something that you're familiar
45 with as being a potential chronic sublethal
46 effect, liver enzymes, liver damage? There's a
47 whole raft of papers that are here. And if you

1 can just scroll through very slowly, you can see a
2 number of studies this document makes mention of.

3 So would you agree that physiological and
4 biochemical effects are potentially sublethal
5 effects and chronic effects that may be found from
6 pulp mill effluent?

7 MR. HAGEN: Do you want to take that one?

8 MS. BOYD: I guess I was actually trying to look for
9 where the references were, but I guess it's only
10 on before -- it's only on mine. But I guess the
11 short of it is, I mean, we recognize, for example,
12 in the environmental effects monitoring that we
13 have been doing, that we have seen effects, I
14 guess you could call it chronic in that the -- I
15 mean, well, I was going to debate the word
16 "chronic", because the point is that we have
17 identified effects. We are now looking towards
18 identifying the cause and solution. So in that
19 sense, I wouldn't say they're necessarily chronic,
20 because we're working towards a solution. So I
21 guess I would shift -- I would say that in the
22 processes we've gone through for -- starting with
23 pulp and paper and in implementing the
24 environmental effects monitoring program, that
25 we're working towards solutions where we do see
26 effects.

27 Q All right. Well, certainly it's chronic from the
28 aspect of the fish, would it not be? It's a
29 chronic effect upon the fish? It's something that
30 happens over the course of time. That's what I
31 take to be the genesis of the word "chronic".

32 MS. BOYD: That's true. But then, if you're fixing
33 them, then you're coming away from that, right?

34 Q Well, hopefully you're in the business of fixing
35 that, right?

36 MS. BOYD: And that's what I'm saying. In the process
37 that we've implemented for our environmental
38 effects monitoring program, we started by
39 identifying -- selecting effects parameters,
40 measuring those, confirming if effects occur or
41 not, and then we introduced investigating the
42 cause of those effects and investigating
43 solutions.

44 Q Right.

45 MS. BOYD: So we're moving in that direction such that
46 -- that's why I was just debating "chronic"
47 because we're moving towards a solution.

1 Q Yes, I understand.

2 MS. BOYD: I'm not trying to --

3 Q I take that point, Ms. Boyd, and I'm sorry, I
4 didn't meant to cut you off, but I take that
5 point --

6 MS. BOYD: No, it's okay.

7 Q -- that you're moving towards solutions and you're
8 focusing primarily on the reproductive aspect of
9 fish and trying to arrive at what's causing the
10 diminution in gonad size in fish, which could
11 potentially affect the fish's ability to
12 reproduce; is that right?

13 MS. BOYD: That's correct.

14 Q Okay.

15 MS. BOYD: In that particular study.

16 Q And so what I'm doing, in effect, in going through
17 this Canada document is to point out that it's not
18 just a reproductive effect that can be
19 characterized as a sublethal effect, but, for
20 example, there's physiological -- if you continue
21 on, there's morphology can also be symptomatic of
22 some of the studies that -- and let's just
23 continue on. Let's go to Morphology, which you
24 will find at the top of page 23, and the authors
25 here of this federal document say:

26

27 Various degrees of skeletal deformities as
28 well as fin and gill erosion have been
29 reported in fish from areas near bleached
30 pulp mill discharge.

31

32 And there's a number of references, I take it, to
33 some reports that come after this. So
34 morphological, it's not uncommon, then, that
35 morphological changes have occurred to fish as a
36 result of their exposure to pulp mill effluent; is
37 that right?

38 MS. BOYD: I guess, I mean, I don't have the studies,
39 and I'm reading this, and while that can be true,
40 part of what we're missing here is kind of a
41 better understanding of which papers these are and
42 what effluent that they're measuring it in
43 because, again, going back to the issue of
44 improving the effluents --

45 Q Right. And I --

46 MS. BOYD: -- they may not all be the same. If we
47 measured studies from the '70s, we'd be dealing

1 with a lot more toxic effluent. So it's hard
2 sometimes to make a determination here without
3 knowing more about those studies.

4 Q Yes, I can appreciate the fact that you're a
5 scientist and you, as a scientist would want to
6 research the journals and make sure that you would
7 -- your opinion would conform to that. But I've
8 taken you to a Canadian document, so I'm assuming
9 that if Canada is putting this document forward
10 that it's not going to be in the business of
11 misleading the public, certainly, is it?

12 MS. BOYD: I just am not -- I just don't know all of
13 the references it's referring to, so I'm just not
14 sure what timing it is when those studies were
15 done and what the effluent was like then. So I'm
16 just saying that it could have been substantially
17 improved and so it may not reflect current
18 situations.

19 Q Okay. How about let's continue on. Page 23,
20 there's a reference there to mutagenicity. And it
21 says:

22
23 Bleached pulp mill effluents have been found
24 to be mutagenic using standard tests.
25

26 Now, I'm going to take you to a specific test,
27 which is document 3 of the Conservation
28 Coalition's documents. It's also document 28, I
29 believe, of the Commission Counsel's documents.
30 So this is a document entitled, Genetic Toxicity
31 of Pulp Mill Effluent of Juvenile Chinook Salmon
32 Using Flow Cytometry. Are any of you familiar
33 with this report? Have you read it before you
34 came to testify today?

35 MS. BOYD: Yes, I have.

36 Q So just looking at the abstract, I'm not going to
37 take you through the report in any depth, but
38 looking at the abstract, it looks as though there
39 was a study done by Dr. Easton. Are you familiar
40 with Dr. Easton, at all, and his work?

41 MS. BOYD: Yes, I am. And I did read it at the time
42 that it came out.

43 Q Yes. And he's a scientist of some report and
44 renowned, is he not?

45 MS. BOYD: Yes. and Dr. (indiscernible - overlapping
46 speakers) --

47 Q And you're not going to quarrel -- you won't

1 quarrel with the findings in this report, will
2 you?

3 MS. BOYD: I may have an opinion on it.

4 Q All right. And I'll get to your opinion on it in
5 a moment. But in terms of Dr. Easton's
6 reputation, I mean, he's not here to defend
7 himself, but you're not going to --

8 MS. BOYD: Oh no.

9 Q -- take issue with it?

10 MS. BOYD: No, no, no, and I don't really have trouble
11 with the paper, either, other than to put it in
12 proper context.

13 MR. LEADEM: All right, and I'll allow you to do that
14 as soon as I mark it as an exhibit. And now
15 minded, Mr. Commissioner, that I forgot to mark
16 the last one as well. So if we can mark my
17 document number 1 as the first exhibit that needs
18 marking, Mr. Registrar?

19 THE REGISTRAR: Yes, that will be marked as 1041.

20
21 EXHIBIT 1041: Health Canada, Environmental
22 and Workplace Health, Effluents from Pulp
23 Mills using Bleaching - PSL1
24

25 MR. LEADEM: And that was the Health Canada document,
26 Mr. Commissioner. And this particular document,
27 written by Mr. Easton, is the next exhibit after
28 that one.

29 THE REGISTRAR: 1042.

30
31 EXHIBIT 1042: Genetic Toxicity of Pulp Mill
32 Effluent of Juvenile Chinook Salmon
33 (Oncorhynchus Tshawytscha) Using Flow
34 Cytometry
35

36 MR. LEADEM: Thank you.

37 Q So Ms. Boyd, I'll now allow you to express your
38 opinion, because I think I'm obliged to do that.

39 MS. BOYD: I guess my first - I was going to ask you a
40 question back - but I guess all I just wanted to
41 make sure that this was put in proper context.
42 This paper is about a method more so than looking
43 at, for example, the results of genetic toxicity
44 in pulp mill effluents. It's trying to assess
45 this method. This is the first time that they had
46 actually used a method, the flow cytometry, on
47 fish. It had previously been used on rats and

1 some other animals. So that's what I think, as
2 the study is done and looking at it as a potential
3 tool, it was done well in that regard.

4 There are some statements that I would, I
5 guess, that aren't supported in there. For
6 example, where it indicates in there that the
7 effluents that they tested in this test are found
8 in the river, and there was no evidence in the
9 report, itself, that that occurs. And from the
10 information I have on -- have seen on the river,
11 I've not seen those concentrations, for example,
12 eight and 16 percent. But the study did look like
13 it had good potential for that to be a method.
14 But then that was the first stage. It still has
15 to go through further stages of research to get to
16 a point where it could be used as a tool, because
17 it was raised as a potential tool for
18 environmental effects monitoring, but it wasn't
19 ready to, for us, to be able to use in a way to be
20 able to say, "Okay, well, what exactly does that
21 mean?" When we have our parameters for measuring
22 our fish in the standard fish survey, we measure
23 age, growth or size at age, condition, liver, and
24 gonad, and we have a way of looking at that
25 pattern to determine, ultimately, what type of
26 effect we have.

27 Whereas in this flow cytometry, in this
28 method it was more about development and it
29 doesn't tell us exactly how we would apply that to
30 what that indicator means in the end. There's a
31 lot of studies that come up with indicators
32 because somebody's trying to find a good tool that
33 you can use that you can measure on a frequent
34 basis, and it's a great concept, but it just
35 needed to go further.

36 So I guess what would be more interesting, it
37 would be the papers that came after this that
38 would have taken it to those steps, and I don't
39 know if it's gone there.

40 Q Are you familiar with something that came after
41 this?

42 MS. BOYD: No, I'm not. That's what I'm just saying.

43 Q Okay.

44 MS. BOYD: That was, like in my opinion, that's the
45 first stage. And I know I even had conversations
46 with Dr. Kruzynski, at the time.

47 Q Right. He's with DFO, is he not?

1 MS. BOYD: Well, he's retired. He's enjoying himself.
2 Well, he was probably enjoying himself before, but
3 I'm just saying that we did have a discussion
4 about -- like it's you had to be -- like you have
5 to be cautious of where you take the results
6 there, because this was like the first stage.
7 Q Okay. I want to just get back to - and I have
8 just a very brief amount of time remaining to me -
9 I want to examine with you an expert's report,
10 which has been marked as Exhibit 826 in these
11 proceedings, and it's the report that Mr. Don
12 MacDonald has done about contaminants in the
13 Fraser. It was our expert's report number 2. and
14 I'm going to take you to pages 140 and 141 of that
15 report, and there's a number of --
16 MR. LUNN: Is that the paper page 140?
17 MR. LEADEM: 140 of the -- I'm looking for the
18 conclusions. I think it was at the tail end of
19 the paper.
20 MR. LUNN: Yes.
21 MR. LEADEM: There we go, "Recommendations". That's
22 what I'm looking for.
23 Q So have any of you on the panel read this before
24 coming in to testify here? That would make my job
25 easier. It was on your list --
26 MR. GRACE: I read it last week.
27 Q That's good. Any of the federal representatives,
28 have you people read it?
29 MS. BOYD: I've read parts of it.
30 Q Okay.
31 MS. BOYD: I confess, it wasn't easy to get through all
32 of it.
33 Q I'm specifically going to take you to the
34 recommendations. I don't expect you to read it
35 all, because there's a lot of reading here, but it
36 is on a topic that I would have thought most of
37 you would have wanted to read about because it
38 discusses contaminants, and your field is
39 contaminants in the Fraser system, or contaminants
40 generally in the province, is it not? I'm getting
41 blank stares.
42 MS. BOYD: Go ahead.
43 MR. GRACE: I'm just agreeing with him.
44 Q Well, let's start with you, Mr. Grace. You seem
45 to be -- contaminants in the Fraser is something
46 that obviously concerns you, correct?
47 MR. GRACE: Sure.

1 Q All right.

2 MR. GRACE: Although I look more at the Thompson.

3 Q Yes, I understand.

4 MR. GRACE: Yes.

5 Q Let's look at some of the recommendations here,
6 because Mr. MacDonald, after studying specifically
7 the sockeye and the contaminants in the Fraser
8 with regard to sockeye, has made some
9 recommendations. And the first one he says is:

10
11 Effluent monitoring programs for all
12 industrial sectors should be reviewed and
13 evaluated to determine if they provide the
14 necessary and sufficient data to characterize
15 effluents and evaluate effects on aquatic
16 ecosystems. The results of such monitoring
17 programs should be compiled in a single
18 database that is publically accessible.

19
20 Do any of you on the panel have any reaction to
21 that? Does that sound to you like something
22 that's eminently sensible?

23 MR. HILL: Yeah, I think reviewing the monitoring
24 reports, or the monitoring programs makes sense
25 and it's something we do.

26 Q And having these readily accessible in a single
27 database, is that also something that would be of
28 similar use, Mr. Hill?

29 MR. HILL: I don't know. We make use of the data
30 that's in the provincial BMS system, and I don't
31 know how that might affect other people.

32 Q I get the sense that, Canada, you've got a
33 database, and B.C. has a database, but somehow the
34 databases aren't talking to one another; is that
35 true?

36 MR. GRACE: The databases may not, but I know I have
37 access to the Environment Canada database.

38 Q Right.

39 MR. GRACE: And download data on occasion.

40 Q Is there a lot of sharing amongst the -- of the
41 databases between the two groups, between the
42 Province and the Federal Government? Do you have
43 free access to those databases?

44 MR. GRACE: I think part of the issue is none of us
45 here are database experts. There's other people
46 in our organization that look after those matters,
47 so hence the blank stares.

1 Q Okay, you're like me; you trust somebody else to
2 do the technology for you or the IT stuff, right?
3 Okay.

4 MS. BOYD: I was going to say, it's certainly a good
5 idea.

6 Q Okay.

7 MS. BOYD: It is a hurdle getting over -- getting to a
8 database, and I would just kind of stress that if
9 you can convince -- I mean, I've found over the
10 years, that it is -- you can get a database
11 developed, but it's sometimes difficult to get --
12 maintain that database and ensure that the
13 resources are put to that. So I think it's a
14 great idea to be able to put -- to have data
15 publicly accessible, but it would be a definite
16 challenge to try and put all of it together in one
17 database.

18 MR. LEADEM: All right I think my time is up, so I'm
19 going to cede the floor, but I thank you for your
20 answers to my questions.

21 MS. BROWN: Thank you, Mr. Commissioner. My name is
22 Anja Brown, and with me is Kennedy Bear-Robe, law
23 student, and we're here, today, on behalf of the
24 First Nations Coalition. The First Nations
25 Coalition is made up of some of the tribes from
26 the Fraser River, some Fraser River aboriginal
27 fishing organizations, the Council of Haida
28 Nation, and also some of the Douglas Treaty
29 Nations.
30

31 CROSS-EXAMINATION BY MS. BROWN:
32

33 Q So in the remaining minutes I'll start out, Ms.
34 Boyd, by taking you back to your evidence of this
35 morning, and you spoke of a local monitoring
36 committee and indicated that the people or the
37 groups that sit on such committees depends on the
38 particular mill at issue, but can include First
39 Nations and non-governmental organizations. And
40 my question is whether you're able to provide a
41 specific example of such a committee on the Fraser
42 River?

43 MS. BOYD: There isn't on the Fraser, we just have the
44 Upper Fraser Mills, which work as one group, and
45 then Domtar, which EEM is linked to it and we do
46 have this Thompson River monitoring group. So
47 there is, I guess, a link to the EEM program for a

- 1 mill on the Fraser with aboriginal --
2 Q Right. And Mr. Grace, you talked about the
3 Thompson River group. So is that an example of a
4 local monitoring committee?
5 MR. GRACE: It sort of incorporated the local
6 monitoring committee, but it's above and beyond
7 what typically goes for just the pulp mill. It
8 includes representatives from -- well, because of
9 the municipal sewage side of it and the rest.
10 Q So speaking, then, on the committee that you've
11 been involved in, what sorts of input would you
12 receive or would the committee receive by the
13 various First Nations participants?
14 MR. GRACE: At this point, it's mostly access to their
15 sites that we sample at. The main participant
16 would be the Kamloops Indian Band, because of
17 their proposal to put in a sewage treatment plant,
18 but that hasn't gone ahead. But certainly when
19 that does go ahead, then they would become an
20 active partner as far as incorporating their --
21 voluntarily incorporating their monitoring program
22 into the entire partnership program.
23 Q So does the Kamloops Indian Band have its own
24 monitoring program in place that provides some
25 contribution to the committee?
26 MR. GRACE: Not at present.
27 Q All right. And is that something that's being
28 discussed?
29 MR. GRACE: Yes.
30 Q And does the Kamloops Indian Band or any of the
31 other First Nations participants in that committee
32 provide any feedback with respect to concerns that
33 they have on the effect of pulp and paper mills on
34 sockeye salmon?
35 MR. GRACE: Well, they can present any of their
36 concerns. I don't know whether they have had any
37 particularly with sockeye salmon, but at our
38 annual meetings they are invited and they can have
39 input at that point.
40 Q All right. And then what's the next level? The
41 input that's provided to the committee, who does
42 that go to for consideration?
43 MR. GRACE: From a legislative point of view, it would
44 -- if it's impacting the provincial permit, then
45 we would deal with it. If it was going to affect
46 the federal EEM monitoring, then Janice would deal
47 with it.

1 Q Ms. Boyd, this morning you talked about the Smart
2 Regulation Initiative. Is that a national -- or
3 was that a national initiative?

4 MS. BOYD: Yes, it was. I mean, that's -- the program
5 was called Smart regs, I think it was. The point
6 was anyone could put a reg forward to try and make
7 it more effective, and so the EEM -- the EEM was
8 put forward to do that, and previously there had
9 been one for pulp and paper air emissions.

10 Q And do you know if there was any B.C. input to
11 that initiative?

12 MS. BOYD: I don't believe so, other than like from the
13 regions we got requests for providing some
14 information. So that would be the B.C. input from
15 B.C. But not provincially, that I know of. I'm
16 just trying to remember from the list of people in
17 the front, if there was any kind of provincial --
18 I don't think so, but I just have to look in that
19 front cover of the Smart Regulation document.

20 Q All right. I'll just move on in the interests of
21 time. Mr. Lunn, could you please turn up Exhibit
22 1033. And if we could go to vii, which is the
23 list of recommendations. And Mr. Hagen, you'll
24 recall that you were asked some questions this
25 morning with respect to some of those
26 recommendations. Any my question is on
27 Recommendation 34, which is a recommendation that
28 communications between all stakeholders involved
29 in EEM should continue beyond the mandate of the
30 Metal Mining EEM Team, that it should include
31 annual stakeholder meetings or workshops to get an
32 update to discuss new science and other issues as
33 they arise. And my question to Mr. Hagen, or to
34 anyone on the panel that might be able to answer
35 this, is whether Recommendation 34 has been
36 implemented?

37 MR. HAGEN: Yes, I can answer that. Our Recommendation
38 34 is one of those recommendations which we see as
39 one that we can be implementing as we go along by
40 making changes to our practices and ensuring that
41 the spirit of the recommendation is followed. So
42 perhaps I can illustrate that with a couple of
43 examples, and one of them would be metal mining.
44 The EEM program had an Investigation of Cause
45 Workshop about a year ago, and First Nations were
46 a part of that. Other stakeholders were invited
47 to be a part of that workshop. So environmental

1 groups were there, First Nations were invited. So
2 that would be one example where they have an
3 opportunity to -- for specific feedback into a
4 particular aspect of the program.

5 And another example would be, getting back to
6 your previous question about First Nations'
7 representation on a local monitoring committee.
8 If we look at Gibraltar, for example, they have a
9 technical advisory committee which has First
10 Nations representation, I believe. And we've
11 informed that committee about the requirements for
12 EEM and the monitoring that is required and
13 invited other stakeholders, via that committee, to
14 provide feedback about monitoring they might like
15 to see incorporated. So that's one aspect of it.

16 And also, via that panel, or separate to
17 that, the First Nations have had an opportunity to
18 comment on the permit and perhaps have -- bring
19 their concerns forward so that can be incorporated
20 into the provincial permit and also into the
21 monitoring programs that are being done. And the
22 idea here is that we would try to do the best of
23 our ability to harmonize so that all stakeholders
24 who have concerns that require environmental
25 monitoring, the federal requirement, they're met,
26 the provincial requirement, they're met, and any
27 other significant concerns that other stakeholders
28 may have can also be addressed in that program.
29 So that would be a good example of that.

30 Q Right. And would you agree that such
31 collaboration between various stakeholders and
32 also First Nations is not only an opportunity to
33 provide input, but also an opportunity to share
34 different sorts of expertise?

35 MR. HAGEN: Yes. And the qualifier there is when we do
36 invite other representatives to the table for a
37 local monitoring committee whether it be an
38 environmental group or First Nations, we do ask
39 that there's technical input. So there is that
40 aspect of it.

41 Q This morning, in response to some questions that
42 Ms. Baker had with respect to compliance, Mr.
43 Hagen, you indicated that compliance isn't
44 something that you follow closely, but your sense
45 of it was that there's generally good compliance.
46 And what I'm trying to understand is, is
47 compliance part of a different department from

1 monitoring?

2 MR. HAGEN: Yes, it is. Janice and I are involved with
3 compliance promotion, so we work as advisors
4 primarily to our management and to other
5 stakeholders, other groups, informing them what
6 they need to do to be in compliance. But we do
7 have an enforcement branch which will actually do
8 inspections and check whether compliance
9 requirements are complied with. So if there are
10 any out of compliance incidents, we should inform
11 our enforcement people.

12 Q Right. And does enforcement, in turn, communicate
13 back to you on what the outcome of their
14 investigations are?

15 MR. HAGEN: They do, yes. We have a good working
16 relationship with enforcement and ourselves and we
17 talk about the various cases and, well, the sites.
18 We share information, basically, to keep each
19 other informed.

20 Q So an important element of understanding observed
21 effects and developing solutions is the level of
22 compliance and what the outcome of enforcement
23 action is; is that correct?

24 MR. HAGEN: Well, perhaps it would be useful if I
25 clarify. We're talking about environmental
26 effects monitoring, specifically. Recall that the
27 objective of EEM is to assess the adequacy of the
28 regulations. So a lot of the information we're
29 collecting goes towards generating that
30 information that we need to assess whether the
31 regulations are adequate. So the compliance
32 issues in that instance with EEM are basically
33 conducting an appropriate program on specific
34 timelines and ensuring that those reports come in
35 on time and that the data is generated.

36 Q Mr. Lunn, could you please turn up paragraph 214
37 of the PPR. This paragraph refers to a train
38 derailment that took place in 2006 near Lytton,
39 where there was a spill of 800 tons of
40 metallurgical coal into the Thompson River. And
41 if we can -- we can see there, in the second part
42 -- or the second sentence of that paragraph that
43 the spill occurred during the late summer Fraser
44 River sockeye run. Is anyone on the panel aware
45 of this incident?

46 MR. GRACE: I was involved in that.

47 Q All right. Mr. Grace, are you able to advise what

1 type of remediation occurred as a result of that
2 incident?

3 MR. GRACE: I wasn't sort of the on-ground person, so I
4 couldn't say for sure what all happened, but the
5 coal that was along the banks was removed, the
6 cars that were still on the bridge were removed,
7 and then at some point I know there was a lot of
8 discussion about when to remove the cars that were
9 actually in the river, but I don't know exactly
10 when they were removed. They didn't want to
11 remove them right then, because of the sockeye and
12 other salmon running through. I think they waited
13 until much later into the winter, when there were
14 no migrating salmonids going past the site.

15 Q And whose responsibility was it to attend to those
16 various remediation steps?

17 MR. GRACE: In this case, it would have been the
18 railway companies and their consultants that did
19 the actual hands-on remediation.

20 Q And do you know if there was any documented
21 detrimental effect to the salmon run as a result
22 of that accident?

23 MR. GRACE: I'm not aware of any documented impacts. I
24 know there was a fair amount of monitoring done to
25 try and confirm or disprove, whichever, whether or
26 not there was an impact, but I don't think any of
27 the monitoring showed anything too much, other
28 than they did find a bit of coal deposits in some
29 of the depositional areas, very thin layers of
30 coal.

31 But it turns out the coal wasn't as bad as it
32 could have been because the coal, when it's
33 processed, is heated up to a very high temperature
34 to -- it's washed and dried and dried at a very
35 high temperature which actually dries off the
36 volatiles, which tend to be the more toxic
37 fraction of the coal. So if it had been raw coal,
38 there would have been much more problems with
39 things like PAHs, which were not present in this
40 coal because of the high temperature drying.

41 Q Okay, my final question is with respect to mines
42 that have been closed. What is the duty on a
43 previous owner to remediate ongoing -- the
44 discharge of ongoing deleterious substances into
45 waterways?

46 MR. HAGEN: Well, just generally speaking here, a mine
47 owner has an obligation to address a s. 36(3)

1 issue. So we have our inspectors identify that
2 there is a discharge that is deleterious to fish
3 and is emanating from a mine at it, and if we can
4 identify an owner, then our enforcement staff will
5 be directing the owner to do something about the
6 problem.

7 Q And what are the legal consequences if an owner
8 fails to do that? And by "legal" I simply mean
9 pursuant to the regulations.

10 MR. HAGEN: Well, I'm not really the proper person to
11 answer that, I'm not an enforcement officer, I
12 don't have the training, but I do know that they
13 have a number of options, inspector directions,
14 all the way up to court prosecution.

15 Q And are you aware of that happening in any case in
16 B.C.?

17 MR. HAGEN: Currently, we have an inspector direction
18 regarding the Tulsequah Mine, the Tulsequah,
19 Chief, which is not in the Fraser Basin, and that
20 is probably the highest profile ongoing inspector
21 direction that I'm aware of. I do know that there
22 are other inspections going on, but I'm not
23 familiar with the cases.

24 MS. BROWN: Thank you. Those are my questions.

25 THE COMMISSIONER: Thank you, Ms. Brown.

26 MS. BAKER: I just have one question of re-exam. I
27 don't know if Canada has any as well.

28 MR. TIMBERG: One short question. Mr. Lunn, if we
29 could go to Exhibit 1027.

30

31 CROSS-EXAMINATION BY MR. TIMBERG, continuing:

32

33 Q Ms. Boyd, you've been asked about the Smart
34 Regulation and whether there had there been any
35 input from other stakeholders in it and you asked
36 to see this document. And I think if we could
37 look at page 2, if you could summarize the input?

38 MS. BOYD: Yeah, I did take a quick look, thank you.

39 Q I think page 2 and then 2 and 3 talks about -- is
40 that what you needed to see?

41 MS. BOYD: Yeah, what I was looking for was the list of
42 participants that are listed there. The Privy
43 Council. So there's industry. The Privy Council,
44 I think, was driving this initiative, and that's
45 their presence, environmental group Pictou
46 Harbour, and DFO. The aboriginal representation
47 was Chiefs of Ontario. So I guess the answer was,

1 no, there wasn't provincial representation on this
2 at all.

3 Q And if we could just turn to page 3, at the top,
4 and it looks like Saskatchewan and Alberta were
5 consulted?

6 MS. BOYD: Yes, and they are, under the regulation,
7 they are the regional authorization officer under
8 the pulp and paper regulations in Saskatchewan and
9 Alberta, as opposed to our regional director of
10 environmental protection operations, which is the
11 authorization officer for the rest of the
12 provinces.

13 MR. TIMBERG: Thank you. Those are all my questions.

14 MS. BAKER: I have no re-examination, actually. So
15 we're finished for the day. It sounds like the
16 city's on a boil out there, so we --

17 THE COMMISSIONER: Ms. Baker, I wonder if I could just
18 ask this. Mr. Leadem, at the end of his cross-
19 examination -- if Mr. Lunn could bring up Exhibit
20 826.

21 MR. LUNN: Certainly.

22 THE COMMISSIONER: And Mr. Leadem had turned up the
23 recommendations that exist within that lengthy
24 report, and obviously these witnesses may have had
25 access to this report prior to today, but it is a
26 lengthy report and they may not have had a
27 reasonable opportunity to really have a close look
28 at it.

29 Mr. Leadem was interested in their response
30 to some -- at least Recommendation 1, but perhaps
31 he was going to go on, had he had time, to the
32 other recommendations. And I would like to invite
33 Commission Counsel to talk to Mr. Leadem and
34 counsel for the Federal Government and the
35 Provincial Government to see if this is an
36 appropriate and unique situation where the
37 Commissioner could have the opportunity to hear
38 any views that these four representatives have
39 with the Province and the Federal Government with
40 regard to these recommendations because, as I say,
41 time is short today and they probably haven't had
42 a sufficient time to -- now, they may not be, at
43 the end of the day, the persons who could respond
44 to all of these recommendations, but I simply
45 invite the four of you to have a word to see if we
46 could not elicit that information from them, to
47 the extent that they can do it, and then put that

1 on the record so that we have their response to
2 these recommendations, and I say to the extent
3 that they are able to provide that response.

4 MS. BAKER: Thank you. I'll talk to my friends after
5 the break.

6 THE COMMISSIONER: I would be grateful for that. Thank
7 you very much, and thank you, Mr. Leadem.

8 MS. BAKER: Thank you to the witnesses for showing up
9 today and giving their --

10 THE COMMISSIONER: Yes, I wanted to thank you, Ms.
11 Baker, to you, and I want to express appreciation
12 to the four of you for coming here, today, and
13 answering questions and making us aware of your
14 knowledge about these matters. Thank you all very
15 much.

16 We're adjourned, then, until ten o'clock
17 tomorrow morning, is that correct? Yes.

18 MS. BAKER: Yes, that's correct.

19 THE COMMISSIONER: Thank you.

20 THE REGISTRAR: The hearing is now adjourned until ten
21 o'clock tomorrow morning.

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(PROCEEDINGS ADJOURNED TO TUESDAY, JUNE 14,
2011, AT 10:00 A.M.)

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I HEREBY CERTIFY the foregoing to be a true and accurate transcript of the evidence recorded on a sound recording apparatus, transcribed to the best of my skill and ability, and in accordance with applicable standards.

Pat Neumann

I HEREBY CERTIFY the foregoing to be a true and accurate transcript of the evidence recorded on a sound recording apparatus, transcribed to the best of my skill and ability, and in accordance with applicable standards.

Diane Rochfort

I HEREBY CERTIFY the foregoing to be a true and accurate transcript of the evidence recorded on a sound recording apparatus, transcribed to the best of my skill and ability, and in accordance with applicable standards.

Karen Hefferland