



“When You Talk - We Listen!”



MANITOBA PUBLIC UTILITIES BOARD

Re:

MANITOBA HYDRO
NEEDS FOR AND ALTERNATIVES TO
REVIEW OF MANITOBA HYDRO'S
PREFERRED DEVELOPMENT PLAN

Regis Gosselin	- Chairperson
Marilyn Kapitany	- Board Member
Larry Soldier	- Board Member
Richard Bel	- Board Member
Hugh Grant	- Board Member

HELD AT:

Public Utilities Board
400, 330 Portage Avenue
Winnipeg, Manitoba
April 4, 2014
Pages 5220 to 5484

1 APPEARANCES

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24

25

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1 --- Upon commencing at 9:01 a.m.

2

3 THE CHAIRPERSON: Good morning. I
4 believe that we're ready to resume today's -- the
5 proceedings of the hearing. Before we start, I have a
6 request to make of Manitoba Hydro.

7 Manitoba Hydro advised the PUB panel on
8 the public transcript that Manitoba Hydro would be
9 making a decision today -- by today as to whether to
10 instruct the Keeyask general civil contractors to
11 proceed or not proceed for construction starting in
12 July 2014. The PUB panel also heard evidence that
13 there is a financial penalty to be paid by Manitoba
14 Hydro if the contractors instructed to proceed for July
15 2014 construction but Manitoba Hydro, for whatever
16 reason, subsequently changes the starting date.

17 Manitoba Hydro was to notify the PUB
18 panel and all parties as to what decision was made.
19 Could you advise the panel, please, what's happening
20 with that particular matter? Mr. Wojczynski,
21 please...?

22 MR. ED WOJCZYNSKI: Yes, Mr. Chair. I
23 participated in a meeting on Tuesday afternoon on this
24 issue, and I will be expecting that I'll be able to,
25 probably after lunch today, communicate what the

1 decision was as to what we -- we are informing the
2 general civil contractor. So we will inform the PUB
3 and this hearing at that time.

4 THE CHAIRPERSON: Would you be in a
5 position to give us a written -- a copy of the written
6 communication to the contractor?

7 MR. ED WOJCZYNSKI: I'll -- I'll take
8 that under advisement. I'm not sure what -- what the
9 process will be for that, but I'll get back to you on
10 that after lunch, as well.

11 THE CHAIRPERSON: Thank you, Mr.
12 Wojczynski. Over to you, Mr. Hombach.

13 MR. SVEN HOMBACH: Good morning, Mr.
14 Chairman. Good morning, members of the panel. Today
15 is reserved for the evidence of MNP LIP, which is the
16 independent expert appointed by the boards to speak to
17 macro-environmental matters in the NFAT. Before we
18 turn it over to Me. Monnin, I need to speak to a few
19 administrative matters.

20 First of all, after the lunch break
21 today there will be a short presentation by one of the
22 presenters, Mr. Tim Sale, that is scheduled for 12:45.
23 That likely means that the panel will need to break at
24 twelve o'clock sharp to accommodate that schedule.

25 There will also be a CSI session late in

1 the day. CSI stands for commercially sensitive
2 information. At that point, the doors will be closed
3 and members of the public will have to excuse
4 themselves. I don't know the exact timing at this
5 point, but I would anticipate that that would happen
6 around four o'clock in the afternoon.

7 I'd also like to make the parties aware
8 that there's going to be a change in the schedule on
9 Monday. As most of the people in the hearing room are
10 familiar with by now, Mr. Jim Foran recently passed
11 away. Jim Foran was a senior regulatory lawyer who
12 used to handle Centra Gas matters before the Public
13 Utilities Board.

14 The funeral is at 10:30 on Monday, and
15 to accommodate the lawyers that would like to attend,
16 the panel has agreed to commence the hearing early on
17 Monday morning and go from eight o'clock till ten
18 o'clock, then break till 1:00 in the afternoon, and go
19 until the end of day or six o'clock. If anybody would
20 like to know the details they can approach me or the
21 Manitoba Hydro lawyers, or Mr. Monnin.

22 Those are the administrative matters I
23 need to speak to. So, Mr. Chairman, I suggest we turn
24 it over to Me. Monnin to qualify his witnesses.

25 THE CHAIRPERSON: Bonjour, Me. Monnin.

1 MR. CHRISTIAN MONNIN: Bonjour, M.

2 President. And Me. Monnin will turn it over to Me.

3 Weinstein who will be qualifying the witnesses this

4 morning.

5 MR. MICHAEL WEINSTEIN: Good morning,

6 Mr. Chair. And --

7 THE CHAIRPERSON: Good morning, Mr.

8 Weinstein.

9 MR. MICHAEL WEINSTEIN: -- members of

10 the panel. Yes, Mr. Monnin has been kind enough to

11 give me the wheel for the morning, so I'll try to keep

12 us on course. One matter I want to touch on first is

13 that when we swear the witnesses from MNP and then

14 qualify them, we'd like to have Mr. Sabine qualified as

15 our expert witness.

16 And with him is Ms. Sarah Keyes. And

17 we'd like to have her -- her qualified as a fact

18 witness only. She did provide support in the

19 preparation of the report, but she's not here to

20 express an opinion. She's here just to provide support

21 to Mr. Sabine. And she may comment on the methodology,

22 but we're not expecting her to express any opinion or

23 to ask that this proceeding accept her opinions as --

24 on an expert basis.

25 I'd also like to now take a moment just

1 to address a few exhibits that need to be entered. The
2 first one was an Elenchus exhibit that was touched
3 upon. It was provided by Mr. Williams and then
4 referred to by Mr. Todd. And I believe one (1) page of
5 this document was entered as Elenchus 8 ERA -- or ERA-
6 7, pardon me. We'd like to enter the full document as
7 ERA-8, and that is the California Energy Demand 2014 to
8 2024 Final Forecast Volume I. And two (2) copies have
9 been provided to Mr. Secretary.

10

11 --- EXHIBIT NO. ERA-8: California Energy Demand
12 2014 to 2024 Final Forecast
13 Volume I

14

15 MR. MICHAEL WEINSTEIN: The errata
16 summary for MNP, which is entered as MNP-4, has also
17 been provided to Mr. Secretary. We'd like to enter
18 three (3) additional exhibits today. The first is the
19 March 2014 redacted macro-environmental considerations,
20 which is essentially just the final revised version of
21 the public MNP report. And that we'd like to enter as
22 MNP-6. Copies of that have been circulated, provided
23 to members of the panel and to Mr. Secretary.

24

25 --- EXHIBIT NO. MNP-6: March 2014 redacted macro-

1 environmental
2 considerations
3

4 MR. MICHAEL WEINSTEIN: The scope of
5 work for MNP we would like to enter as MNP-7.

6
7 --- EXHIBIT NO. MNP-7: Scope of work for MNP
8

9 MR. MICHAEL WEINSTEIN: And we'd also
10 like to enter the slide deck which MNP will use today
11 as MNP Exhibit Number 8.

12
13 --- EXHIBIT NO. MNP-8: Presentation slide deck
14

15 MR. MICHAEL WEINSTEIN: And the panel's
16 been provided with copies of all those and additional
17 copies have been circulated as well, Mr. Chair. As
18 long as those exhibits are all acceptable, Mr. Chair, I
19 guess we could now turn to swearing the witnesses.

20
21 IEC MEYERS NORRIS PENNY PANEL:

22 CRAIG SABINE, Sworn (Qual.)

23 SARAH KEYES, Sworn

24
25 QUALIFICATION OF WITNESS:

1 MR. MICHAEL WEINSTEIN: I'd now like to
2 qualify Mr. Sabine as the expert witness for MNP.

3 Mr. Sabine, you're here on behalf of
4 MNP, which has been retained by the Manitoba Public
5 Utilities Board in order to assist the PUB to conduct a
6 Needs For and Alternatives To review of Manitoba
7 Hydro's proposed Preferred Development Plan, correct?

8 MR. CRAIG SABINE: That's correct, yes.

9 MR. MICHAEL WEINSTEIN: MNP prepared a
10 report dated February 14th, 2014, in accordance with
11 the terms of reference and MNP's scope of work dated
12 September 20th, 2013, to critically review certain
13 aspects of Manitoba Hydro's Preferred Development Plan
14 and filings, correct?

15 MR. CRAIG SABINE: Yes.

16 MR. MICHAEL WEINSTEIN: Was the report
17 prepared by you or under your supervision and control?

18 MR. CRAIG SABINE: It was prepared by
19 me under my supervision, with significant input from
20 Ms. Keyes, who sits to my left.

21 MR. MICHAEL WEINSTEIN: Can you please
22 describe for the Board the primary areas of focus in
23 your work for the PUB?

24 MR. CRAIG SABINE: Primary areas of
25 focus are a critical sort of third-party review of the

1 macro-environmental impacts and issues associated with
2 the Preferred Development Plan and -- and alternative
3 plans, focussing on collective impacts to the macro-
4 economics of the projects, and -- and the planning
5 process, with focus on certain valued environmental
6 components that we've identified as -- as key for the
7 panel's review.

8 That includes greenhouse gas emissions
9 and -- and associated topic areas, as well as caribou,
10 lake sturgeon, changes to the water regime, and --
11 sorry, and other valued environmental -- or other
12 valued fauna in the region.

13 MR. MICHAEL WEINSTEIN: Thank you. Mr.
14 Sabine, your curriculum vitae has been filed with the
15 panel as part of Hill Co. Exhibit number 8.

16 Can you describe your qualifications and
17 experience, particularly as they relate to the work
18 undertaken?

19 MR. CRAIG SABINE: Yes, I -- I hold a
20 bachelor of environmental studies from the University
21 of Waterloo, with a specialization in environment and
22 resource, as well as a minor in biology. I also have
23 an MBA from the Queen's School of Business.

24 I have for -- dating back to -- to my
25 studies, studied various topics relating to

1 environmental issues of economic development and
2 sustainable development in Canada. I participated in
3 restoration ecology projects for the Lower Trend
4 Conversation Authority, as well as biological
5 monitoring, populations monitoring on behalf of the
6 Niagara Escarpment Commission in Ontario.

7 Subsequent to this, I spent some time
8 working at Environment Canada, where I was part of the
9 trans-boundary air issues branch, where I developed
10 some of the first elements of emissions trading schemes
11 in Canada for NOx and SOx emissions.

12 I, subsequently to that, spent ten (10)
13 years with ICF International, a consulting firm, and
14 have been advising businesses and -- and the public
15 sector for over twelve (12) years now on issues
16 associated with climate change, carbon markets, NOx and
17 SOx, emissions, mitigation strategies, as well as
18 mercury, and -- and water policy, and more recently
19 have joined MNP as part of their energy and utilities
20 practice, where we again focus on environmental issues
21 associated with economic development in Canada and the
22 US and with specialty in energy utilities, upstream oil
23 and gas, electric utilities, power generation, and
24 things of that nature.

25 MR. MICHAEL WEINSTEIN: Can you

1 generally describe the type of clientele that you do
2 work for at MNP?

3 MR. CRAIG SABINE: We typically do work
4 -- our team exclusively does work for utilities, as I
5 mentioned, both vertically integrated and -- and
6 transmission and distribution utilities, power
7 generation companies, such as TransCanada, Capital
8 Power, AltaGas, as well as, you know, provincial
9 utilities, Mitch -- Manitoba Hydro, BC Hydro, FortisBC,
10 as well as public sector entities, such as Environment
11 Canada, Natural Resources Canada, DAUC, the Ontario
12 Energy Board, the independent electricity system
13 operators and other RTOs, as well as the Ontario Power
14 Authority in Ontario.

15 MR. MICHAEL WEINSTEIN: Thank you, Mr.
16 Sabine. With that, Mr. Chair, I would ask that Mr.
17 Sabine be accepted by the Board as an expert for the
18 purposes of giving evidence on the work performed by
19 MNP according to its scope of work under the NFAT.

20 THE CHAIRPERSON: Thank you, Mr.
21 Weinstein. I'll canvass the -- the Intervenor to see
22 what their views are. Mr. Williams, please.

23 MR. BYRON WILLIAMS: Mr. Sabine -- good
24 morning, members of the panel, and also to Ms. Keyes,
25 and to Mr. Sabine. Just a couple questions for you.

1 In your curriculum vitae, you also discuss some work in
2 environmental audit -- auditing that you took at the
3 Schulich School of Business.

4 Is that right?

5 MR. CRAIG SABINE: That's correct, yes.
6 I have a designation in environmental auditing --
7 auditing from Jacques Whitford, which is an engineering
8 firm, and the Schulich School, yeah.

9 MR. BYRON WILLIAMS: And what exactly
10 is environmental auditing, sir?

11 MR. CRAIG SABINE: It's a set of
12 techniques, methodologies, approaches to review,
13 assess, analyze environmental impacts of projects. It
14 had a particular focus on GHG reporting, greenhouse gas
15 reporting, and verifying that the emissions reported by
16 large final -- final emitters are accurate and -- and
17 valid.

18 MR. BYRON WILLIAMS: Thank you. Sir,
19 if -- if I were seeking to describe your skill set that
20 you've performed for this analysis, would I be correct
21 in suggesting that your key -- key skills for the
22 purposes of this assignment relate to the assessment of
23 regulatory and financial risk and costs related to the
24 environmental impacts of economic activity, including
25 energy transmission and generation?

1 MR. CRAIG SABINE: I think that's a
2 very fair characterization, yes. Certainly my
3 expertise lies at the nexus of the science and physical
4 environmental impacts, and translating that into
5 meaningful analytics with regards to the economic
6 impacts, et cetera.

7 MR. BYRON WILLIAMS: Okay. Certainly,
8 Mr. Chair, I should -- should have noted that our
9 client, Ms. Desorcy, is here, and -- and as is Ms.
10 Fast, our very gifted articling students who I always
11 neglect to introduce.

12 And on behalf of CAC (Manitoba), we
13 welcome the evidence of MNP and certainly suggest that
14 Mr. Sabine be qualified is a -- as an expert in the
15 assessment of regulatory and financial risk and costs
16 related to the environmental impacts of economic
17 activity, including energy transmission and generation.

18 THE CHAIRPERSON: Thank you, Mr.
19 Williams.

20 Good morning, Mr. Gange.

21 MR. WILLIAM GANGE: Thank you, Mr.
22 Chair. Green Action Centre has no objections to the
23 qualification of this witness.

24 THE CHAIRPERSON: Thank you, Mr. Gange.
25 Mr. Orle, please.

1 MR. GEORGE ORLE: MKO has no objection
2 and does not object to the qualification of the expert
3 as a witness -- or witness as the expert.

4 THE CHAIRPERSON: Thank you, Mr. Orle.
5 Ms. Saunders, please.

6 MS. JESSICA SAUNDERS: Good morning.
7 MMF has no objections.

8

9 (BRIEF PAUSE)

10

11 MR. SVEN HOMBACH: And, Mr. Chairman,
12 MIPUG does not have a representative in the hearing
13 room this morning, so I would suggest that we turn it
14 over to Manitoba Hydro to canvass whether they have any
15 concerns in qualifying the witness.

16 THE CHAIRPERSON: Could I hear from
17 Manitoba Hydro, please?

18 MR. DOUGLAS BEDFORD: No objections to
19 the witness.

20 THE CHAIRPERSON: After consulting my
21 panel mates, the panel will accept Mr. Sabine as an
22 expert witness for the purposes of the assessment of
23 the regulatory risks and financial costs related to
24 environmental issues for energy and transmission --
25 energy transmission and generation. So, Mr. Sabine,

1 good morning. Good morning, Ms. Keyes.

2 MR. CRAIG SABINE: Thank you. Good
3 morning.

4

5 (BRIEF PAUSE)

6

7 EXAMINATION-IN-CHIEF BY MR. MICHAEL WEINSTEIN:

8 MR. CRAIG SABINE: So I guess we are
9 ready to proceed here, so good morning, Mr. Chair.
10 Good morning, panel members, counsel, IEC -- sorry,
11 Intervenors, Manitoba Hydro. I appreciate the time
12 that I'm going to be able to spend with you today, and
13 thank you for allowing me to participate here.

14 We'll -- we'll jump right in. I have a
15 slide deck that follows along with our report section
16 by section. Our scope covers a broad swath of ground,
17 I would say, with many different topic areas that are
18 related, but in some cases pretty loosely related.

19 So we'll kind of bounce around in terms
20 of the head space that we'll be in, which I'll try and
21 -- I'll try and give us some time between sections to -
22 - to absorb some things and allow any questions that
23 the panel may have at that time.

24 We'll -- we'll look at the direct
25 impacts of climate change, which was a key -- a key

1 concern with the development plans, as well as the --
2 the direct GHG emissions and air pollutants associated
3 with -- with those plans. Look at the water regime
4 changes.

5 And then we'll look at a subset of
6 valued environmental components that we felt were
7 representative of -- of others and -- and critical to
8 the analysis of the plans and -- and for the panel's
9 consideration; so caribou, lake sturgeon, and other at-
10 risk fauna. And then we'll -- we'll touch on the
11 equitable distribution section of our report and our
12 analysis done there.

13 I would say that again it's -- it's a
14 lot of ground to cover, so we'll -- with the
15 presentation really be going through at a -- at a
16 pretty high level, and -- and of course encourage
17 questions where -- where the panel requires or would
18 like more detail. Of course, there's more detail in
19 the report, and in the IR responses and in the reports
20 that were used to -- to substantiate some of the things
21 that we're saying for sure.

22 So our scope of work, this is really
23 more for reference than anything, and -- and this
24 presentation can act as a standalone document. There's
25 certain enough detail there to provide a decent read.

1 But the -- we were mandated by the -- by the panel to
2 take a critical analysis look at the macro-
3 environmental impacts and benefits of -- of the
4 Preferred Development Plan and -- and alternative
5 plans, with some specific focus on the macroeconomic
6 consequences of those impacts and issues, and how they
7 interrelate with the plans and the decisions therein.

8 We looked at air, water, flora, and
9 fauna. A lot of focus was placed on -- on climate
10 change issues and the greenhouse gas and other air
11 emissions associated with the plans, and how those
12 things interact in -- in the export markets in the
13 Midwest US, or MISO; as well as the expected changes in
14 those markets, in terms of capacity mix and what --
15 what impacts that would have on both the exports as
16 well as the electricity markets in those regions.

17 We took a look at the cost and need for
18 sturgeon fishway, as well as the -- the main water
19 regime changes that are -- that are likely to be of
20 some concern, and -- and -- to the communities as well
21 as to the ecology of -- of the reach.

22 And then the last piece was to review
23 the global warming impacts direct -- global warming
24 impacts that could be expected in the future and how
25 those things might affect the Preferred Development and

1 alternative plans.

2 There were some limitations of our
3 analysis that we had to consider. Macro-environmental,
4 or macro-environment, is not a discrete or definitive
5 term. If we asked ten (10) people in the room what
6 'macro-environment' means, we'd probably get eleven
7 (11) different answers. So we had to come up with
8 something that worked for the purposes of this hearing
9 to the best of our purview.

10 So we -- we decided that a high-level
11 review of the broad impacts that could fundamentally
12 shift a collective and interdependent set of decisions
13 on -- on the plans, framed what our analysis would look
14 like, and those impacts that had a reasonable potential
15 to incur macroeconomic implications for those plans.

16 We attempted to the best of our ability
17 to avoid redundancy in the concurrent CEC environmental
18 assessment hearings that are being conducted on Keeyask
19 and will likely be conducted on -- on other project --
20 or plan project -- planned project elements, should
21 they proceed further down the line. And as directed by
22 the PUB, we did have some latitude in -- in the
23 definition of 'macro-environment' and -- and the
24 related issues therein.

25 So our report had -- had sort of several

1 key messages, and we'll just quickly go over them
2 before we get into the detailed meat of -- of this
3 report. Our review focussed on impacts and con -- that
4 were considered to be significant and material in the
5 local and the global context, and we tried to weight
6 those two (2) things to the extent possible.

7 It -- it investigates the extent to
8 which Manitoba Hydro's consideration of these impacts
9 was prudent in their analysis performed for the NFAT
10 filing; assesses the reasonability of Hydro's analysis
11 data and assumptions in that analysis. We -- we
12 generally find that the Preferred Development Plan's
13 consideration for resource conservation, sustainable
14 energy development, and avoidance of GHG emission --
15 emissions over the long term makes it very attractive.

16 Conversely, there are a number of local
17 -- more local environmental impacts and significant
18 risks that should be considered carefully and managed
19 accordingly as we proceed with these plans, should they
20 be approved. Hydro's analysis in the NFAT provides an
21 acceptable narrative of the macro-environmental
22 concerns, with a few no -- noteworthy exceptions where
23 it was found that examination was somewhat in --
24 insufficient, at least in how it was articulated in the
25 NFAT filing, and to -- to really enable a -- a sound

1 review by the panel.

2 Some rebuttal evidence has been filed in
3 relation to our -- to our report, and we'd just like to
4 identify that now. And we will talk about some of that
5 in more depth as we go along. Carbon pricing, it was
6 noted that embedding carbon pricing in economic
7 analysis is common practice, and that's certainly true.
8 It's more a question of meth -- methodological approach
9 in -- in doing that, that is either un-transparent or
10 in question. And -- and we'll talk about that when we
11 get to the carbon pricing section.

12 But we didn't have full transparency on
13 the methodology and assumptions that were input into
14 that analysis, which forced MNP to come with its own
15 assumptions in -- in how that was characterized. And -
16 - and we believe that those assumptions were reasonable
17 in our treatment, but we certainly also recognize that
18 for consistency purposes we would -- we -- we could
19 perform analysis using the assumptions that Hydro used
20 if they are also considered to be reasonable. And --
21 and we did do some of that analysis subsequent.

22 We were clear that our -- our carbon
23 value modelling was really an estimated or
24 representative proxy for the value of non-emitting or
25 low-emitting exports of what they might have in a

1 future that includes carbon pricing. And it certainly
2 was an exogenous analysis from the dynamic analysis
3 that Hydro conducted in its -- in its SPLASH modelling
4 and -- and financial modelling.

5 There was -- there was an instance in
6 the rebuttal evidence where it was noted that our
7 extrapolation of carbon pricing was improperly
8 characterized. We're not entirely clear on what it
9 meant by 'improperly extrapolated', so we'll try to
10 explore that in the presentation and potentially when
11 we get to cross. And we'd like to do that to ensure
12 that everybody's on the same page. We liked to, as I
13 mentioned, to do some new scenarios which brought in,
14 again, only what we could interpret as the correct
15 assumptions, in terms of extrapolating those carbon
16 prices.

17 The other point of concern was the
18 drought analysis. There's certainly considerable
19 uncertainty that has been identified by all parties in
20 trying to predict what a drought might look like in the
21 future. But it's also been acknowledged that a more
22 severe drought than those on record are certainly
23 possible.

24 And since it's certainly possible, it
25 only seems prudent to me that in a low case or worst-

1 case scenario that captures the worst case economic
2 scenario for the Preferred Development Plan would
3 include drought characteristics that characterize
4 drought as -- as more severe or longer than those on
5 record. And -- and we note that that analysis had not
6 been conducted by Hydro in its NFAT filing and
7 analysis.

8 So we'll get into the first section of
9 the report in terms of the detail, which is the direct
10 impacts of climate change. In our view, this is about
11 reasonability; reasonable findings based on global
12 climate modelling that -- that we reviewed in terms of
13 the results of that -- that we've reviewed and -- and
14 certainly Hydro has reviewed and -- and worked
15 extensively with parties that do, that conduct global
16 climate modelling.

17 On an annual basis, it's noted that
18 greater precipitation and, therefore, greater runoff
19 and higher stream flows are standard for Northern
20 watersheds in climate change scenarios. Increased
21 precipitation and runoff, however, expect to occur
22 during the winter, late winter, early spring seasons,
23 which may be meaningful in terms of the economic
24 analysis, depending on the characteristics of the hydro
25 system.

1 Therefore, reasonable analysis would
2 suggest that the timing is important to the economic
3 analysis of the plans. The examination of the system's
4 ability to store in leverage seasonal changes in
5 greater detail is a reasonable expectation for analytic
6 purposes to assist their panel in their
7 recommendations.

8 In Hydro's rebuttal evidence, they
9 provide greater clarity on the reason that they elected
10 to conduct modelling on an annual average basis rather
11 than on a seasonal basis. And we found that to be
12 reasonable, acceptable, but we'll likely talk about
13 that later, would be my guess as well. So, you know,
14 we'll save getting into more detail for then.

15 The next bit, in terms of climate change
16 direct impacts, is that the modelling also suggests
17 that as a result of climate change there's likely to be
18 increased instances and increased severity of drought
19 in the later part of -- of this century.

20 We do recognize that hydrologic drought
21 is defined differently than perhaps climatic or
22 meteorological drought, but the two (2) are
23 intrinsically linked. Hydrologic drought would
24 represent a period of below average hydro conditions
25 for an extended period of time, which seems to be, to

1 me, sort of a more lax definition of what drought might
2 be.

3 Since it's demonstrated in much of the
4 evidence that hydrologic drought poses the most severe
5 risk to any energy safety of -- of Manitoba Hydro and
6 that there's always a possibility of drought occurring
7 that's worse than those droughts of record,
8 particularly given increasing impacts of climate change
9 over the long term, that it only makes sense for -- and
10 again, we -- we talked about this in the intro section,
11 that it only makes sense to analyze drought conditions
12 more severe than those on record in a worst case or low
13 case economic scenario.

14 And I'll get into the emissions impacts
15 of the plans themselves and the analysis of those
16 potential emissions impacts. In terms of cumulative
17 operating emissions, those are the emissions associated
18 with the operations of -- of Manitoba Hydro internally
19 to Manitoba.

20 Prefer -- Preferred Development Plan
21 certainly has low operating emissions relative to the
22 alternative plans, particularly those relying on
23 natural gas generation. Some plans do or could have
24 lower overall operating emissions, such as Keeyask¹⁹,
25 Conawapa³¹, and the 750 megawatt line. However, not

1 all plans provide the same level of energy output and,
2 therefore, a potential for export. And, therefore, the
3 prospective emissions displacement in a regional
4 context could be -- could be much different.

5 So even though you're getting
6 potentially less emissions -- or more emissions, sorry,
7 in Manitoba, you may actually get a greater level of
8 emission displacement regionally.

9 The Prefer -- Preferred Development Plan
10 also has the highest net GHG displacement potential.
11 This is allowed for by surplus energy from Keeyask and
12 Conawapa projects and the 750 megawatt transmission
13 line, which allows exports into the MISO region, which
14 allows for displacement of fossil generation in -- in
15 those states.

16 And hydroelectric generation obviously
17 has much lower GHG emissions than the marginal capacity
18 generation in MISO, which is currently primarily coal
19 and natural gas.

20 We can see on the table of slide 14 some
21 of the -- the impacts quantitatively of the Preferred
22 Plan versus a subset of alternative plans.

23 It is recognized that Plan 4 has likely
24 been removed from the analysis at this point. But we
25 see here that, for analytical purposes, still

1 interesting certainly to -- to look at that plan
2 against the Preferred Plan.

3 And we see that cumulative operating
4 emissions of 7 1/2 megatonnes over the lifetime of the
5 plan are certainly the lowest by far in comparison to
6 the plans we have here. And the displacement potential
7 also is -- is the highest at 191 megatonnes over the
8 lifetime of the Preferred Plan.

9 The next closest alternative plan
10 actually is only -- only offers about half as much
11 displacement on a regional basis.

12 So why -- what's generating these
13 results? Well, essentially, a simple -- simple
14 representation from our friends at CAP (phonetic) shows
15 that coal generation in -- in the US Midwest is
16 certainly extensive. North Dakota and Minnesota, the
17 directly neighbouring states to Manitoba, are certainly
18 no exception. They have a very high percentage of coal
19 generation in those states.

20 The last MISO market assessment that was
21 conducted in 2011 actually demonstrates that coal is on
22 margin over 90 percent of the peak and off-peak
23 periods. And the marginal generation is, in theory,
24 the megawatt hours that would be displaced by exports
25 coming into those markets.

1 To get a sense of how that capacity mix
2 in MISO might change over time, which is important
3 because even though it's been demonstrated that 90
4 percent of marginal generation today is coal, that's
5 likely not going to be the case twenty (20) years,
6 thirty (30) years, fifty (50) years from now.

7 So we took a look at current and future
8 policies to get a sense of what that generation mix
9 might look like in the future, and -- and Hydro
10 certainly did this in its -- its analysis as well. And
11 -- and we -- we found that the same set of policies
12 were reviewed by Hydro as -- as the ones that we
13 reviewed. So we have good alignment in that sense.

14 The Preferred Development Plan aligns
15 well with all of those policies in terms of -- from a
16 Canadian context, from a regional context, from a
17 provincial context. And -- and the US policies would
18 provide it potentially with some opportunities as well,
19 which we'll -- we'll get into in detail.

20 The export value of -- of Hydro's
21 exports into MISO will certainly be there, but there is
22 risk associated with exactly what that value would be.
23 And that's driven by the fact that MISO is estimating
24 that even current regulations and -- and currently
25 proposed regulations could affect 84 percent of the two

1 hundred and ninety-five (295) coal plants in MISO.

2 Capacity mix in MISO is likely to change
3 significantly over time as a result, and coal would be
4 reduced. And therefore the emissions intensity of
5 MISO's receiving region would put downward pressure on
6 the value, potential value, of -- of exports.

7 THE CHAIRPERSON: That last sen --
8 sentence, could you explain that last sentence? I
9 would have thought that the reduction in emissions
10 intensity would have the opposite effect, would --
11 would actually put upward pressure on prices.

12 MR. CRAIG SABINE: That's true. It
13 could put upward pressure on -- on energy prices, which
14 could add value to -- to export energy. In the context
15 of the environmental premium that's embedded in those
16 energy prices, a reduction in emissions intensity would
17 -- would have the opposite effect.

18 The net effect I'm not getting into
19 here. I assume Potomac did that, but you're certainly
20 right in that.

21 MR. RICHARD BEL: Could you explain the
22 counterintuitive results on the greenhouse gas
23 emissions chart that shows that, after the Preferred
24 Development Plan, the next lowest emissions are the Gas
25 Plan? It -- it seems counterintuitive.

1 (BRIEF PAUSE)

2

3 MR. RICHARD BEL: Oh, I see. Okay.

4 Okay, sorry. I -- I misread that. Sorry.

5 MR. CRAIG SABINE: Okay, no problem.

6 MS. MARILYN KAPITANY: But I have a
7 question on that chart, since we've turned back to it.

8 MR. CRAIG SABINE: Okay.

9 MS. MARILYN KAPITANY: Could you
10 explain -- I understand the Preferred Development Plan,
11 but on the comut -- cumulative GHG operating emissions,
12 why Plan 5 is showing lower emissions than Plan 4?

13

14 (BRIEF PAUSE)

15

16 MR. CRAIG SABINE: Subject -- subject
17 to check the details, my guess is that one of the
18 fossil generation sources assumed in Plan 4 is running
19 harder for some reason based on -- I -- I really
20 couldn't say, just based on the titles of these, but we
21 can certainly get that detail for you.

22 MS. MARILYN KAPITANY: Thank you. That
23 would be great.

24 MR. CRAIG SABINE: Sure. We can
25 provide an undertaking to do that.

1 (BRIEF PAUSE)

2

3 MR. CRAIG SABINE: The undertaking
4 would be to perform an analysis between Plan 4 and Plan
5 5 to determine the drivers for the differences in
6 operating emissions.

7 MR. MICHAEL WEINSTEIN: I just wanted
8 to confirm that was the undertaking panel member
9 Kapitany was seeking?

10 MS. MARILYN KAPITANY: Yes, thank you.

11

12 --- UNDERTAKING NO. 97: MNP to perform an analysis
13 between Plan 4 and Plan 5
14 to determine the drivers
15 for the differences in
16 operating emissions

17

18 MR. CRAIG SABINE: Okay. So we were
19 just talking about some of the drivers for a reduction
20 in -- in coal capacity in MISO, and -- and likely an
21 increase in -- in alternative forms of generation,
22 natural gas and wind in particular. And -- and the
23 policies that are driving these are summarized here in
24 the slide. I -- I won't get into too much to do with
25 them, because they are there to read later.

1 But there are a -- a confluence of -- of
2 policies from the EPA that are -- are coming to bear in
3 the near term which are requiring plants to reduce
4 mercury emissions by up to 90 percent, which is quite
5 significant and costly to -- to control. The Cross-
6 State Air Pollution Rule seeks to reduce SOx and NOx
7 emissions. There's also regulations being put in place
8 for the management and disposal of coal flash and other
9 solid waste materials from -- from coal facilities.
10 And in their treatment of -- of cooling water, and --
11 and how that cooling water is -- is -- goes through
12 intakes and is consumed.

13 All those things are going to add
14 significant operating costs to coal plant -- to coal
15 plants, and -- and those plants and -- and the managers
16 behind them are going to have to make some decisions on
17 whether to retrofit those plants to meet these
18 regulations, or -- or retire the plants. Most of the
19 analysis by the EIA and consult -- Manitoba Hydro's
20 consultants and others would suggest that a -- a fair
21 number of these coal plants would chose to retire,
22 which will, of course, reduce the total generation of
23 coal in MISO.

24 At the same time, there's renewable
25 portfolio standards in most US states today, North

1 Dakota and Minnesota no exception. Wisconsin as well.
2 And -- and some of the -- the requirements for
3 renewable generation in those states, i.e., the -- the
4 amount of renewable generation that has to be purchased
5 by distribution utilities, could be significant. In
6 Minnesota's case, 25 percent by 2025, which is
7 certainly a -- a significant -- for -- for those
8 jurisdictions, significant to achieve.

9 What all of that means, essentially, is
10 that after an expected set of retirements in the coal
11 fleet in MISO, increased generation from retrofitted
12 plants will actually keep coal total output relatively
13 flat, but demand growth will be -- will be met with a
14 series of -- of wind and gas installations and increase
15 in generation, which will drive down the amount of coal
16 on the margin and increase the share of wind and gas
17 generation on the margin, which essentially -- we -- we
18 see here in -- in the graphic on slide 18 that coal on
19 margin goes down from a predicted 77 percent in 2015
20 down to -- to 60 percent by 2034.

21 In terms of what that means for the
22 actual greenhouse gas emissions and the intensity of --
23 of the interacting markets, the exported energy from
24 Manitoba continues to be very low emitting over the
25 time horizon that we -- that we looked at, somewhere

1 between 2 and 10 tonnes per gigawatt hour between 2014
2 and 2047, which is still quite low even at ten (10).

3 In comparison the receiving markets in
4 MISO are many multiples higher than this; currently
5 around nine hundred (900) or eight (8) -- eight-ninety
6 (890) in 2014 tonnes per gigawatt hour. That will be
7 driven down by the change in capacity in those markets
8 that we've just discussed, down to 711 tonnes per
9 gigawatt hour, but certainly still much, much lower
10 than -- than Hydro's exports.

11 Of note, Hydro's planning assumptions
12 was found to be 750 tonnes per gigawatt hour blanketed
13 across their planning horizon, which does come out to
14 be conservative to our analysis, which attempted to
15 forecast a changing emissions intensity in MISO over
16 time. So -- so it would -- seven-fifty (750) is
17 certainly a reasonable assumption for planning purposes
18 and comes out to be conservative.

19 We also undertook a carbon policy review
20 which we'll see later and -- and in the CSI
21 presentation later this afternoon, is important when
22 trying to capture or tease out what the incremental
23 value of non- or low-emitting exports might be in a
24 future that includes carbon pricing. The problem is,
25 is there's considerable uncertainty regarding what the

1 stringency and nature of that carbon policy might be.
2 Whatever it might be, the -- the Preferred Development
3 Plan certainly aligns with those carbon policy or
4 policies, and -- and that's true of Canadian policy,
5 regional policy, and -- and the US potential policies
6 as well.

7 The risk, in terms of exports with
8 expected future US broad-based carbon policies, is that
9 there's a small likelihood of a federal cap and trade
10 or market-based mechanism actually existing in the near
11 term. We probably don't see incremental value placed
12 on -- incremental environmental value placed on non-
13 emitting generation until the mid-part of the next
14 decade.

15 And -- and even at that point, tempered
16 carbon pricing could negatively impact the economics of
17 the Preferred Plan in that case. However, the other
18 regulations that we talked about certainly provide
19 upside in that they're going to drive lower-cost
20 generation out of the system in MISO, and -- and in
21 that sense add a premium to -- to Hydro's exports.

22 So other policies that we looked at, in
23 the Canadian context and the Manitoba-specific context
24 there's a number of regulations that essentially limit
25 or negate development of new coal projects and -- and

1 will wean off Canadian regions from the use of coal in
2 -- in electricity generation. Certainly that's the
3 case in Manitoba.

4 So the Preferred Plan aligns with that
5 well, given that it doesn't include any plans for --
6 for coal development, nor do any of the alternative
7 plans.

8 Manitoba's Clean Energy Strategy that
9 was released in December of 2012, we find the PDP to
10 also align well with it in that it provides a strategic
11 direction that emphasizes hydroelectric development in
12 the province.

13 There's also some regional efforts going
14 on around North America, two (2) of which Manitoba at
15 some points have been involved with on the periphery.
16 The Midwest Greenhouse Gas Reduction Accord seems to be
17 no longer functioning in a meaningful manner.

18 But if it were to -- if it were to
19 reorganize itself and Manitoba were to choose -- were
20 to choose to be a participant, certainly the PDP would
21 align with -- with its strategic direction and -- and
22 objectives. Same goes for the Western Climate
23 Initiative which, to my knowledge, Manitoba is an
24 observer of.

25 The next bit, in terms of our climate

1 change analysis, includes the analysis of life cycle
2 emissions of the projects included in the plans. This
3 is done to give a sense of, from plan to plan, on a
4 life cycle basis, how they compare, how the projects
5 compare to one another in terms of emissions output.

6 All LCAs, including the one conducted
7 for Keeyask, include inherent accuracy -- accuracy
8 risks and limitations, given that we -- we don't know
9 all of the factors that would drive emissions at this
10 time; for example, where materials would be sourced for
11 the construction of Keeyask.

12 Some of these -- some of these things
13 are known, but not all of them. So we can only
14 estimate and make some assumptions around where those
15 materials might come from, and that will affect
16 emissions in -- in the life cycle. So the actual
17 emissions might be quite different. But a reasonable
18 level of caution and risk mitigation was performed, in
19 our view, by Hydro and Hydro's consultants, Pembina
20 Institute, when they conducted this assessment.

21 And we endeavoured to check the data
22 assumptions in the analysis, and we sort of did a -- a
23 materiality assessment to determine which components of
24 the life cycle are most important, most impactful on
25 the -- on the total life cycle emissions. And

1 therefore, those are the areas where we focussed.

2 Oh, right. Mr. Weinstein reminded me
3 that LCA is an acronym in this proceeding that's
4 typically used for La Capra. La Capra is not mentioned
5 in our presentation at any point other than right now,
6 so LCA in this context means life cycle emissions -- or
7 life cycle assessment.

8 Right. And the -- the analysis that we
9 evaluated was -- was only a life cycle analysis of the
10 Keeyask project itself against other technologies to be
11 representative of -- of a plan-to-plan relationship.
12 To my knowledge, there is a life cycle assessment
13 currently being conducted for Conawapa now as well, but
14 it isn't complete at this time.

15 So the elements of the analysis that are
16 material includes materials transportation, the
17 emissions associated with materials transportation --
18 that is, transportation of construction materials to
19 site; the emissions associated with the steel
20 production and the cement production, which of course
21 are -- are both significant in -- in a large hydro
22 project of this nature; and then the emissions
23 associated with the production and refining of the fuel
24 that will be combusted during the construction of the
25 facility, as well as in the operations, ongoing

1 operations, in the long term of the facility. Heavy
2 equipment, earth moving, things of that nature are
3 using this fuel.

4 For sensitivity, the -- the Pembina base
5 case made the assumption, and -- and a conservative
6 one, that all steel would be sourced or come from
7 China. And -- and this was simply to capture
8 potentially the longest distance of potential source
9 between -- between source and -- and site in Manitoba.

10 So conservative in the sense that, yes,
11 steel is likely to -- to come from many different
12 places, both near and far, but it's likely that all of
13 those sources would be geographically somewhere in
14 between China and -- and Manitoba.

15 They also conducted their own
16 sensitivity case which made the assumption that all
17 steel would come from the United States, which gave
18 them about a 13 percent total reduction in -- in LCA
19 emissions. We conducted a similar sensitivity where we
20 got a little bit more specific in where we assumed
21 steel would be produced. And you can see there that we
22 looked at Hamilton, Pittsburgh, Cleveland. And that
23 would only serve to provide further reductions in the
24 life cycle emissions. So we find this to be overall
25 conservative.

1 The second sensitivity was steel source
2 emissions factor, so the emissions associated with
3 producing -- actually producing the steel. Overall,
4 producing steel in China could increase total life
5 cycle emissions between 5 and 9 percent. This was used
6 as a conservative assumption, because we assume but
7 don't know, due to data limitations, in many cases,
8 that Chinese steel production is likely the most energy
9 intensive and, therefore, emissions intensive.

10 However, this is all fairly immaterial
11 when we compare these -- these emissions in the life
12 cycle with other generation technologies, particularly
13 those that are relying on gas, which would have far
14 greater life cycle emissions regardless of what
15 assumption we use on -- on steel production.

16 A similar message for cement. The --
17 the base case made the assumption that cement was
18 produced, I believe, in Edmonton and would be sourced
19 from Edmonton. However, due to lack of data
20 availability on -- on production emissions, the
21 assumption that the emissions intensity of -- of cement
22 production would be akin to the US average.

23 We didn't know exactly where the data
24 source came from for -- for that assumption, nor
25 exactly what that emissions intensity was from the NFAT

1 filing, but we did endeavour to -- to find an estimate
2 of average US cement production emissions intensity.
3 And that was taken from EPA documentation.

4 And based on -- based on our analysis,
5 using our assumption, excuse me, we see that total life
6 cycle emissions could be between 2 and 9 percent
7 greater, which is material to the LCA calculation being
8 nearly 10 percent. But again, it's immaterial when we
9 look at the comparison to other generation
10 technologies, particularly those one -- those relying
11 on gas generation.

12 The fourth sensitivity looked at the
13 emissions associated with fuel sourcing production and
14 refining. In the base case, the assumption was made
15 that crude used to produce the fuel that would be
16 combusted on site would be sourced 40 percent from
17 heavy -- heavy crude sources, likely Alberta Oil Sands
18 projects, and -- and 60 percent from light sources
19 which have very different emissions profiles, given the
20 production methods used in -- in Alberta and other
21 heavy fuel plays around the world in comparison to
22 light crude plays in Texas, Saudi Arabia, and other
23 places.

24 Sensitivity that was conducted looked at
25 increasing the fuel source from heavy to a hundred

1 percent. And we conducted the same analysis. There's
2 an allocation factor that's required to attribute the
3 amount of diesel from -- that would come out of a
4 typical barrel of oil that's -- that's produced.

5 We found -- MNP found that the average
6 diesel product ratio per barrel of -- of US oil based
7 on EIA data is about point two-four (.24). We -- we
8 calculated that Hydro's assumption was point three-six
9 (.36), and this accounts for some -- some slight
10 difference. But we do note that Hydro found in their
11 sensitivity that based on moving their -- their fuel
12 sourcing to a hundred percent domestic Alberta source,
13 there would -- there could be up to a 86 percent
14 increase in -- in total fuel source related emissions.
15 Our analysis showed that it may be as high as 63
16 percent greater. So again, Hydro was conservative in
17 this sense.

18 We also looked at the generating
19 technologies that might be used in planning, and -- and
20 their direct life cycle emissions intensities as
21 calculated through various studies, both theoretical
22 studies and actual operating results of -- of real time
23 plants. The LCA from Pembina endeavoured to do their
24 own research, and looked at a number of -- of different
25 studies. Their -- their median for hydro power was

1 found to be -- or, sorry, their median for other
2 technologies data is here, and it -- it -- it's
3 obviously found to be much greater in most cases than -
4 - than that of the LCA of -- of Keeyask.

5 We also took a look at an IPCC report as
6 a intergovernmental panel on climate change, which
7 conducted the same type of study, but a -- but across
8 two hundred (200) or more different studies of
9 emissions intensity of -- of operating power plants
10 around the world, and we found that the emissions
11 intensities found by Pembina were -- were reasonable
12 for the most part.

13 But there is quite a lot of variation in
14 some cases, particularly for wind, which is important
15 for -- for this analysis, given that some of the
16 alternative plans include significant amount of wind
17 generation. We see that the variation could be a
18 minimum of -- of 2 tonnes per gigawatt hour, which
19 would put it quite well in line with how low the
20 assumed emissions intensity of Keeyask might be. It
21 could be as high as eighty-one (81), depending on the
22 assumptions that you've used. The median was found to
23 be about thirteen (13).

24 The reason for this variation really
25 just comes down to the input assumptions used in the

1 analysis, the most material of those being the capacity
2 factors used, which we see in this excerpt on slide 29
3 from the IPCC study, which actually is a study seeking
4 to levelize wind related life cycle emissions factors
5 for comparability purposes. That capacity factors can
6 range anywhere from 20 percent to 46 -- 45 percent,
7 which would have dramatic impacts, obviously, on the
8 total output of the facility over its lifetime, and
9 therefore on -- on the emissions tonnes per megawatt
10 hour of output.

11 Lifetime is also a -- an important lever
12 in this analysis. Some analyses used twenty (20)
13 years. Others used up to forty (40) years. Life cycle
14 boundary also important. You know, there's a number of
15 -- of questions in terms of -- of the boundary that's
16 drawn. In -- in my experience, the most important one
17 is, Did you include the emissions associated with fuel
18 production that would be combusted to construct that
19 wind facility, or those wind facilities, or not?

20 All this is really meant to articulate
21 that when you conduct an analysis based on the average
22 of a number of different studies, if you haven't
23 articulated fully whether there's comparability in
24 terms of the assumptions going into all those studies,
25 it's not quite as meaningful, because you're not

1 comparing apples to apples to apples.

2 I would also note that it may have been
3 prudent to take a look at what assumptions for wind
4 were used in the economic analysis of -- of the plans
5 that included wind. For example, what capacity factor
6 did Hydro use in -- in that analysis, and, you know,
7 that's the -- the input assumption that should have
8 been applied here as well to keep them consistent. And
9 it's not clear to us based on what's in the NFAT filing
10 whether that was the case or not.

11 This is the last piece in terms of
12 climate change and -- and emissions, and it's really
13 the environmental attributes of the exported energy of
14 the plans, and -- and that value, and we'll -- we'll
15 get into this in more depth, I -- I believe, in the CSI
16 presentation later, but just in summary, we did
17 endeavour to conduct an analysis to extract a
18 representation of what the value might be of the
19 environmental attributes associated with the low
20 emitting export generation that would be sold into MISO
21 markets.

22 Hydro's base case using its carbon price
23 forecast and its assumptions for -- for export -- for
24 export, sorry. We -- we found, using our approach,
25 that nearly \$600 million of net present value of the

1 revenues of the plan could be attributed to the
2 environmental attributes or environmental value,
3 assuming, of course, that there is a carbon policy in
4 the MISO market or in the US that would align with the
5 carbon pricing forecast that was embedded in -- in
6 those export prices that Manitoba Hydro used.

7 We did make some tweaks to -- to the
8 carbon pricing forecast, and -- and we did do three (3)
9 scenarios. In a low scenario, you might get about half
10 as much environmental attribute value, at about 300
11 million. In our base case, it was just slightly over a
12 billion of net present value. And we see -- I -- I
13 suppose maybe the more important factor on this slide
14 on -- on slide 31, is that none of the alternative
15 plans that we looked at, you know, compare very well
16 with the value that -- that could be there, should a
17 carbon pricing scheme actually become reality.

18 MS. MARILYN KAPITANY: Mr. Sabine, just
19 before you leave that one, so for the other plans, what
20 are the two (2) bars showing your scenarios?

21

22 (BRIEF PAUSE)

23

24 MR. CRAIG SABINE: The -- the dark blue
25 bars use the MH -- the -- the Hydro base case

1 assumptions, and the light blue bars use MNP's base
2 case assumptions.

3 So we're going to switch gears here, and
4 -- which I'm happy about, because that seemed like it
5 took quite a long time. So the -- the next area that
6 we'll focus on is the water regime.

7 There are a number of key impacts that
8 we'd like to -- that we'd like to highlight here today.
9 Of course, there's -- there's more detail in the
10 report, but the key impacts and their significance to a
11 water regime are really the loss of Gull Rapids. This
12 is critical, because it's one (1) of the few remaining
13 naturally valued river components with importance as --
14 as fish spawning habitat, and it holds unique value
15 that should be considered in making decisions going
16 forward, and that's high significance.

17 Split Lake flooding, although it's not
18 anticipated that the Keeyask project's operations, or
19 Conawapa's, for that matter, will -- will increase
20 Split flooding or -- or lead to -- to flooding at Split
21 Lake. It's unclear what effects will occur on and
22 around Split Lake, given that there have been some
23 observations of -- of flooding already to date, and
24 we'll get into that in a little bit more detail in a
25 minute as well.

1 Continued erosion of the shoreline over
2 the long-term could lead to hazards for wildlife, First
3 Nations and other groups using the area in terms of
4 navigation and safety. Erosion also could lead to
5 reduced water quality. I'm sorry, I apparently have
6 another appointment. Sorry. Let me pick back up here.

7 It appears, however, that the -- the
8 erosions estimates by Hydro and -- and its -- its
9 planning consultants were obviously quite robust, but
10 there is always risk of unanticipated consequences. I
11 think that's the -- that's the real message here.

12 Wetlands. Loss of wetlands leads to
13 several noteworthy impacts, including loss of key
14 habitat, increased debris in the flow regime, and
15 reduced water quality as well, and -- and that's quite
16 difficult to mitigate, although Hydro does have plans
17 in place to -- to do -- to do that.

18 This graphic on slide 34 demonstrates
19 the extent of flooding of the Keeyask project, which
20 does appear to be significant. And that's probably
21 true to some extent, but we do note that, in comparison
22 to a project of this size and nature, it certainly is a
23 -- a low amount of total flooding.

24 What we'd also like to highlight here
25 that's key is that the anticipated flooding as far

1 upstream as Split Lake area is very, very limited. And
2 you see that it's barely discernible, actually, on --
3 on this -- on this map. Of course, this is based on --
4 on Hydro's modelling of what flooding might be, and
5 we'll discuss that, you know, there's -- there could be
6 risks, that unanticipated impacts do occur.

7 In terms of our comparative analysis, to
8 sort of assert that the amount of flooding is -- is
9 low, we looked at eight (8) or nine (9) other projects
10 in Canada. And on a reservoir area to capacity basis,
11 Keeyask certainly is on the low end of -- of that
12 ratio. In fact, it's -- it's only about half of the
13 average ratio of all those projects that we looked at,
14 at point two-three (.23), which is sort of a misleading
15 number in that it's very, very small, but when you
16 apply that to square kilometres, you get a -- a fairly
17 large number. So when you crank it up to point five
18 (.5), that number obviously grows in significance quite
19 dramatically.

20 Lake Winnipeg regulation. Hydro expects
21 that the operation of Keeyask will not affect the
22 operation of LWR. Our findings in our report suggest
23 that there's no risks that Hydro will not be able to
24 release the maximum volume of water when required from
25 Jenpeg -- Jenpeg due to the requirements of the

1 operating licence, which sets out when the height of --
2 of Lake Winnipeg reaches certain standards that
3 outflows from Jenpeg would either have to be set at
4 maximum, or -- or as instructed by -- by the minister
5 as required.

6 However, recent observations have shown
7 that water levels are high or above licence -- or -- or
8 above the norm when the licence maximum water level at
9 Lake Winnipeg is above 715 feet and maximum flows are
10 released.

11 So we -- we note that it -- that there's
12 possible longer-term water regime changes that might
13 occur on the Upper Nelson as a already highly altered
14 system, and this is critical for Hydro's plans in terms
15 of monitoring it on -- monitoring the ongoing changes
16 during and upon completion of the project and over the
17 long-term.

18 If we look at Split Lake, we see that
19 it's all -- the -- the levels at Split Lake are already
20 regulated and controlled fairly greatly by Hydro. The
21 water flowing from the Churchill River Diversion and
22 from LWR combine at Spilt Lake, and therefore, there's
23 some flexibility in terms of how much water reaches
24 there during certain high flow conditions.

25 Sixty-eight (68) percent of the flow

1 into Split Lake comes from Kelsey outflow, 29 percent
2 from CRD, and 3 percent is local inflow. So that's to
3 say that, if maximum volumes are required to be
4 released from Lake Winnipeg and Jenpeg, there is
5 opportunity potentially to control how much is coming
6 from the CRD to manage that.

7 However, that said, as recently as July
8 2011, higher than usual water levels have been observed
9 at Split Lake and the Split Lake area, which is
10 attributed largely to the operation of LWR.

11 So there are indications that the
12 Keeyask project, given that it will slow and deepen
13 waters downstream of Split Lake, could impact the area
14 during conditions requiring full release from Lake
15 Winnipeg. Although noted as highly unlikely by -- by
16 Hydro, the risk is sufficient in -- in our minds for
17 consideration by the panel, for sure.

18 Okay. Moving to a new topic, unless
19 there's any questions, would be our first valued
20 environmental component: caribou. In the region,
21 there's three (3) distinct populations: the Barren-
22 ground caribou of the Beverly and Qamanirjuaq herds,
23 the coastal or Pen Islands herd, and the boreal,
24 woodland, or summer woodland caribou.

25 The extent of their interactivity is

1 unclear in the scientific record, although there are
2 indications that some of -- at last some of the -- the
3 woodland herd has integrated with the Pen Islands herd.

4 Impacts will be different in nature and
5 significance for each of these different groupings, and
6 -- and that's what we'll focus on here.

7 There is an increased vulnerability of
8 caribou populations due to the project developments.
9 Habitat loss due to infrastructure, flooding, and the
10 changes to -- to habitat composition and diversity
11 could be meaningful for the animals. The direct loss
12 of -- of unknown -- of the known quality woodland
13 caribou calving habitat is of critical significance.

14 Changes in ice conditions and -- and
15 other navigation risks could be meaningful. And then
16 of course increased hunting and predation as a result
17 of the increased activity in the area could be
18 problematic for particularly the -- the woodland herd.

19 This interrelates to another issue
20 identified by First Nations and First Nations partners
21 of the project, that there will be threats to
22 traditional hunting opportunities of the caribou,
23 further disruption. There -- there -- you know,
24 hunting opportunities have been reduced over the last
25 fifty (50) years because of past Hydro developments.

1 And -- and further disruption could have substantial
2 impacts on the continued ability for current and future
3 generations, of course, to hunt in the areas affected
4 by the projects.

5 We see here on slide 40 a representation
6 of the -- the extent of -- of the Beverly and
7 Qamanirjuaq herd range. And we see that its very
8 southern boundary comes in close to where the
9 generation projects would be located. And -- and the
10 Lower Nelson actually acts as somewhat of a -- a
11 boundary to -- to the range.

12 And not shown here, but we know that the
13 -- the Pen Islands herd sort of migrates from the
14 opposite direction, from the southeast, and comes as
15 far north as -- at times comes as far north as -- as
16 the Lower Nelson and -- and the Keeyask project area.

17 Calving -- calving habitat is of
18 particular concern for the resident caribou species.
19 Overall, Hydro expects there to be a net increase
20 actually in calving -- in viable calving habitat, with
21 new islands being formed due to the flooding of the
22 reservoir and some artificial habitat being -- being
23 created in -- in the mitigation plans, or with respect
24 to mitigation plans.

25 There is risk, however, that the caribou

1 will not respond to that new habitat. There's no
2 scientific evidence that supports that they would use
3 new islands that are generated.

4 Migratory caribou of the two (2)
5 northern migratory herds may continue to access the
6 area despite increased threats as they do have high
7 site fidelity to sensory disturbance. But there may be
8 also in that case a greater risk of mortality if
9 mitigation measures aren't entirely effective.

10 Based on past experience, we anticipate
11 their migration into the Keeyask-affected areas and the
12 Gillam region will actually be reduced, however. It is
13 noted by several First Nations in their environmental
14 evaluation reports that over time, their observations
15 of -- of significant migrations into the area has been
16 reduced over time, so new development likely
17 exacerbates this.

18 THE CHAIRPERSON: The high site
19 fidelity to sensory disturbance seems like high site
20 fidelity despite sensory disturbance?

21 MR. CRAIG SABINE: Correct. They --
22 they -- if they're disturbed due to the construction
23 activities or -- or, you know, highways or -- or
24 interaction with -- with humans, they may leave the
25 area for a time, but they -- they will come back, I

1 think, is what that's saying in terms of sensory
2 disturbance, which is counter to the -- the calving
3 habitat issue. Even though they have high site
4 fidelity to sensory disturbances, we don't know that
5 they have necessarily high site fidelity to a total
6 change in -- in their preferred calving habitat.

7 Based on the observation, there's
8 relatively few actual individuals of resident caribou
9 in the study area, but it -- it's not entirely clear
10 how many there are. Habitat impacts could drive the
11 subspecies away from the Keeyask area entirely, and
12 again particularly if the new calving habitat is not
13 favoured or sensory disturbance in that area leads to
14 further abandonment.

15 Drowning risk is another issue that we -
16 - that we touched on in the report. The KCNs note
17 concerns regarding increased chance of drowning due to
18 altered ice regimes in winter and increased river flows
19 and changed river flows at other times. There's
20 certainly evidence from other jurisdictions that
21 supports this observation, this theory.

22 We see here that at least two (2)
23 significant instances since 1984 have occurred in
24 Quebec where ten thousand (10,000) caribou, which
25 obviously is a very significant number of individuals,

1 drowned in a hydro reservoir,. And -- and as recently
2 as 2007, I believe, three hundred (300) other
3 individuals were -- were found to have drowned in a
4 reservoir, as well.

5 This has not been found to have happened
6 in any of Hydro's reservoirs to my knowledge, but
7 certainly the fact that mortality of large numbers is -
8 - is a big risk, typically near river crossing routes
9 where flows may change. It's definitely worth
10 consideration.

11 So I'll move into our next small friend,
12 perhaps large friend in this case, the lake sturgeon.
13 There certainly are going to be key impacts to lake
14 sturgeon, and those impacts will be fairly immediate.
15 Things may change over the long term, but habitat
16 fragmentation and loss, and the loss of spawning
17 habitat particularly at Birthday Rapids, Gull Rapids,
18 and Gull Lake will have an impact on the populations of
19 sturgeon in the Kelsey to Kettle reach.

20 Blocked upstream movement, as well as
21 altered downstream movement, represents material bar --
22 barriers to the productivity of the fish. And, of
23 course, this all leads to an increased threat in the
24 existing lake sturgeon population, which the -- the
25 lake sturgeon conservation strategy is -- has the

1 objective to avoid. The impacts on water quality,
2 spawning habitat loss, introduction of the dam, and the
3 impoundment of Gull Lake are likely to result in
4 immediate decline in sturgeon population levels.

5 Hydro does have a number of substantial
6 mitigation strategies in place in its planning. It's
7 difficult to ascertain whether these strategies, which
8 are aimed at preserving and enhancing actually the
9 population, will be sufficient over the long term.

10 There's a lack of data; certainly a lack
11 of consensus on the effectiveness of stocking methods
12 and reliance on constructed habitat. The science is --
13 is quite challenging in this case because of the long
14 life cycle of the -- of the sturgeon. They have very
15 long lives, up to eighty (80) years. They sexually
16 mature late, up to twenty-five (25) years. And they
17 have distinct life cycle periods where they require
18 different types of habitat.

19 Supporting conditions of a self-
20 sustaining population in the Keeyask reservoir and
21 Stephens Lake area is not guaranteed by construction of
22 this artificial habitat. And it would take potentially
23 up to twenty-five (25) years, when we get viable
24 adults, to -- to understand the true results of -- of
25 stocking programs which leaves quite a long time to

1 risk -- at -- at risk in terms of -- of planning and
2 being prepared, given the construction period of -- of
3 Keeyask and -- and Conawapa.

4 Short-term declines over -- short-term
5 declines in the -- in the early period of the seventy-
6 eight (78) year planning horizon introduces a number of
7 risks that the pro -- proposed strategy may not result
8 in sustainable long-term population levels.

9 However, we -- we do recognize that
10 Hydro's plans definitely bolster and add additional
11 resources to the roles currently being played by the
12 Saskatchewan and Nelson River Lake Sturgeon Management
13 Board, Split Lake Resource Management Board, academia,
14 federal provincial government, and -- and Hydro
15 themselves. This investment in -- in understanding the
16 fish populations and -- and adding to the preservation
17 of the populations over the long term certainly would
18 not be made if the Preferred Development Plan doesn't -
19 - does not go forward.

20

21 (BRIEF PAUSE)

22

23 MR. CRAIG SABINE: We looked at
24 specifically the needs for a fishway. It's not exactly
25 known how the sturgeon are going to respond to the

1 constructed habitat, as we've -- as we've gone over.
2 And, therefore, it's reasonable that passage will be
3 necessary to ensure that the sturgeon are -- are able
4 to fill all their -- their life stages and requirements
5 for population sustainability.

6 The DFO notes that habitat degradation
7 and protection of habitat are the two (2) key critical
8 elements to support sustainment of a sustainable
9 population. And, therefore, passage for the fish to be
10 able to find those habitat areas that it prefers may be
11 necessary.

12 However, more study is likely necessary
13 on the populations as construction and impoundment
14 occur. The need and requirements for upstream passage
15 which will likely -- which -- which could be necessary
16 in order to support the goal of providing viable
17 habitat is a sound approach and -- and is supported by
18 -- by the DFO.

19 A better understanding of fish mortality
20 as a result of turbine injury and entrainment --
21 entrainment may also be needed. And we'll -- we'll get
22 into that later as well. But we believe that it is
23 prudent to monitor sturgeon use of the altered and
24 constructed habitat prior to finalizing the design --
25 design and need for a fishway.

1 If it were to be needed, we estimate
2 that the fishway cost would be between 12 and 50
3 million for each project. Certainly 50 million would
4 be the high end for Keeyask. There is a reasonable --
5 it is reasonable that there could be an adder for
6 Conawapa, given that its head is about double that of -
7 - of Keeyask. So 75 million predicted as the high side
8 there.

9 We -- we looked at a number -- again, a
10 -- a number of -- of real facilities in Canada which
11 have fishways. And we came to an average cost per
12 gross head in metres ratio and applied that to the
13 gross head of Keeyask and Conawapa. We see that this
14 now supports our estimate. On average, about 43
15 million for a plant the size of -- of Keeyask; 72
16 million for a plant the size of Conawapa. And on the
17 high end, ratios would be 55 million and 91 million,
18 which really comes to a potential total for both
19 projects, so between 115 and 150 million.

20 THE CHAIRPERSON: Mr. Sabine, going
21 back to your comment about DFO.

22 MR. CRAIG SABINE: M-hm.

23 THE CHAIRPERSON: The comment you made
24 that DFO supported this, you meant supported more
25 study?

1 MR. CRAIG SABINE: Correct, supported -
2 - there -- there is -- I believe it's entered into
3 evidence. It's a letter.

4 MR. BYRON WILLIAMS: I'm not sure it's
5 quite entered into evidence --

6 MR. CRAIG SABINE: Yet.

7 MR. BYRON WILLIAMS: -- yet. It was
8 cited by Deloitte with the permission of Mr. Monnin.
9 I'll just note it's -- is part of the pending CAC
10 Exhibit 45-11, that letter is.

11 MR. CRAIG SABINE: Thank you. But
12 essentially states, yes, that there isn't clarity on
13 whether the needs for the fishway is there. And more
14 study is required before determining that as -- so long
15 as the facility is designed and constructed in a way
16 that, you know, supports retrofit of -- of a fishway at
17 a later date.

18 Which brings us to Section 7, other at-
19 risk fauna. This one we should be pretty quick to go
20 through. The key -- there's sort of -- there was a lot
21 of different impacts to a lot of different fauna in the
22 area on this one, so we've kind of just tried to
23 whittle it down to core concepts for this presentation.

24 Number 1 is the increased mercury
25 concentration in fish. Fish and aquatic animals are at

1 risk of mercury contamination due to increased
2 flooding, causing them to become unsafe for -- for
3 human consumption. These impacts could last as long as
4 twenty (20) to thirty (30) years post-initial flooding,
5 which would equate to the loss of these animals as a --
6 as a healthy or safe source of food for at least one
7 (1) generation, which is significant for First Nations
8 communities in the area.

9 And this links to the availability of
10 these -- of these species for a source of traditional
11 food. It compromises the ability of KCNs, First
12 Nations, to pursue, obtain, and consume traditional
13 foods due to habitat loss -- or due to the mercury
14 contamination but also in other species, such as
15 caribou, moose, and -- and other animals, that there is
16 habitat loss, declining quality of life in the area,
17 which may reduce the numbers available for hunting
18 opportunities.

19 There's also wildlife risk associated
20 with the transmission infrastructure, which we haven't
21 talked about a whole lot so far in the presentation.
22 But certainly the projects do require transmission
23 infrastructure to be -- to be built, as well.

24 This -- the associated projects may pose
25 further consequence to avian species due to collision,

1 although Hydro's plans do include bird -- bird
2 diverters, which have been shown in the science to be
3 quite effective in -- in reducing the number of bird
4 collisions.

5 There are SARA-listed endangered species
6 that this is of particular interest to. The olive-
7 sided -- sided flycatcher and common nighthawk would
8 prefer the type of habitat that would be created by a
9 right-of-way and, therefore, would be in contact with
10 this infrastructure, the towers and the lines,
11 potentially more often.

12 The increased edge habitat of the right-
13 of-ways also will enhance the hunting opportunities for
14 predator species: wolves. Actually, the common
15 nighthawk as well prefers to use these corridors for
16 hunting purposes. And that would have consequences for
17 caribou in the area and other ungulates that -- that
18 could be -- could suffer mortality numbers due to
19 predation in an increased manner.

20 A number of mitigation strategies have
21 been put in place to deal with some of these issues.
22 And provided that Hydro manages the effects of the
23 projects as expected, including replacement of habitat
24 for threatened species, mitigating the impacts to the
25 ecosystems in the area, the consequences of development

1 are anticipated to be quite manageable on other at-risk
2 fauna and will not affect the long-term liability of
3 wildlife populations in the general region.

4 Though the effects of fauna are not
5 expected to be extremely adverse or widespread based on
6 the studies conducted to date, precaution should be
7 taken to ensure that all the potential impacts are
8 considered over the long term and any unexpected
9 adverse impacts are dealt with accordingly.

10 I think this is our last section on the
11 equitable distribution component of our report. We
12 found that the majority of the significant impacts
13 noted in our report, those with medium or high rating
14 occur in the medium term. This indicates that the
15 current generations will carry the bulk of the burdens
16 of negative impacts from water regime changes, from
17 aquatic habitat changes, shoreline erosion, mercury
18 levels, GHGs and air pollutants, and the impacts to
19 caribou.

20 The most significant short-term impact
21 occurs on water regime and lake sturgeon. In respect
22 to sturgeon, based on the research analysis performed,
23 we are unclear on the duration of the effect -- of how
24 long the effects will last beyond the short term. So
25 there is risk that they could also continue to persist

1 into the long term and, therefore, affect future
2 generations, as well.

3 The most significant long-term impacts
4 are those direct -- are those associated with the
5 direct impacts of climate change, which may be further
6 exacerbated by GHGs and air pollutants in the short
7 term that would be associated with alternative plan --
8 alternatives plans that are reliant on -- on gas
9 generation. This represents also the largest area of
10 inequitable distribution, as climate change will impact
11 future generations much more significantly than it does
12 today.

13 Not to say that we're not all being
14 impacted currently by climate change, but certainly all
15 science predicts that it will become worse if not
16 managed accordingly over the next twenty (20) to thirty
17 (30) years.

18 The chart on page 53 from the report
19 shows our -- an analytic representation of -- of the
20 distribution. We see that lake sturgeon is a very high
21 significance and -- and a very high risk of occurrence,
22 and it would impact the present generation in the most
23 significant way.

24 Climate change direct impacts, as I just
25 mentioned, has a -- has a substantial risk of

1 occurrence as well, and certainly of high significance,
2 but likely to impact future generations more
3 significantly as times go on. And all the other issues
4 we see there are somewhere in between.

5 I believe that concludes my direct
6 presentation, so thank you very much. And I will be
7 happy to answer questions as they come.

8 THE CHAIRPERSON: I have a question.
9 It relates to the fish pathway, if one is imposed --
10 not imposed; if -- if studies determine a fish passway
11 -- passageway would be needed for Keeyask, at some
12 point after Keeyask is built can DFO impose it on
13 Manitoba Hydro? Or is it a commitment of Manitoba
14 Hydro?

15 I just want to understand if, you know--

16 MR. CRAIG SABINE: I don't -- I don't
17 believe they can impose it unless, in a hypothetical,
18 sturgeon were to be listed under SARA, in which case
19 the Minister could impose that as a requirement of the
20 operating licence. Under the situa -- under the
21 scenario that that -- that they're not listed under
22 SARA, it would be a collective decision by Hydro, the
23 management boards, and -- and potentially DFO as well
24 whether the need is there or not. That's what my
25 understanding is anyway.

1 THE CHAIRPERSON: In terms of the cost
2 of the fish passageways that you examined, can you --
3 were you in a position to describe the factors that
4 impacted the variation in cost? In other words, were
5 there some factors that caused some passageways to be
6 more expensive than others?

7 That -- were you able to determine that?

8 MR. CRAIG SABINE: There -- there
9 wasn't a strong correlation or -- and -- and it was
10 quite variable. The -- the studies that we looked at
11 were quite variable, and there was a strong correlation
12 to -- between gross head and cost.

13 My assumption is because most of the
14 studies that we looked at, or -- or the examples that
15 were available to us were that they were typically
16 smaller, in terms of had smaller projects. So there
17 was only really only one (1) project of a significant
18 size that -- that would be comparable to -- to Keeyask
19 and/or Conawapa, and it certainly had the highest cost.

20 So, you know, qualitatively, we made the
21 link that as head increases, so does -- so does costs,
22 which is intuitive, given that you'd have to go up much
23 higher and there would be more material required to --
24 to transcend that -- that height.

25 But, as with most economies of scale,

1 the linear relationship is assumed to -- to come apart
2 as things get larger, given that fixed costs would be -
3 - would be there regardless of the size.

4 THE CHAIRPERSON: None of those
5 passageways were for lake sturgeon, were they?

6 MR. CRAIG SABINE: One was, I believe,
7 yes.

8 THE CHAIRPERSON: Okay. Is there
9 anything unique about sturgeon fish -- a lake sturgeon
10 passageway relative to other passageways, or is this
11 just a standard methodology used for passageways?

12 MR. CRAIG SABINE: Our indication is
13 that each project is essentially unique, in a lot of
14 ways akin to -- to hydro projects themselves. They're
15 all -- they're all subject to the constraints of the
16 environment in which they're in.

17 And I don't think that's entirely
18 different for the fish passageway itself, although I
19 would note that being a large, slower moving, bottom
20 sort of existing fish, it's likely that the -- the rise
21 of the fish passage itself, you know, would have to be
22 -- the steepness -- the steepness of that rise would --
23 would not be very great so -- which would obviously
24 extend the -- the total size of -- of the passage
25 itself.

1 THE CHAIRPERSON: I think it's probably
2 an appropriate time to take a break. Why don't we take
3 ten (10) minutes and resume the proceedings after
4 coffee? Thanks.

5

6 --- Upon recessing at 10:42 a.m.

7 --- Upon resuming at 11:00 a.m.

8

9 THE CHAIRPERSON: I believe that we're
10 ready to resume the proceedings. I notice we have some
11 documents from Manitoba Hydro. I wonder if we should
12 acknowledge them right away.

13 MS. JANET MAYER: Good morning. Janet
14 Mayer, for Manitoba Hydro. We have two (2) answers to
15 undertakings that I believe have been provided to
16 everyone. The first one is Undertaking number 70,
17 which was from transcript page 3,913. And it will now
18 be filed as Manitoba Hydro Exhibit 159.

19

20 --- EXHIBIT NO. MH-159: Response to Undertaking 70

21

22 MS. JANET MAYER: And the second
23 written answer to undertaking is to Undertaking number
24 73. It is from transcript page 4,038. And it will now
25 become Manitoba Hydro Exhibit Number 160. Thank you.

1 --- EXHIBIT NO. MH-160: Response to Undertaking 73

2

3 THE CHAIRPERSON: Thank you.

4 Mr. Weinstein, please.

5 MR. MICHAEL WEINSTEIN: Thank you, Mr.
6 Chair.

7

8 CONTINUED BY MR. MICHAEL WEINSTEIN:

9 MR. MICHAEL WEINSTEIN: I think Mr.

10 Sabine is in a position now to answer that lone
11 undertaking that was given during his direct evidence
12 this morning.

13 MR. CRAIG SABINE: So, Ms. Kapitany, we
14 have taken a quick look at the data behind these --
15 these plans. The difference -- there's two (2)
16 reasons. One -- sorry, slide -- slide 14 of the
17 presentation.

18 The installation of -- of new gas starts
19 one (1) year earlier, which inherently contribute to
20 increased emissions. But also, the import
21 opportunities from the 750 megawatt line versus the 250
22 megawatt line offer a -- an offset of fossil generation
23 internally that is not needed because of the imports
24 that the plan's analysis is -- is showing, so you're
25 getting -- you're getting less internal emissions,

1 although those emissions may obviously be created in --
 2 in MISO, being the exporting market, but they're not
 3 shown here because this is only operating emissions of
 4 Hydro. Is that sufficient?

5 MS. MARILYN KAPITANY: Yes. Thank you.

6 MR. MICHAEL WEINSTEIN: Mr. Chair, I --
 7 I trust that for the record, that undertaking has been
 8 satisfied.

9 THE CHAIRPERSON: Mr. Grant has some
 10 questions, sir.

11 DR. HUGH GRANT: This isn't specific to
 12 the undertaking. I have to preface this by saying I
 13 found this report extremely difficult to read. I -- I
 14 can cite -- let me start with a trite example. On page
 15 53:

16 "The migratory caribou are preferred
 17 for hunting due to their size,
 18 flavour, and recognizability."

19 What does that last word mean,
 20 'recognizability', when it comes to a caribou?

21 MR. CRAIG SABINE: They have a -- a
 22 distinct physical nature from -- from the woodland
 23 species, their --

24 DR. HUGH GRANT: And that --

25 MR. CRAIG SABINE: -- colouring and --

1 and size.

2 DR. HUGH GRANT: And that makes it
3 preferred for hunting?

4 MR. CRAIG SABINE: Easier to -- easier
5 to identify. I suppose it doesn't make them preferred,
6 per se, but it makes it easy to identify that -- that
7 these are the ones -- these are the -- the individuals
8 that they are looking at.

9 DR. HUGH GRANT: Okay. On a more
10 substantive footing, I -- I guess what I found
11 difficult in this is the series of references, the
12 things of critical significance or high significance,
13 or low significance, or significant risk, or low risk,
14 and it's trying to put this in some sort of perspective
15 to make a judgment.

16 And if I can just cite on page 1, which
17 is an executive summary, so I take it the main advice
18 you would offer to panel, and that is -- I think it's
19 the second sentence.

20 "Generally, the net environmental
21 benefits of Manitoba Hydro's
22 Preferred Plan are found to outweigh
23 its overall environmental costs in a
24 regional and global context."

25 A couple things here. I don't imagine

1 you're comparing net benefit to total cost.

2 Would this be total cost -- total
3 benefit to total cost you're comparing?

4 MR. CRAIG SABINE: Yes, that would be
5 correct.

6 DR. HUGH GRANT: And to my mind is --
7 is, so somehow, you've made a comparison of benefits
8 and costs, and I'm trying to understand how you made
9 that valuation. So in other words, if lake sturgeon
10 are at high risk, how do I -- how do I weigh that
11 potential cost to the potential benefits?

12 MR. CRAIG SABINE: Certainly, this was
13 one (1) of the core challenges to the scope of work
14 that -- that we endeavoured to take on. Very difficult
15 to compare the cost to lake sturgeon versus the
16 potential costs of climate change.

17 So is -- it -- it's certainly a
18 qualitative type of ana -- analytical framework to --
19 to look at the total effects of all of the different
20 impacts that we -- that we looked at, and -- and
21 provide weighting across those different -- different
22 impacts.

23 I think that the statement here in the
24 executive stum -- summary is representative of climate
25 change being seen as potentially the most -- on a

1 global context and regional, the most significant risk
2 to -- to, really, total economic activity, but it was
3 given more weight in making that type of an assertion
4 than local impacts to discreet species, or -- or de --
5 or -- or very discreet elements of -- of the
6 environment.

7 DR. HUGH GRANT: Okay. I'm not sure
8 that's gotten me very far. Let me cite another
9 example. You talk about the rapids at Gull Lake, and
10 you talk about them as being naturally valued.

11 I don't know what that means, what --
12 what -- when something is naturally valued...?

13 MR. CRAIG SABINE: It has increased
14 significance, and it -- and -- and is -- you know, in
15 our view, more valued, because it's one (1) of the few
16 remaining natural spawning habitats for -- for the
17 sturgeon.

18 DR. HUGH GRANT: But isn't everything
19 here naturally valued as opposed to economically -- you
20 know, in terms of short-term economic benefits? Is --
21 is -- isn't everything that you're dealing with
22 naturally valued?

23 Are -- are some things you're assigning
24 a direct monetary amount to?

25 MR. CRAIG SABINE: Everything is

1 naturally valued, yes. We are attempting to translate
2 that natural value into a monetary type of -- of value,
3 or way of thinking about it, which, you know, in
4 Hydro's multiple accounts analysis, they've done
5 something similar in nature, applying a monetary or
6 economic value to -- to an environmental externality
7 that there actually is no market-to-price.

8 DR. HUGH GRANT: But you're not doing
9 that here. At no point are you trying to say, Here is
10 a -- here is a environmental benefit that we can
11 translate into dollar terms, and here's an
12 environmental cost that we can translate into dollar
13 terms, and then we can do a net benefit calculation.
14 But you're not doing that, and I'm not saying you --
15 you need to, I'm just trying to understand how you
16 aggregate environmental costs and benefits, if -- if
17 it's not through a monetary form, other than just kind
18 of a, It feels right, kind of evaluation.

19 Can I just -- just one other thing in
20 that context, and its embedded in this same sentence
21 written. It's -- it's comparing costs and benefits,
22 and you said, "In a regional and a global context."
23 Arguably, it may be a bit selfish, but perhaps this
24 panel should be worried about a Manitoba context.

25 So, for instance, if -- if there was an

1 environmental damage very specific to Manitoba, and
2 environmental benefits that may accrue somewhere in
3 South Texas --

4 MR. CRAIG SABINE: M-hm.

5 DR. HUGH GRANT: -- if we did the cost-
6 benefit analysis on that Manitoba perspective, we might
7 come to a very different evaluation than -- than a
8 regional or a global context.

9 Would that be correct?

10 MR. CRAIG SABINE: Entirely correct. I
11 don't disagree with that at all. Part of our scope of
12 work was to evaluate these impacts on a -- a regional
13 and global -- in a regional and global context, and --
14 and that's where we -- and that's where we focussed.

15 DR. HUGH GRANT: Well, may -- maybe
16 I'll just limit myself to one (1) last point. It's
17 been probably a week since we talked about discount
18 rates, so I can't avoid this. You use what seems to
19 me, a enormously high discount rate when you come to
20 evaluate the impact of climate change associated
21 things.

22 I would think if you were coming forward
23 in a sense, looking upon you to give us a -- a voice
24 interested in environmental concerns, that you would be
25 voicing something about intergenerational concerns, and

1 therefore use an extremely low discount rate to
2 evaluate some aspects of the cost associated with the
3 construction of Keeyask and Conawapa, or the benefits -
4 - the environmental benefits accruing to it.

5 MR. CRAIG SABINE: M-hm.

6 DR. HUGH GRANT: Did you give any
7 thought at all to how to measure discount rates?
8 Because I think most people would think that a simple
9 time preference -- I mean, you're really trying to
10 measure how individuals assign weights to this, and it
11 really has nothing to do with Hydro's cost of capital.
12 It has something to do with how different generations
13 value the present and the future.

14 MR. CRAIG SABINE: I agree with that as
15 well. I'm not a proponent of environmental issues in
16 any way. This was meant to be entirely objective.

17 When -- when it comes to analyzing the
18 likelihood of carbon policy, or a carbon pricing
19 mechanism in the future, there is an increased risk --
20 certainly increased risks of that occurring or not in
21 comparison to other standard market risks, which is why
22 we applied an adder to represent that incremental risk,
23 and whether pricing will actually ever occur or not.
24 And certainly in recent years, the certainty around
25 whether carbon will ever actually have a -- have a

1 market to -- to price, it as a commodity has come into
2 significant question, which is why we felt that
3 increasing the overall discount rate was appropriate.

4 We -- we only used Manitoba Hydro's
5 discount rate due -- for -- for consistency purposes,
6 really, and then we assumed that there was a 50/50
7 chance, essentially, of carbon policy becoming reality,
8 and therefore added a -- a 50 percent kicker on that --
9 on that discount rate. Which, evidently, comes in
10 fairly close to the social discount rate used in -- in
11 the -- the multiple accounts benefit analysis,
12 socioeconomic analysis, yeah.

13 DR. HUGH GRANT: I -- I think Hydro has
14 used different discount rates in different contexts,
15 and I don't think they would have applied the same one
16 in this context. Sorry.

17 Let -- let me try to just end with one
18 (1) more hopefully concrete comment. There's a concern
19 -- obviously it's nice if benefits exceed costs, but
20 often you're more concerned with trying to maximize the
21 extent -- maximize those net benefits. And to that, my
22 question is really about mitigation, and there may be
23 specific instances here where there's a issue that you
24 identify as being of high significance in an
25 environment context, and there's potential mitigation

1 costs, and those costs are quite concrete in dollar
2 terms.

3 And so how -- again I -- I guess I'm
4 going back to how you value these environmental
5 benefits or costs in monetary terms. So do you -- what
6 advice do you give to the panel in terms of lake
7 sturgeon as incredibly high risk --

8 MR. CRAIG SABINE: M-hm.

9 DR. HUGH GRANT: -- if you give us an
10 estimate of the cost to mitigating, that's one thing.

11 How do I measure -- how -- how should I
12 measure in dollar terms, and how do I compare that
13 environmental value to the monetary?

14 MR. CRAIG SABINE: We'd say the cost
15 that we have identified as being concrete --

16 DR. HUGH GRANT: You can build a
17 fishway.

18 MR. CRAIG SABINE: You can build a
19 fishway, for example.

20 DR. HUGH GRANT: Is it worth it if it
21 comes to pass that it's necessary?

22 MR. CRAIG SABINE: It's -- in our
23 analysis, it's not. Even though the cost may be
24 somewhat concrete, obviously, it's -- there's still
25 upside or downside risk on what that actual number

1 might be, it's -- it's valuing the need for something
2 that is entirely unclear or not, or whether it, in and
3 of itself, will be entirely successful in creating the
4 conditions for a viable population of -- of sturgeon in
5 the reach.

6 So even though the -- the cost of
7 implementing that mitigation measure is concrete, its
8 effects -- the -- the visibility on the effects are --
9 are not concrete, which has to be weighed in, which is
10 why it's very difficult to make those types of
11 comparisons directly.

12 DR. HUGH GRANT: So you can't put a
13 dollar cost on wiping out the lake sturgeon population?

14 MR. CRAIG SABINE: I'm not in a
15 position to do that, no.

16 DR. HUGH GRANT: So -- but generally in
17 -- somehow you've weighed environmental benefits,
18 environmental cost and decided that overall, the
19 benefits exceed the cost in a intangible way.

20 MR. CRAIG SABINE: An intangible way
21 would be a -- a fair way of putting it, yes.

22 DR. HUGH GRANT: Thank you.

23 THE CHAIRPERSON: Mr. Weinstein, did
24 you want to add anything else, or...?

25 MR. MICHAEL WEINSTEIN: No, thank you,

1 Mr. Chair. We're, I guess, prepared to proceed with
2 cross-examination, unless Mr. Hombach has anything to
3 add.

4 MR. SVEN HOMBACH: I don't have any
5 administrative matters to address, Mr. Chairman, so I
6 suggest that we turn it over to Mr. Williams.

7 THE CHAIRPERSON: Mr. Williams, please.

8 MR. MICHAEL WEINSTEIN: Sorry, Mr.
9 Chair, I apologize for interrupting. I just -- just
10 before panel member Grant began his questions, I just
11 wanted to confirm that Mr. Sabine's answer had
12 satisfied the undertaking that he gave earlier.

13 THE CHAIRPERSON: The answer is yes.
14 Mr. Williams, please.

15

16 CROSS-EXAMINATION BY MR. BYRON WILLIAMS:

17 MR. BYRON WILLIAMS: Good morning
18 again, members of the panel and MNP and -- and your
19 counsel.

20 I was just -- I -- I hope we got -- I
21 was just thinking that I might have to ask Dr. Grant to
22 come and give a -- a lesson at my class in cross-
23 examination one day, because that was -- I -- I appear
24 before you truly humbled, which is rare.

25 I'll just note, in terms of schedule, I

1 -- I've -- I've caucused with my -- my colleagues.
2 MIPUG will not have any cross-examination. I do not
3 believe MKO will have any cross-examination, and I
4 think the MMF will be about fifteen (15) minutes.

5 I'm estimating that I'll be somewhere
6 between forty (40) minutes and an hour, subject to the
7 panel's patience. So you'll let me know if I'm -- I'm
8 stressing the panel's patience.

9 Mr. Sabine, in -- and if we could pull
10 up, please, from MNP, your report, Exhibit 6, MNP-6,
11 page 78.

12 Oh, yeah. Oh, and Ms. Menzies reminds
13 me that I should introduce some exhibits, and I
14 apologize for that. You should have a little document
15 -- book of documents, CAC-45-11. For the reporter,
16 it's got two (2) tabs. There's a beautiful colour
17 diagram prepared by Ms. Menzies on Tab 1. So that
18 would be CAC-45-11.

19

20 --- EXHIBIT NO. CAC-45-11: Book of documents

21

22 MR. BYRON WILLIAMS: In -- in terms of
23 CAC-45 -- excuse me, Exhibit 52, it would be in a blue
24 excerpt from the Ontario Ministry of Natural Resources
25 relating to lake sturgeon stocking.

1 --- EXHIBIT NO. CAC-52: Excerpt from Ontario
2 Ministry of Natural
3 Resources relating to lake
4 sturgeon stocking
5

6 MR. BYRON WILLIAMS: And we have
7 proposed for CAC Exhibit 53, a -- a two (2) page
8 excerpt from the Keeyask environmental impact
9 proceeding. That should be just a two (2) sided paper,
10 and thank you, Ms. Menzies.
11

12 --- EXHIBIT NO. CAC-53: Two (2) page excerpt from
13 Keeyask environmental
14 impact proceeding
15

16 MR. BYRON WILLIAMS: Mr. Sabine, if I
17 use the word 'extirpation' -- E-X-T-I-R-P-A-T-I-O-N,
18 for the reporter -- to describe the elimination of a
19 species from a certain geographic region, would that be
20 a definition you're comfortable with, sir?

21 MR. CRAIG SABINE: Yes, it would.

22 MR. BYRON WILLIAMS: And if we can just
23 scroll down on page 78 of this report? In -- in terms
24 of the screen before us, Mr. Sabine, on the second
25 paragraph, there's some advice from MNP that in the --

1 in the context of lake sturgeon in the short term, the
2 risk of extirpation is notable.

3 Do you see that reference, sir?

4 MR. CRAIG SABINE: Second paragraph,
5 you say?

6 MR. BYRON WILLIAMS: Yeah, the very
7 last line.

8 MR. CRAIG SABINE: Yes.

9 MR. BYRON WILLIAMS: And are you using
10 the term 'extirpation' in that sentence to describe the
11 elimination of a -- the potential eliminations of a
12 species from a certain geographic region?

13 MR. CRAIG SABINE: Yes. It would be
14 loosely boundaried between the Kelsey to Kettle reach.

15 MR. BYRON WILLIAMS: Kelsey to Kettle,
16 sir?

17 MR. CRAIG SABINE: Yes.

18 MR. BYRON WILLIAMS: And that would
19 relate to Keeyask, and -- and I thank you for that.

20 Would you apply the same risk of
21 extirpation to the reach from Limestone to the Hudson
22 Bay, the area encompassed in the future by Conawapa?

23 MR. CRAIG SABINE: I wouldn't, because
24 I don't believe that the science is as well understood,
25 given that there was a tremendous amount of work done

1 in this area during the Keeyask EIS, but there could be
2 a similar risk in nature; it's reasonable.

3 MR. BYRON WILLIAMS: And -- and thank
4 you for that.

5 So just in -- in the context of that
6 specific sentence, you're focussed on between Kettle
7 and Kelsey?

8 MR. CRAIG SABINE: Correct.

9 MR. BYRON WILLIAMS: You're saying
10 you're -- you're not prepared to go that far as of yet
11 between Limestone and -- and the Bay in terms of
12 extirpation of lake sturgeon in that region because of
13 the -- the weight of evidence is not in?

14 MR. CRAIG SABINE: Correct, and we also
15 know that the population in the Kettle to Kelsey reach
16 is -- is currently in lower numbers than it is in
17 Limestone to Hudson Bay reach.

18 MR. BYRON WILLIAMS: That -- that's
19 very helpful. Thank you. You used in -- in your
20 answer to Board member Grant the term 'externality'.

21 And with so many economist in the room,
22 I'm hesitant to try and define it, but I'm going to
23 try.

24 MR. CRAIG SABINE: I don't blame you
25 there.

1 MR. BYRON WILLIAMS: If -- if I refer
2 to an environmental externality as the economic concept
3 of uncompensated environmental effects of production
4 and consumption that affect consumer utility and
5 enterprise cost outside the market mechanism, would I
6 get an 'A', a -- a 'D', or an 'F' from you, Mr. Sabine?

7 MR. CRAIG SABINE: Let's go with a 'B'.

8 MR. BYRON WILLIAMS: Okay. It's -- in
9 -- in general, we're talking the same language?

10 MR. CRAIG SABINE: Yes.

11 MR. BYRON WILLIAMS: Okay. Now, just
12 if we could pull on your report to page 48, being the
13 MNP, March 20, 20 -- 2014 redacted report, Exhibit 6.
14 I -- I do want to direct you to the same sentence that
15 Board member Grant directed to you.

16 You see, again, a reference to Gull
17 Rapids as one of the few remaining naturally valued
18 river components, sir?

19 MR. CRAIG SABINE: M-hm.

20 MR. BYRON WILLIAMS: And in the context
21 of the historic effect of -- of hydro development on
22 the Nelson River system, did you choose the term 'one
23 of the few remaining naturally valued river components'
24 to attempt to convey the material alterations that have
25 already taken place to the Nelson River, sir?

1 MR. CRAIG SABINE: Yes, in -- in this
2 context. The sturgeon prefer large rapids for spawning
3 activities. And of course, large rapids are the -- the
4 locations that also hydro power generators prefer to
5 put dams.

6 MR. BYRON WILLIAMS: And not to suggest
7 that Gull Rapids is -- is pristine, but the -- the
8 water flows there are more analogous to the -- to the -
9 - the -- the -- what we might have seen in the 1950s,
10 than much of the rest of the -- the Nelson River?

11 MR. CRAIG SABINE: In theory, yes,
12 although the flows would be altered, given the
13 integrated operation of -- of the entire
14 Nelson/Churchill system. But according to the studies
15 that we've reviewed, Gull Rapids represents something
16 as close to the natural state of the river as -- as
17 you're going to get.

18 MR. BYRON WILLIAMS: Okay. Thank you.
19 And we'll come back to the -- in a few moments to the
20 other effects, in terms of the integrated operations.

21 Just a -- a last couple of questions,
22 which, again, may relate to -- to Board member Grant's
23 questions. In some of the literature, I see a
24 reference to the -- a term 'natural capital', which I
25 understand to refer to the stock of resource and

1 environmental assets, including the flows of ecological
2 services that exist in a region at a given point in
3 time.

4 Is that a term that you're familiar
5 with, sir?

6 MR. CRAIG SABINE: Yes, that -- that
7 definition sounds about right for natural capital,
8 although it, I would say, has some intangible elements
9 to how you would use that in an analytic context.

10 MR. BYRON WILLIAMS: And -- and just
11 foll -- just following along. In -- in some of the
12 literature, I've also seen the term 'natural capital
13 valuation', which I understand to be the process of
14 assigning value to the market and non-market goods and
15 services provided by ecological systems.

16 Again, is that a term that you'd be
17 familiar with, sir?

18 MR. CRAIG SABINE: Yes, not an analysis
19 that we undertook as part of this.

20 MR. BYRON WILLIAMS: Yeah. And that's
21 just -- just the point, just that is not the type of
22 analysis that -- that would have been undertaken?

23 MR. CRAIG SABINE: Correct.

24

25 (BRIEF PAUSE)

1 MR. BYRON WILLIAMS: Perhaps we can
2 turn to page 57 of your report, MNP-6.

3 And, Mr. Sabine, before I direct you
4 exactly to your report, in terms of the term of
5 environmental art, 'habitat degradation', if -- if I
6 find that to be the processes of human origin that make
7 habitats less suitable or less available to a species,
8 is -- would that be a -- a definition you'd be
9 comfortable with?

10 MR. CRAIG SABINE: You said habitat
11 degradation?

12 MR. BYRON WILLIAMS: Yeah.

13 MR. CRAIG SABINE: Yes, that -- that
14 sounds fair.

15 MR. BYRON WILLIAMS: And if we can just
16 scroll up on this page a little bit. Scroll down it,
17 excuse me. I apologize. Would I be correct in
18 suggesting I wouldn't see the words 'habitat
19 degradation' in your report? Instead I would see words
20 such as 'loss of disruption' -- 'loss and disruption of
21 habitat'.

22 Would that be fair?

23 MR. CRAIG SABINE: Loss and/or
24 disruption, yes.

25 MR. BYRON WILLIAMS: And just for my

1 working purposes, sir, are -- are you in essence using
2 those -- could I use those terms interchangeably?

3 MR. CRAIG SABINE: Yeah, that -- yes,
4 that's -- that's fair.

5 MR. BYRON WILLIAMS: And, again, just
6 referring you to a term of art, 'habitat
7 fragmentation'. If I described that to you as the
8 emergence of discontinue -- discontinuities in an
9 organism's preferred environment, does -- does that
10 sound like a -- a definition of 'habitat fragmentation'
11 that you're familiar with, sir?

12 MR. CRAIG SABINE: I'm not I've ever
13 recognized it put exactly that way; but again, it
14 sounds fair.

15 MR. BYRON WILLIAMS: And I'll give you
16 a couple of examples just to make sure we're -- we're
17 working on the same page.

18 MR. CRAIG SABINE: Sure.

19 MR. BYRON WILLIAMS: If I suggested to
20 you that habitat fragmentation could include the
21 isolation of one (1) habitat fragment from other areas
22 of habitat, would -- would we be working off of a
23 similar def -- definition, sir?

24 MR. CRAIG SABINE: Yes, assuming that
25 that habitat is either preferred or necessary by an

1 individual or species.

2 MR. BYRON WILLIAMS: And making that
3 same assumption of preference for a species, would
4 habitat fragmentation also be appropriate to refer to
5 the breaking up of one (1) patch of ha -- habitat into
6 several smaller patches?

7 MR. CRAIG SABINE: Yes, also
8 consistent.

9 MR. BYRON WILLIAMS: And just scrolling
10 down the text -- yeah, that's fine right there. In --
11 would I be correct again in suggesting to you that in -
12 - in your terminology you tend to use language such as
13 'impediments to fish movement'?

14 MR. CRAIG SABINE: Yes, I think I've
15 used the term 'habitat fragmentation' in my discussion
16 of sturgeon as well.

17 MR. BYRON WILLIAMS: And are they
18 analogous, sir, or are they -- or is there a nuance
19 that I'm -- I'm missing?

20 MR. CRAIG SABINE: There may -- there
21 may be a nuance, in that I think if we take your pure
22 definition of 'habitat fragmentation' there would be no
23 capacity to move from one fragment to the other.
24 Conversely, in -- in the other language it may imply
25 that it's becoming more difficult, as opposed to

1 impossible.

2 MR. BYRON WILLIAMS: And just to -- to
3 torture this discussion for just a second more, if I --
4 if I can fit through a -- a generating station's
5 turbines, is -- I guess that -- that would be an
6 impediment, but not a fragmentation?

7 MR. CRAIG SABINE: Correct.

8 MR. BYRON WILLIAMS: And if I'm too big
9 to get through, I guess we're fragmented, are we?

10 MR. CRAIG SABINE: Assuming that
11 there's no alternative pathway, yes.

12 MR. BYRON WILLIAMS: Thank you for
13 that. I -- I wonder if we could turn to CAC Exhibit
14 45-8, page 46. And, Mr. Sabine, this is a document
15 that I shared with you, and you at least had a chance
16 to -- to read over it yesterday.

17 Is that fair, sir?

18 MR. CRAIG SABINE: I did. I received
19 it late yesterday evening and -- and had a chance to --
20 to go through it.

21 MR. BYRON WILLIAMS: And I thank you
22 for your courtesy in -- in so doing. You'll recognize
23 this document as something dating from November 2010.

24 And it's a report by the -- by the
25 Canadian Scientific Advisory Secretariat relating to

1 recovery potential assessment of lake sturgeon, the
2 Nelson River population, sir?

3 MR. CRAIG SABINE: M-hm, yes.

4 MR. BYRON WILLIAMS: And you'll see
5 that the -- the region of the Nelson River for the
6 purposes of this discussion has been called
7 Designatable Unit 3?

8 Do you see that, sir? The --

9 MR. CRAIG SABINE: Yes. Yes, sir, I
10 do.

11 MR. BYRON WILLIAMS: So if from time to
12 time I say, "Designatable Unit 3," or, "DU3," you'll
13 understand what --what I'm referring to, sir?

14 MR. CRAIG SABINE: Yes.

15 MR. BYRON WILLIAMS: The Nelson River
16 lake sturgeon population in -- in its entirety?

17 MR. CRAIG SABINE: Yes.

18 MR. BYRON WILLIAMS: And if we could
19 turn to page 62 of this exhibit -- oh, sadly, it's not
20 in colour. Oh, there we go. Thank you.

21 You'll agree with me, Mr. Sabine, that
22 this is a map appended to the report we were just
23 discussing, presenting the extent of the Nelson River,
24 but divided into six (6) specific management units
25 which are characterized by different colours?

1 Would that be fair?

2 MR. CRAIG SABINE: Yes, sir.

3 MR. BYRON WILLIAMS: And subject to
4 check, you'll accept that this is a reasonable
5 depiction of the Nelson River system, sir?

6 MR. CRAIG SABINE: I would, yes.

7 MR. BYRON WILLIAMS: We'll come --
8 we'll -- we'll stay on this page for a minute. But,
9 sir, based upon your review of the literature, would it
10 be fair to say that scientific knowledge of the
11 historic distribution of lake sturgeon in -- in the
12 Nelson River system is limited?

13 MR. CRAIG SABINE: I would agree but
14 preface with -- it would depend on the definition of
15 the extent of population. We know that there are
16 longstanding oral histories of First Nations that have
17 significant insight into the population and behaviour
18 of the sturgeon throughout DU3.

19 MR. BYRON WILLIAMS: A better answer
20 than the question, sir, and I thank you for that. For
21 the purpose of our -- the next few moments of our
22 discussion, I'm going to use the term 'hydro project'
23 to refer to the construction of the five (5) existing
24 hydroelectric projects on the Nelson River, coupled
25 with the Churchill River Diversion and Lake Winnipeg

1 regulation.

2 So you understand that, sir, for the
3 purposes of our conversation?

4 MR. CRAIG SABINE: Yes, sounds fair.

5 MR. BYRON WILLIAMS: And you mentioned
6 this previously, but you would agree that as a
7 consequence of the hydro project, and in particular the
8 impact of the Churchill River Diversion, the Nelson
9 River is no longer a naturally functioning river
10 system, in that its seasonal -- seasonal flow volumes
11 have been reversed, with water levels higher in the
12 months in -- in the winter months and lower in the
13 summer months?

14 Would that be fair?

15 MR. CRAIG SABINE: Seems to be
16 consistent in the -- in the history, yes.

17 MR. BYRON WILLIAMS: And I believe
18 you've already said this in your evidence -- we don't
19 need to turn there -- on slide 37.

20 But you would agree that as a result of
21 the hydro project, the Nelson River is already a highly
22 altered system?

23 MR. CRAIG SABINE: Correct. That is
24 the common -- common understanding.

25 MR. BYRON WILLIAMS: And if we look to

1 this map, and in particular directing your attention to
2 the red starting around Kelsey, being MU3, and -- and
3 then work our way down the Lower Nelson. You'll agree
4 with me that the riverine habitat is severely
5 fragmented in the reaches between Kettle and Limestone.

6 Would that be fair?

7 MR. CRAIG SABINE: Severely fragmented

8 --

9 MR. BYRON WILLIAMS: By --

10 MR. CRAIG SABINE: -- by what?

11 MR. BYRON WILLIAMS: Let me try that
12 again. It's severely fragmented by the presence of a
13 number of hydroelectric generating stations, including
14 Kettle, Long Spruce, and Limestone?

15

16 (BRIEF PAUSE)

17

18 MR. CRAIG SABINE: Potentially. We --

19 we --

20 MR. BYRON WILLIAMS: The adjective
21 'severely' was too strong for you, sir? Materially?

22 MR. CRAIG SABINE: We were -- we were
23 talking about MU3, which by my read, although it is
24 pretty small here, does not include Limestone or Long
25 Spruce.

1 MR. BYRON WILLIAMS: And my question
2 was imprecise, sir.

3 That stretch between Kelsey and
4 Limestone, I'll suggest to you, is materially
5 fragmented by existing hydroelectric generating
6 stations?

7 MR. CRAIG SABINE: Yes. In that case,
8 that fragment includes those specific stations and --
9 and would be fragmented by them.

10 MR. BYRON WILLIAMS: And we can also
11 agree that the hydro project has contributed to severe
12 habitat degradation along reaches of the Nelson
13 relating to flooding, altered flows, erosion, and
14 sedimentation?

15 MR. CRAIG SABINE: That could be a
16 common understanding throughout the history, yes.

17 MR. BYRON WILLIAMS: And indeed, MNP
18 uses the term 'highly damaged' to describe this river
19 system.

20 Would that be fair, sir?

21 MR. CRAIG SABINE: We used that term,
22 yes.

23 MR. BYRON WILLIAMS: And as a
24 consequence of the considerable alterations suffered by
25 this ecosystem and its water regime, it is therefore

1 highly vulnerable to future change.

2 You'd agree with that, sir?

3

4 (BRIEF PAUSE)

5

6 MR. BYRON WILLIAMS: I think I might
7 even be quoting your words back to you from page 37.

8 MR. CRAIG SABINE: I would agree in the
9 sense that -- relative to its natural state, yes.

10 MR. BYRON WILLIAMS: Thank you. And
11 while the waters of the Nelson have been altered
12 immeasurably, sir, you'll agree that the sounds of Gull
13 Rapids have not yet been silenced?

14 MR. CRAIG SABINE: My understanding is
15 that is correct, though I've never heard them myself.

16 MR. BYRON WILLIAMS: And Gull Rapids is
17 one of the remaining spawning areas on the Lower Nelson
18 River reported by First Nation inhabitants?

19 MR. CRAIG SABINE: I would agree with
20 that, yes.

21 THE CHAIRPERSON: Well, Mr. Williams, I
22 went back to page 37 and I read the -- the sentence
23 that you asked about, and it doesn't refer to high --
24 "highly vulnerable." It just refers to, "therefore
25 vulnerable." So --

1 MR. BYRON WILLIAMS: Sorry.

2 THE CHAIRPERSON: Page 37.

3 MR. BYRON WILLIAMS: One second, sir.

4 THE CHAIRPERSON: Go ahead.

5

6 CONTINUED BY MR. BYRON WILLIAMS:

7 MR. BYRON WILLIAMS: If I've mis --

8 misstated that, then I apologize. "Therefore

9 vulnerable." I apologize. I've misstated that to you,

10 Mr. Sabine.

11 You'll agree that is the result of the

12 considerable existing alterations suffered by the

13 ecosystem and its water regime, it is therefore

14 vulnerable to future change?

15 MR. CRAIG SABINE: Yes.

16 THE WITNESS: And, Mr. Chair, thank you

17 for that.

18

19 CONTINUED BY MR. BYRON WILLIAMS:

20 MR. BYRON WILLIAMS: And staying on

21 this map and focussing you on the Lower Nelson,

22 starting at Kettle and moving towards the Hudson Bay,

23 am I correct in suggesting that the Keeyask generating

24 station, if approved, will be the fifth generating

25 station on the Lower Nelson?

1 (BRIEF PAUSE)

2

3 MR. CRAIG SABINE: Not if we are
4 considering the reach from Kettle to the Hudson Bay. I
5 think we'd have to go farther upstream. And then it
6 would be the fifth, yes.

7 MR. BYRON WILLIAMS: I meant to say
8 Kelsey. And if I misspoke, I apologize. I'm glad
9 you're listening more carefully than I'm talking. So
10 let me just clarify that.

11 Moving from Kelsey to the Hudson Bay, in
12 that region, Keeyask will be the fifth generating
13 station built in the Lower Nelson if it is approved?

14 MR. CRAIG SABINE: Yes, I would agree
15 with that. And evidently, the third starting with a
16 'K', which may add to further confusion in the future.

17 MR. BYRON WILLIAMS: And it would be
18 fair to say that an inevitable consequence of the
19 construction of Keeyask will be additional habitat
20 degradation and fragmentation?

21 MR. CRAIG SABINE: We have identified
22 that there would definitely be incremental habitat
23 degradation. Fragmentation is subject to further
24 study, assuming that a transverse of -- of the Keeyask
25 station is not built in the future.

1 MR. BYRON WILLIAMS: And under that
2 same assumption, in the event that Conawapa is
3 approved, that would contribute to additional
4 fragmentation in this system, as well, sir?

5 MR. CRAIG SABINE: It is likely and
6 reasonable that it would contribute to further
7 fragmentation, although certainly given that an EIS has
8 not been conducted on Conawapa, the extent to which
9 isn't clear on the record to date.

10 MR. BYRON WILLIAMS: Now, if I could
11 turn to MNP-8, slide 34.

12 THE CHAIRPERSON: I don't want to
13 belabour the point here, but I do want -- I want to
14 make sure that the record is as accurate as possible.
15 You know, we talked about the vulnerable to future
16 change. And you responded -- when Mr. Williams asked
17 you that question you responded by saying, "Yes,
18 relative to its natural state." Well, that's not quite
19 the same as what I'm reading here.

20 You -- I think you indicated that
21 additional change to the Nelson River system -- oh, let
22 me -- let me rephrase that. It is vulnerable to future
23 change. It doesn't matter what the natural state was
24 before.

25 In addition of -- an additional

1 generating station adds to the vulnerability, as I
2 understand it.

3 MR. CRAIG SABINE: Yes, I think that's
4 correct. I either misheard or -- or did not read in my
5 -- in my glance at this that it included the term
6 'ecosystem'. In that sense, I would agree that the
7 already altered state by previous hydroelectric
8 development does create further vulnerabilities to
9 certain ecosystem elements. That's not necessarily
10 applicable to all ecosystem elements or the water
11 regime in generalistic terms.

12

13 CONTINUED BY MR. BYRON WILLIAMS:

14 MR. BYRON WILLIAMS: Just to -- and
15 again, I don't want to belabour the point either, but I
16 just do want to catch a nuance here, sir. There's the
17 incremental effect of Keeyask, per se.

18 But I'll suggest to you, when that is
19 imposed upon an already compromised environment, the
20 ramifications may be more serious in terms of
21 uncertainty or -- and risk?

22 MR. CRAIG SABINE: They may be, yes.

23 MR. BYRON WILLIAMS: I think we've gone
24 enough down that path though. I want, if we're on
25 slide 34, just to orientate ourselves and -- and Ms.

1 Desorcy, because she's got that big map right in front
2 of her, I can see.

3 The potential spawning sites for
4 sturgeon in -- in the particular area upstream of the -
5 - the proposed dam site, would there be one right at --
6 at -- towards the right of the screen, right at -- is
7 that where Gull Rapids would be, sir?

8 MR. CRAIG SABINE: To my understanding,
9 yes. The Keeyask dam would be, essentially, directly
10 at the location of Gull Rapids.

11 MR. BYRON WILLIAMS: And -- and that's
12 recognized as a potential spurgeon -- sturgeon spawning
13 site?

14 MR. CRAIG SABINE: Yes. Yes, sir.

15 MR. BYRON WILLIAMS: And the other
16 potential one would be Birthday Rapids, in terms of
17 potential sturgeon spawning, sir?

18 MR. CRAIG SABINE: Yes, that is also
19 true. There may be other potential spawning sites, but
20 those two (2) are known to be significant --
21 significant ones.

22 MR. BYRON WILLIAMS: Thank you. If we
23 could turn to CAC Exhibit 45-11, and Tab 1? And -- and
24 the next page, please. You'll see, sir, and this is
25 obviously a -- a Menzies/Williams production, a -- a --

1 what we purport to be a illustrative example of wild
2 lake sturgeon life history. And --

3 MR. CRAIG SABINE: Sorry, are you
4 asking me if I agree with this being the --

5 MR. BYRON WILLIAMS: Sir, is it -- is
6 it something we can work, with at least for
7 conversation purposes?

8 MR. CRAIG SABINE: I -- I believe so,
9 yes.

10 MR. BYRON WILLIAMS: And what we're
11 attempting to display here is the life cycle of the
12 sturgeon from spawning through egg larvae, fingerling,
13 and back again.

14 And you'll agree that it is a -- roughly
15 a -- an approximation of your understanding of the life
16 cycle, sir?

17 MR. CRAIG SABINE: Yes, it is. And --
18 and -- but just for clarification, by 'yearling', you
19 mean 'young-of-year'?

20 MR. BYRON WILLIAMS: I think, sir,
21 yearling -- we were going to come to that, but what I
22 would suggest to you is my understanding of 'yearling'
23 is from -- excuse me. My understanding of 'young-of-
24 year' is from larvae up to yearling.

25 Would that be your understanding as

1 well?

2 MR. CRAIG SABINE: It's consistent,
3 yes.

4 MR. BYRON WILLIAMS: And then
5 'yearling' would be the year 1? Okay. And -- and you
6 would agree with me, sir, that sturgeon are generally
7 considered to have high site fidelity, except to move
8 somewhat longer distances for spawning?

9 Would that be fair?

10 MR. CRAIG SABINE: That is correct.
11 They have high site fidelity within their life stages.

12 MR. BYRON WILLIAMS: And that site
13 fidelity, I'll suggest to you, is particularly
14 pronounced for young-of-the-year.

15 Would that be your understanding, sir?

16 MR. CRAIG SABINE: Yes, that would be.

17 MR. BYRON WILLIAMS: And in terms of --
18 to the extent that there is migration, would it be fair
19 to say that that is functionally linked to new movement
20 between adult feeding and spawning habitats, sir?

21 MR. CRAIG SABINE: My understanding is
22 that that's not entirely clear in the science, but
23 certainly, evidence would suggest that that's true,
24 yes.

25 MR. BYRON WILLIAMS: So we can assume

1 that, generally, adults feed in one (1) location and
2 spawn in another?

3 MR. CRAIG SABINE: Yes.

4 MR. BYRON WILLIAMS: And that they will
5 tend to move upstream to suitable areas containing
6 rapids.

7 Would that be your understanding?

8 MR. CRAIG SABINE: They would move
9 somewhere with suitable rapids.

10 MR. BYRON WILLIAMS: Fair enough. They
11 -- they -- there's the spawning things which makes me
12 blush, and the eggs -- eggs are -- are laid, hatched,
13 and then they move -- subsequently move downstream.

14 MR. CRAIG SABINE: I -- I'm --

15 MR. BYRON WILLIAMS: You -- you --

16 MR. CRAIG SABINE: -- I'm not -- I'm
17 not clear whether they move upstream or downstream from
18 that -- from that life stage, but they do -- they do
19 move, is my understanding, yes.

20 MR. BYRON WILLIAMS: Here's my point,
21 sir. The risk to spawning would come both from habitat
22 -- habitat degradation and habitat fragmentation, I'll
23 suggest to you, in that successful spawning requires
24 both a non-degraded environment, and open connections
25 between feeding and spawning habitat.

1 Would that be fair?

2 MR. CRAIG SABINE: Open connections
3 between feeding and spawning habitat would certainly be
4 a requirement, as would access to suitable spawning
5 habitat. It -- it -- it's -- well, let's just leave it
6 at that for now.

7 MR. BYRON WILLIAMS: And -- and that's
8 fair enough. Let's go to the subject of the -- it
9 seems both you and I are eager to discuss, which is
10 young-of-the-year, and would it be correct to suggest
11 that young-of-the-year represent the critical life
12 stage between hatchling and yearling?

13 MR. CRAIG SABINE: Yes, it would.

14 MR. BYRON WILLIAMS: And once the
15 young-of-the-year sturgeon hatch, the velocity of the
16 water helps them to drift downstream to shallow parts
17 of the river, where they find suitable habitat?

18 MR. CRAIG SABINE: I've not -- I've not
19 reviewed that particular fact.

20 MR. BYRON WILLIAMS: Okay.

21 MR. CRAIG SABINE: No.

22

23 (BRIEF PAUSE)

24

25 MR. BYRON WILLIAMS: Maybe if we can

1 just go to page 61 of your report for a second, at the
2 top? And maybe I have worded this improperly. Once
3 young-of-the-year sturgeon hatch, the velocity of the
4 water helps them to drift downstream to shallow parts
5 of the river, where there is sand or other suitable
6 habitat, sir?

7

8

(BRIEF PAUSE)

9

10 MR. CRAIG SABINE: Yes. It appears we
11 stated that, so I evidently did not recollect.

12 MR. BYRON WILLIAMS: No problem. And
13 this is the -- at -- at this stage of their life cycle,
14 this is where lake sturgeon are particularly vulnerable
15 to mortality.

16 Would that be fair, sir?

17 MR. CRAIG SABINE: Very true, yes.

18 MR. BYRON WILLIAMS: And as compared to
19 older sturgeon, sub-adults, or -- or spawning adults,
20 habitat for this -- for young-of-the-year is -- is very
21 critical, and also very limiting.

22 Would that be fair, sir?

23 MR. CRAIG SABINE: Yes, to keep them
24 safe and -- and to provide them with a source of -- of
25 their food, that would be correct, yes.

1 MR. BYRON WILLIAMS: And so for this
2 species's stage of the life cycle in particular, the
3 risk of habitat degradation is particularly acute,
4 agreed?

5 MR. CRAIG SABINE: It would be
6 particularly acute, yes, as well as the spawning
7 habitat itself.

8 MR. BYRON WILLIAMS: Thank you. And
9 just to leave young-of-the-year, would it be fair to
10 say that this is among the least understood life --
11 life stages of lake sturgeon?

12 MR. CRAIG SABINE: The studies that we
13 have reviewed would -- would indicate that there is
14 considerable uncertainty with the behaviour and
15 population dynamics during that life stage, yes.

16 MR. BYRON WILLIAMS: If we could turn
17 to CAC Exhibit 45-8, page 56? And Mr. Chair, just --
18 I'm -- I'm making relatively good progress. I'm
19 guessing I would require about twenty (20) more
20 minutes, so I -- I'm always -- I'll take the advice of
21 the Board in terms of both the duration of my cross-
22 examination, and -- and also the -- the timing, so...

23 THE CHAIRPERSON: No, I think that
24 we're fairly tight for time, so what -- what I would
25 suggest we do is if we don't get this finished before

1 noon, we would simply hear the balance of your cross-
2 examination after we have heard from Mr. Sale.

3 MR. BYRON WILLIAMS: Okay.

4 THE CHAIRPERSON: Is that --

5 MR. BYRON WILLIAMS: Yeah.

6 THE CHAIRPERSON: -- going to be okay
7 with you?

8 MR. BYRON WILLIAMS: And I'll go till
9 as long as you -- you just cut me off, sir --

10 THE CHAIRPERSON: Okay. Another five
11 (5) minutes and we should be okay.

12 MR. BYRON WILLIAMS: Okay.

13

14 CONTINUED BY MR. BYRON WILLIAMS:

15 MR. BYRON WILLIAMS: If we could just
16 scroll down on the page just a bit more? Again, I
17 realize that this document -- this is -- we're going
18 back to the Canadian Science Advisory Secretariat
19 Recovery Potential Assessment.

20 I'm directing your attention, sir -- and
21 -- and so, Mr. Sabine, I realize this isn't a primary
22 document to your analysis, but you have reviewed it.
23 I'm directing your attention to the last paragraph,
24 above, "limiting factors."

25 And you'll see the suggestion that the

1 most important current threats to survival and recovery
2 of lake sturgeon in this region are -- I'll suggest to
3 you one (1) is, is habitat degradation or loss
4 resulting from the presence of dams, impoundments, and
5 other barriers.

6 Would that be your understanding as
7 well, sir?

8 MR. CRAIG SABINE: Yes. I believe we
9 identified that in -- in the report and -- and
10 presentation this morning that habitat degradation is
11 the most critical, yes.

12 MR. BYRON WILLIAMS: And another one,
13 just staying on in this sentence, is the risk from
14 fishing.

15 MR. CRAIG SABINE: Historically
16 speaking, the state of the populations today are -- are
17 more a result of fishing practices over time, and to
18 some extent, also driven by hydroelectric development,
19 yes.

20 MR. BYRON WILLIAMS: And -- and just to
21 finish that, again, in this document, they're
22 identified among the most important current threats to
23 survival and recovery, population fragmentation
24 resulting from the presence -- presence of dams,
25 impoundments, and other barriers.

1 And would that be your understanding as
2 well, sir?

3 MR. CRAIG SABINE: It would, yes.

4

5 (BRIEF PAUSE)

6

7 MR. BYRON WILLIAMS: Sir, turning to
8 page 58 in this same document, and -- and perhaps if --
9 if we could just scroll back to page 57 for a second,
10 and then slowly scroll down the page? You'll see here,
11 sir, on pages 57 and 58, there's a discussion of
12 mitigation alternatives, and it -- stop there, please -
13 - and enhancements.

14 Do you see that, sir?

15 MR. CRAIG SABINE: Yes.

16 MR. BYRON WILLIAMS: And if we could
17 scroll down to the top of page 58 now? Keep -- keep
18 going, scrolling down, please. Thank you. That's good
19 there.

20 Sir, and -- and if you're unfamiliar
21 with this, I'll -- I'll accept that, but you'll see, in
22 terms of addressing issues related to fragmentation,
23 there's a recommendation that we prevent any additional
24 fragmented -- fragmentation, particular -- particularly
25 downstream of the Limestone generating station, to

1 prevent further loss of connectivity in the region.

2 Sir, are -- are you familiar with that
3 line of reasoning, or -- or thinking in terms of lake
4 sturgeon protection?

5 MR. CRAIG SABINE: No, I can't say that
6 I am. I see that it's stated here. I -- I can't say
7 what drives that.

8 MR. BYRON WILLIAMS: Okay. And it was
9 kind of new to me, so that's why I was asking as well.

10 MR. CRAIG SABINE: And I -- I would add
11 that, particularly given that the population between
12 Kelsey and Kettle is known to be in a -- a more severe
13 state of distress than that between Limestone and
14 Hudson Bay, and I'm only speculating here, but perhaps
15 the recommendation is to prevent that population from
16 becoming as stressed as the rest of the reach.

17 MR. BYRON WILLIAMS: And, sir, I thank
18 you for that, and that's probably -- I had been
19 wondering about it, and just wanted -- if you had any
20 thoughts or were aware of it.

21 Just to -- to finish, as -- seeing that
22 it's twelve o'clock. Sir, in terms of lake sturgeon,
23 you referenced a -- a number of significant
24 uncertainties relating to their -- their future path.

25 Would that be fair?

1 MR. CRAIG SABINE: Future path?

2 MR. BYRON WILLIAMS: Let me try it
3 again.

4 In -- if we're looking at risk to lake
5 sturgeon, would I be fair to say that one of the
6 uncertainties would be: Will habitat remediation for
7 spawning succeed?

8 MR. CRAIG SABINE: There is no
9 certainty that that would be the case, no.

10 MR. BYRON WILLIAMS: And another
11 significant certainty I'll suggest to you is whether
12 habitat remediation for young-of-the-year will succeed.

13 Would that be fair?

14 MR. CRAIG SABINE: I wouldn't say that
15 we assessed that in as much detail, but that is my
16 general understanding, yes.

17 MR. BYRON WILLIAMS: And another
18 significant uncertainty is whether the impact of
19 additional fragmentation, assuming new construction,
20 will be mitigated in the absence of fish -- fish
21 passages.

22 Would that be fair?

23 MR. CRAIG SABINE: Correct. The
24 impacts of that fragmentation are not well enough under
25 -- are not well-understood enough to provide concrete

1 recommendations at this time.

2 MR. BYRON WILLIAMS: Mr. Chair, I'd
3 suggest we adjourn, and subject to the instruction to
4 the panel, I would say no more than fifteen (15)
5 minutes left, from my perspective. And thank you, MNP.

6 MR. CRAIG SABINE: Thank you.

7 THE CHAIRPERSON: Mr. Hombach...?

8 MR. SVEN HOMBACH: Okay. I'll just
9 remind everybody that at 12:45, we need to regroup for
10 the presentation of Mr. Sale.

11 THE CHAIRPERSON: So with -- with that,
12 we'll see each other again at 12:45. Thank you.

13

14 (PANEL RETIRES)

15

16 --- Upon recessing at 12:04 p.m.

17 --- Upon resuming at 12:50 p.m.

18

19 THE CHAIRPERSON: Good afternoon. I
20 believe that we're ready to resume the proceedings. I
21 -- and I want to apologize to the people here, that the
22 reason we're late is because we had the -- the -- our
23 lunch arrived a bit late, so I apologize about that,
24 but I will turn the microphone over to Mr. Hombach.

25 MR. SVEN HOMBACH: Yes. Thank you, Mr.

1 Chairman. And now that we're all well fed, I'm sure
2 that it will go a lot smoother. We now have a
3 presentation, and I'd like to welcome Mr. Tim Sale to
4 the hearing room to deliver his presentation. I'd like
5 to remind the panel and everybody else in the room that
6 presentations are not evidence. As such, Mr. Sale will
7 not appear as a sworn witness.

8 However, the panel will take any
9 presenter comments into account. So, Mr. Chairman, I
10 suggest we turn it over to Mr. Sale.

11 THE CHAIRPERSON: Thank you, Mr.
12 Hombach. I just want to let Mr. Sale know that the
13 panel has had the opportunity to read your -- your
14 submission, so we've had that in hand for some time
15 already, so I'll turn the microphone over to you.
16 Welcome.

17

18 PRESENTATION BY MR. TIM SALE:

19 MR. TIM SALE: Thank you very much.
20 It's, you know, I guess better to be sworn in than
21 sworn at, so we -- we can always -- always debate that
22 -- that issue. The panel, I think, knows now that
23 there are reasonable and feasible alternatives to
24 building large dams at this point, and I know that
25 there'll be much evidence submitted in that regard.

1 I also note that Mr. Thomson, the CEO,
2 has already said that you don't need to make a final
3 decision on Conawapa till 2018. I believe he said that
4 in a meeting. And if that's the case, it's a puzzle
5 why Conawapa is even in your remit, but -- but that's
6 not -- that's not for me to debate.

7 I want to start, though, by saying the
8 second paragraph, there's no doubt these two (2) major
9 dams are both feasible and would provide clean and
10 long-term power for probably a hundred years or more.
11 There's nothing wrong with the projects. They're --
12 they're good projects. The question is whether the
13 need is now, and whether the risk involved in making
14 the decision to go that way is appropriate.

15 I've no doubt that at some time, the
16 dams should be built. In a low carbon future, when
17 there's a price for carbon, when we know where we're
18 headed in that regard in Canada in particular, where we
19 actually don't have a clue where we're headed in terms
20 of carbon reduction at this point. When that's
21 settled, the economics of all kinds of power generation
22 will change, and the risks will change.

23 I don't see anything in North America
24 that suggests we will have a price on -- on carbon in
25 the foreseeable future in terms of politics in the

1 United States and in Canada. It would be nice to say
2 otherwise, but I don't see it happening.

3 I want to talk first about risk. The
4 closer a project is to completion, the lower the
5 capital risk to carry the cost of the project. I think
6 that's -- that's sort of a self-evident truth. And so,
7 when you look at estimates of the capital costs of any
8 big projects, inevitably, they're on the low side.
9 Very rarely a little bit on the high side, and that was
10 actually the case with Limestone in the 1980s. It
11 actually was budgeted higher than it cost. That's very
12 unusual, and very welcome when it happens. It hasn't
13 happened much.

14 I've asked that the panel be given a
15 table that's taken out of Order 43/'13, page 30 of 62,
16 which is PUB's accumulation of the increases in capital
17 costs of projects, and I note that they range from a
18 low in the 70 percent region to a high of 186 percent
19 for the Pointe du Bois rebuilt, and so I think we know
20 that the earlier you're -- you're making capital
21 estimates, the -- the worse they are.

22 We're six (6) years away from Conawapa,
23 and a couple of years or more away from -- from
24 Keeyask's actual contracting, although I noticed that
25 there's been a contract let already without this

1 panel's decision in place. Interest rates and
2 competition for resources, particularly skilled labour
3 and large construction firms is extreme in North
4 America.

5 If you believe anything about what
6 people are saying about the transmission and electrical
7 system in the USA, large projects, highly capital
8 intensive, and -- and in great competition for the few
9 big engineering firms that do those kinds of things is
10 going to continue to be intense, so that -- that will
11 continue to be an issue. So on cost, I think there's
12 serious risks.

13 Power prices, there are a number of
14 submissions to the panel, and I would just note that
15 most consensus is that currently natural -- new natural
16 gas power is less than five (5) -- five (5) cents a
17 kilowatt hour. Even the Brattle Report, with its
18 suggestion of a sixteen dollar (\$16) price -- a sixteen
19 dollar (\$16) a tonne price on carbon by 2020 only
20 brings natural gas costs up to around five (5) cents
21 per kilowatt hour, which is far below Wuskwatim, and
22 certainly has to be below where Keeyask and Conawapa
23 will come in.

24 With the current surplus of natural gas
25 in the United States, which no one that I've read

1 reputably suggests is going to end within at least a
2 decade, and many people are talking about multiple
3 decades of excess gas available at relatively low
4 costs. I don't see that changing.

5 And so when you're -- you've got new
6 power generation in the States costing less than five
7 (5) cents, and Wuskwatim costing ten point five (10.5),
8 according to PUB, and Cona -- Conawapa and Keeyask must
9 be higher than that, that's a serious issue.

10 Thirdly, technology. The cost curve on
11 hydro is pretty flat. Got a few efficiencies, new
12 technology, but not much. It's a long -- long-
13 established, very effective technology. Wind is still
14 curving down, although the curve is flattening to some
15 extent. Solar is still going -- trending down quite
16 steeply, biomass less so. Geothermal, depending on the
17 scale -- geothermal's very sensitive to scale.

18 So if you're doing one-off installations
19 in a city, they're going to cost twenty-five thousand
20 dollars (\$25,000). If you're converting an area where
21 you can mass equipment and do it in a -- in a efficient
22 way -- EKI Energy, which is an Aboriginal energy
23 corporation, is doing geothermal on reserves at
24 fourteen thousand dollars (\$14,000) an installation,
25 which tells you that the cost curve there can be pretty

1 -- pretty effectively still trending down.

2 Interest rates, fourth risk issue.

3 Nobody knows where interest rates are going to be in
4 six (6) months, let alone in a number of years. There
5 are those who would say that inflation in the American
6 economy's inevitable. There are others who will say
7 the opposite, that we got to worry about deflation, if
8 anything.

9 Frankly, the long cost curve for
10 interest rates, we just don't know where that's going
11 to go. So the farther out you're borrowing money -- or
12 the farther out you're committing to borrow money, the
13 more the interest rate risk is an issue.

14 So what you do when you've got that kind
15 of a situation? And my -- my answer is, you look at
16 managing risk. You're not looking at green versus
17 black in terms of the power generation. All the
18 options before you are relatively green. All work. We
19 know they're all feasible, so it's a risk management
20 question.

21 I asked PUB staff to table with this
22 submission the study that was done for Hydro in 2010 on
23 adding up to 1,200 megawatts of wind. It would
24 actually be less than a thousand, because we've already
25 got two (2) -- two hundred and thirty-three (233), so a

1 thousand new megawatts of wind. The study was not
2 released in Canada, and I don't believe PUB was given a
3 copy of it, or has been. It was -- it's in the MISO
4 website in the United States.

5 Minor costs for three hundred (300),
6 very small costs for six hundred (600), and for a
7 thousand new megawatts, we're talking about -- about
8 thirty (30) -- 350 million, according to this study.

9 Now, 350 million's a lot of money, but
10 it's nowhere near the price of a new dam. I'm -- I
11 want to leave with the panel, though I am not allowed
12 time to go through this document, which I think you may
13 have given at this point. It's a note that was
14 prepared for government in 2007, strongly challenging
15 Hydro's numbers on the cost to firm and shape wind.

16 The -- the bottom line of the note says
17 that Hydro's costs are roughly thirty-one (31) to
18 thirty-three dollars (\$33) per megawatt -- per a -- a
19 thousand megawatts -- part -- per megawatt, sorry.
20 Bonneville Power Authority is less than a quarter of
21 that, with few firming resources, and many American
22 firmers and shapers are charging a tenth of that.

23 So Hydro is attributing to wind, and as
24 far as I know they're still attributing to wind,
25 extremely unrealistic, and according to this briefing

1 note, essentially fabricated costs that are really
2 artifacts of choices of various variables that are not
3 very realistic.

4 It's very important to understand that
5 the -- that the Corporation hates wind. There's just
6 no way around it. It had to be ordered by our
7 government to install wind towers in 2002. They
8 asserted over and over again that there was no
9 financially feasible wind resource in Manitoba. In
10 fact, we have better wind resources than most places in
11 Canada because we're part of the Great Plains. We run
12 over 40 percent fa -- capacity factor in St. Leon. I
13 don't know what it is at St. Joseph, but it's over
14 forty (40) at St. Leon.

15 Even after these resources were
16 identified and the companies did their due diligence,
17 Hydro had to actually be ordered to enter into a
18 contract for St. Leon, our first wind farm. They just
19 don't like wind power, full stop. They denied for
20 years in conversation that you could firm and shape
21 wind using our enormous storage capacity.

22 The reality is that a dam without
23 storage capacity is not a whole lot of use, except for
24 power that operates simply on the forebay. And in
25 Northern Ontario, Atikokan and other -- not Atikokan,

1 sorry. I'm blanking on the small town where you drive
2 by and there's a great hydraulic tower. It works great
3 in the summer, spring, and fall. It doesn't work in
4 the winter at all. So you have to have a -- a storage
5 capacity to firm any power unless you're going to do it
6 with natural gas, something like that.

7 And that's why wind is so valuable in
8 Manitoba, because we have an enormous storage capacity.
9 We can store the power we don't need in wind in -- in
10 water, rather. Hydro does it all the time. They build
11 up their storage lakes, raise them over the time the
12 water is flowing so that that stored water is available
13 in the wintertime to generate power, our peak demand
14 time. So we took a long time to get it recognized.

15 The irony for me is that in the recent
16 sale to the United States to one of the Midwest power
17 utilities, Hydro gave away, or perhaps is not giving
18 away, firming and shaping to North Dakota wind, which
19 they essentially denied for a long time that that was
20 feasible. I think the panel needs to know, whether
21 it's confidential information to the panel only or not.
22 They need to know what Hydro is charging to firm and
23 shape that North Dakota wind. That's critical.

24 So wind, I think, is an obvious
25 alternative. It's scalable, and the price for new wind

1 is six (6) cents. The price for new Wuskwatim power is
2 ten and a half (10 1/2).

3 My second major criticism of their plan
4 is that it fails to take into account demand-side
5 management. We have a hundred and twenty thousand
6 (120,000) homes in Manitoba that are heated solely with
7 electricity. Even a -- a long-term planned conversion
8 of, let's say, half of them, would free up an enormous
9 amount of power, roughly a little more than Wuskwatim.

10 And it would free it up in the
11 wintertime, our peak demand time. And it would provide
12 savings to homeowners. And if it's done under the PAYS
13 Program, it wouldn't have any capital cost to Hydro.
14 They wouldn't have to be worrying about enormous
15 capital borrowing that could only be paid back many
16 years hence. It would be paid back by the savings on
17 the extra power available.

18 So geothermal is a real option, and it
19 should be thought of in the same way we thought about
20 rural electrification. In the 1950s we electrified
21 huge parts of rural Manitoba. It was an enormous
22 project. It took many years, created many jobs, made
23 life better for many people. So when you decide
24 that you want to do something of a big scale, clearly
25 we can do it. The question is choosing what it is

1 you're going to do. And I think geothermal conversion
2 is a very, very useful -- useful alternative.

3 So to -- to bring this to a conclusion,
4 I think that we're looking at risk management
5 primarily. And I've identified some of the risks. I'm
6 sure there are others. The question: Do the two (2)
7 alternatives, dams, or a combination of wind,
8 geothermal, and much more aggressive DSM -- which I'm
9 glad to hear Hydro has provided more on that -- in that
10 regard. The answer is: Use the things that are
11 scalable and lower risk.

12 Dams someday? Absolutely. At some
13 point, these are good projects, but certainly not now
14 and not before we've really worked so hard on the
15 demand-side management that we're tired of working on
16 it. Right now we've barely begun at the residential
17 level.

18 A wind project can be ready in eighteen
19 (18) months to two (2) years, sometimes even shorter.
20 It'll generate pro -- power at a fixed cost for twenty
21 (20) to twenty-five (25) years.

22 Short-term construction jobs, most of
23 which can be sourced in Manitoba, will occur, and
24 longer term jobs for a thousand megs of wind are
25 greater than longer term jobs for dam of a similar

1 size. They're in the South. They benefit farmers.
2 They benefit small rural communities. And when you
3 work with the community to put the wind farm in, you
4 don't get any opposition. St. Leon was a wonderful
5 example of community development in that regard.

6 Most importantly for Hydro, there's no
7 finance risk. The risk is entirely borne by the
8 private sector, who promotes the wind farm. And the
9 way Hydro's written its contracts, it gets possession
10 of the wind farm if the company goes belly up. So
11 there's -- there's virtually no capital risk to Hydro
12 for expansion of wind.

13 In summary, the panel should always bear
14 in mind that Hydro's mandate is to provide power to
15 Manitobans first. If price and cost optimization
16 allows Hydro to sell surplus power to others, that's
17 fine but that's ancillary, not central to Hydro's legal
18 mandate.

19 If Hydro wants to become a merchant
20 power generator -- which I really think is what
21 Conawapa is all about; it's merchant power generation
22 for a very long time -- then it needs a new subject --
23 a new -- a new act. And in fact, the panel probably
24 knows it needs a new act anyway, because it's -- the
25 current act doesn't regulate a number of things that

1 Hydro needs to do, and it has virtually no green or DSM
2 mandate in the current act. So we need a new act, but
3 we need a new act if merchant power generation is now a
4 new goal, which it appears to be.

5 So when the risk is significant and the
6 major alternatives are either long term or medium
7 shorter term, choose the ones that are scalable and
8 will meet the need. Choose the one that will save many
9 Manitobans money on their heating bills and virtual
10 eliminate int -- interest rate risk for Hydro, and
11 therefore mitigate significantly rate increases for
12 consumers. Choose the lower-risk one of the jobs and
13 capital costs, or even it -- even equal. If you're
14 choosing on a risk-management basis, and you've got two
15 (2) equal alternatives, then you choose the one that
16 has the lower risk.

17 In this case, the lower risk one has
18 more jobs, generates power closer to load, which is a -
19 - a very important thing for Hydro, reduces demand on
20 long-term transmission -- long-distance transmission,
21 and provides financial support to rural communities and
22 farmers.

23 So I -- I don't know whether there's
24 time to have any questions or not. I would be
25 delighted to answer any questions if there are. I do

1 want to close by saying I want to wish the panel well
2 in -- in a difficult task. And I am proud to live in a
3 province where citizens can voice their opinions on
4 major public policy issues, so I thank you for that
5 opportunity.

6

7 (BRIEF PAUSE)

8

9 DR. HUGH GRANT: Can I just ask -- I'm
10 curious in your estimation, why -- why do you think it
11 would be that Hydro would ignore what seems like a more
12 cost-effective approach, such as wind?

13 So what is -- is there an inherit bias
14 in the Corporation or...

15 MR. TIM SALE: I can't -- I can't speak
16 to the -- to motives, in that regard. I think there's
17 a corporate culture in any big corporation. Speaking
18 with colleagues in other parts of the country when I
19 was minister, I can tell you that there were no large
20 corporations, like Quebec Hydro or -- or SaskPower, BC
21 Hydro, that welcomed at a corporate level new forms of
22 -- of energy generation.

23 They have a -- there's a long
24 engineering history of pouring concrete, building dams.
25 They work, they're great. I'm -- I'm not negative

1 about the dams. But it's -- but it's a corporate
2 culture. And I think when I read Hydro's submission
3 here on -- on wind, it's a six (6) short pages that
4 essentially dismisses wind as having any value
5 whatsoever.

6 I thought, you know, I just don't
7 understand how you could make those kinds of statements
8 in a jurisdiction that has such ample storage capacity,
9 and in a North America that's building more wind than
10 anything else right now, has added enormous amounts of
11 wind capacity. And I don't think that wind promoters
12 are stupid. I don't think they got into the business
13 to go bankrupt and lose money.

14 So it's a puzzle to me, and it was a
15 puzzle when I was minister; it's still a puzzle. I can
16 only put it down to corporate culture.

17 DR. HUGH GRANT: Just to follow up, do
18 you have a suggestion about this natural evolution
19 towards a Manitoba energy corporation as sort of a --
20 is that a solution, or would that compound your --

21 MR. TIM SALE: Well, personally I would
22 love to see Hydro become a Manitoba -- Manitoba energy
23 corporation and then be agnostic in terms of what its
24 preferences were. It would be more on the basis of
25 benefits to citizens, benefits to rate predict --

1 predictability, and so forth.

2 There was talk of that, you probably
3 know that, some years back. Probably more than a
4 decade ago there was talk of that. And it's a shame
5 that it -- that it hasn't happened, in my view, because
6 it -- it automatically, you know, biases in some sense
7 where the Corporation is going, since it's Manitoba
8 Hydro and Manitoba energy.

9 THE CHAIRPERSON: I have some questions
10 but also a comment. I just wanted to indicate to you
11 that, for the record, that, you know, Manitoba Hydro
12 has provided information to us that they will be
13 increasing DSM significantly --

14 MR. TIM SALE: Sorry, I -- I have a
15 severe hearing issue and I just needed to change these
16 things, can you -- just -- sorry --

17 THE CHAIRPERSON: Well, let me repeat
18 that. You know, Manitoba Hydro has provided
19 information to us that they will be amplifying the
20 amount of investments they're making in DSM. You know,
21 in other words they'll be enhancing their DSM plans
22 very significantly. We haven't yet seen the details in
23 -- in -- of that, but any case they -- you know, we
24 expect them to file that information.

25 And I guess the other piece I wanted to

1 let you know is that they have given us full access to
2 all of the information related to the export contracts.
3 So that is currently being examined by the panel and
4 its advisors, so we have complete access to the
5 information. So that piece of -- that is available to
6 us.

7 Now, I do -- I do want to -- you know, I
8 do want to ask you in respect of your experience, you
9 know, you -- you, I guess, were part of the government
10 at -- at the time that Wuskwatim was decided, and you
11 obviously had to deal with uncertainty at that point.

12 Now, absent the -- the advent of shale
13 gas what's different? I mean, you -- you obviously
14 made a decision with respect to the construction of
15 Wuskwatim in the face of significant uncertainty:
16 interest rates, construction costs.

17 So what's different now? I mean, you
18 know...

19 MR. TIM SALE: Well, I -- I think there
20 -- first of all, you're right. When you make a
21 decision of that kind then all those risks were there,
22 for sure. And they were amply borne out. When I was
23 minister, they were talking about seven hundred 700 to
24 800 million for the total project, including
25 transmission. So we know where it -- where it ended

1 up.

2 At that point, we -- we were trying very
3 hard and in fact denounced a target of 1,000 megs of
4 wind. Wuskwatim was well on its way in planning when I
5 became minister. It had been re-engineered downward
6 from doing significant environmental damage with the
7 flooding. It had been re-engineered down from, I
8 think, 390 to 200 megawatts, so much less flooding.

9 So a number of things had been done, and
10 we made the decision to go ahead with it. We could
11 look back now and say it was the wrong decision or the
12 right decision, but you're absolutely right. It's a
13 risk when you make that kind of decision -- and that's
14 primarily my point here, is that if you really have an
15 alternative to that long-term commitment with risk that
16 is shorter term and lower risk, then maybe you should
17 take the shorter-term one.

18 We did announce in 2004 -- September, I
19 believe, of 2004 a commitment to 1,000 megs of wind
20 provincially. That has obviously not happened. And I
21 think it was our view at the time that the next
22 development should be of -- of the kind we're talking
23 about, geothermal, wind, and much more aggressive DSM.
24 Green Manitoba was to have been a much more powerful
25 organization with much more in the way of resources

1 attached to it to enhance DSM. That did not happen
2 either. I can't speak to why. I was essentially out
3 of that role by that time. But I'm sorry it didn't.

4 Can I just -- just to -- on -- on your
5 comment, the -- the issue in the American contracts,
6 the specific issue I'm concerned about is what is being
7 charged for the firming and shaping of American wind
8 from Dakotas in Manitoba's reservoirs.

9 If it's buried in a cost somewhere,
10 somebody must have that figure, because simply having
11 what the export price is will not tell you, at least
12 not clearly, what is being charged for that firming and
13 shaping. I -- I think that's an important number for
14 the panel to ask for, and with the detail, not just,
15 What's the long-term per megawatt hour sale, unless
16 there's a component of that you can pull out and say,
17 And this is what they paid for firming and shaping.

18 THE CHAIRPERSON: Now, Manitoba Hydro
19 will argue that they have -- they currently have the
20 legislative mandate to undertake exports, and, you
21 know, that the -- as you know, the Act was modified to
22 allow Manitoba Hydro to -- to undertake exports, and
23 then you're quite familiar with that, I'm sure.

24 So you're suggesting that -- that the
25 Act be amended beyond what's currently there. I mean,

1 it -- it seems to me that there's ample opportunity,
2 given the mandate, to undertake exports.

3 Am I missing something?

4 MR. TIM SALE: The Hydro Act has been a
5 bone of contention for probably fifteen (15) or twenty
6 (20) years. Hydro wants many amendments to the current
7 Act, in fact, had commissioned a rewrite of the Act
8 internally, and came forward with proposals for a
9 rewrite.

10 Government -- after I was minister, my
11 understanding is government had a full rewrite of the
12 Act prepared, and so there was an acknowledgement that
13 the current Act did not include DSM in any kind of
14 significant way, doesn't regulate gas in the -- in the
15 way that probably it ought to, and there were questions
16 about: Should it become a Manitoba energy corporation?

17 But my understanding of Conawapa is that
18 virtually all of its power would be for export in the -
19 - in the medium-term, that I think you will hear from a
20 number of presenters, that Conawapa power for Manitoba
21 is not needed into the 2030 region. You may hear
22 higher than that.

23 So really we're making a commitment to
24 merchant power generation with the hopes that it'll pay
25 for itself. That's -- that's a -- an issue I -- you

1 know, I'm competent to do the math on that, but I think
2 that's a much bigger commitment to power export than
3 has ever been understood in the past.

4 In the past, it was some export as we,
5 in the Manitoba load, grew to a point of absorbing that
6 -- that power. It was never thought of, I don't think,
7 as we're going to export all of the power available
8 from this huge dam for many, many years to come,
9 because that's essentially what we're going to be doing
10 in my understanding of the -- of the Hydro submission.

11

12 (BRIEF PAUSE)

13

14 THE CHAIRPERSON: I think that the --
15 that's all the pan -- all the questions the panel has
16 to address to you, so I want to thank you on behalf of
17 my fellow panel members for taking the time and trouble
18 to prepare a written submission and to appear before
19 us.

20 I think that we like to hear from
21 individual -- we -- we haven't heard from too many
22 individuals yet, but there's certainly opportunity for
23 people to -- to take advantage of that ability that --
24 or that -- or right that is theirs to come and talk to
25 us about what they think. So thank you very much for -

1 - for doing this. Thank you.

2 MR. TIM SALE: Thank you for your
3 attention and your questions.

4 MR. SVEN HOMBACH: Mr. Chairman, I
5 would suggest we stand down for about two (2) minutes
6 to let the witnesses get into position again.

7

8 --- Upon recessing at 1:17 p.m.

9 --- Upon resuming at 1:20 p.m.

10

11 THE CHAIRPERSON: Good afternoon. I
12 believe that we're ready to resume the hearing itself.
13 Now, before we -- before we start, I -- I -- there is a
14 matter I would like to address on behalf of the Board.
15 The Board would like to provide some clarification on
16 what it expects from the updated financial runs and
17 economic evaluation provided in Manitoba Hydro Exhibit
18 104.

19 The Board understands that Manitoba
20 Hydro's NFAT financial analysis was based on the goal
21 of a timely return to the targeted 75:25 debt-equity
22 target, and to that end, the analysis filed in support
23 of the NFAT assumes even annual rate increases in order
24 to achieve the targeted debt-equity ratio by the end of
25 2031/'32.

1 Once that target is reached, the
2 projected comparative annual rates for the remainder of
3 the fifty (50) year financial forecast period utilized
4 the Corporation's interest coverage ratio target of one
5 point two-zero (1.20).

6 The Board understands that Manitoba
7 Hydro's application utilizes a correction factor which
8 results from moving from the rate setting based on
9 achieving a 75:25 percent debt-to-equity ratio by 2032,
10 to an interest coverage ratio of one point two (1.2).
11 The Board understands that this was applied to all of
12 the financial analysis filed in the original NFAT
13 submission to make an objective comparison among plans.

14 The Board further understand --
15 understands and agrees with Manitoba Hydro that the
16 rate increases in the financials are indicative, and
17 may not reflect what Manitoba Hydro may ultimately
18 apply for in a rate application before PUB. Manitoba
19 Hydro has now indicated that in the April 11 filings,
20 it -- it plans to apply a correction factor to smooth
21 out the rate increases.

22 While there is some benefit to this kind
23 of an analysis, there's one (1) problem from our
24 perspective, and in that -- in that it makes it hard to
25 compare the updated financial information against the

1 information that has been filed by Manitoba Hydro to
2 date.

3 If Manitoba Hydro plans to file updated
4 financials with the correction factor, the Board is
5 certainly interested. However, the Board still expects
6 Manitoba Hydro to file updated financial based on the
7 existing methodology, so that changes can be compared
8 to the original filing.

9 Accordingly, Manitoba -- accordingly,
10 the Board requests that Manitoba Hydro ensure that the
11 information filed on April 11 is presented on a
12 consistent basis as that previously filed in Chapter 11
13 and Appendix 11.4. I want to make the -- the case that
14 it -- it's, you know, if Manitoba Hydro chooses to file
15 information with a correction factor, that -- that's
16 fine, but we definitely need to be able to compare
17 against the information that has previously been filed.

18 Now, would you be in a position to
19 respond, Mr. Wojczynski, right away?

20 MR. ED WOJCZYNSKI: Mr. Chair and
21 panel, I under -- I understand your natural desire to
22 have something as comparable as possible with the
23 previous analysis, and I can't give a full response to
24 what you just communicated. I would need to consult,
25 obviously, with Mr. Rainkie and his team. There have

1 been discussions on this issue, and I -- I can say one
2 (1) thing, but it's not a full answer. So I will
3 consult with him and get back to them.

4 But I do know that one (1) issue that is
5 an impediment to doing exactly what was done before in
6 terms of the rate-setting methodology is that with the
7 higher levels of DSM, and you have the Preferred Plan
8 that includes Conawapa as well as Keeyask, that with
9 the higher levels of DSM, that you push Conawapa back
10 to that target date where the rate-setting methodology
11 was being applied, and that methodology no longer works
12 because the -- the largest plant you're putting on is
13 beyond the date you're using for the -- the rate-
14 setting mechanism.

15 But -- but I'm -- I'm not the -- I -- I
16 know that's a major factor for them, but I -- I'm
17 really not in a position to give a fuller answer than
18 that. So I will take this back to Mr. Rainkie and --
19 and we certainly hear your -- your request to have
20 something as comparable as possible, in -- in addition
21 to something that is a more realistic and smoothed out
22 approach, and -- and I'll -- I'll -- we'll provide a
23 response as soon as -- as we reasonably on that.

24 THE CHAIRPERSON: Thank you. Unless
25 there's some additional business to transact, I'll turn

1 the microphone over to Mr. Williams. I'm sorry -- I'm
2 sorry, there is something.

3

4 (BRIEF PAUSE)

5

6 MR. ED WOJCZYNSKI: The -- I was asked
7 and I had committed earlier to communicating with this
8 Board and all of the other participants about the
9 Manitoba Hydro decision on the general civil contract.
10 What I can say is that things are favourable right now,
11 but we're having a -- a full governance process
12 internal in the Company right now.

13 And so I've -- I've been advised by the
14 president that we'll have an answer forthcoming on the
15 8th, which will be a Tuesday, and then -- and we'll
16 have gone through a -- we've had meetings and -- but we
17 need to have a full governance process. So we'll be
18 providing a response both to the general civil
19 contractor, and to this committee -- to this Board on
20 the 8th.

21 THE CHAIRPERSON: Thank you, Mr.
22 Wojczynski. There an undertaking or an exhibit?

23 MS. JANET MAYER: Yes. There's one (1)
24 further undertaking, so this will now be filed as
25 Manitoba Hydro Exhibit 161. It is our response to

1 MIPUG Exhibit 21, and it was in transcript page 2,451.

2

3 --- EXHIBIT NO. MH-161: Response to Exhibit MIPUG-

4 21

5

6 THE CHAIRPERSON: Thank you. I don't
7 think there's any further business, so Mr. Williams,
8 please.

9

10 IEC MEYERS NORRIS PENNY PANEL RESUMED:

11 CRAIG SABINE, Resumed (Qual.)

12 SARAH KEYES, Resumed

13

14 CONTINUED CROSS-EXAMINATION BY MR. BYRON WILLIAMS:

15 MR. BYRON WILLIAMS: Thank you, members
16 of the panel. Mr. Sabine, we -- we may be jumping
17 around a bit for the first few moments. If you can
18 turn to your PowerPoint MNP Exhibit 8, page 14, for a
19 moment, sir? And sir, there we see a analysis of
20 selected plan error impacts. Is that correct?

21 MR. CRAIG SABINE: Yes. More
22 specifically, greenhouse gas emissions.

23 MR. BYRON WILLIAMS: And among the
24 plans that you -- you analyzed, we see on the extreme
25 right, Plan 7 being a -- a simple cycle gas turbine

1 combined with Conawap -- Conawapa26.

2 Is that right?

3 MR. CRAIG SABINE: Correct.

4 MR. BYRON WILLIAMS: And just in terms
5 of greenhouse gas emishes -- emissions, that ranked
6 second only to the Preferred Plan, in terms of
7 operating emissions, sir?

8 MR. CRAIG SABINE: That's right, if
9 we're ranking from low to high --

10 MR. BYRON WILLIAMS: Yeah.

11 MR. CRAIG SABINE: -- and -- and, you
12 know, only considering these five (5) plans, yes.

13 MR. BYRON WILLIAMS: Okay. And in
14 terms of ranking in terms of cumulative regional GHG
15 displacement potential, that plan would rank third in
16 terms of preferential outcomes, with the Preferred Plan
17 14 being first, Plan 4 being second, and -- and then
18 Plan 7 being third?

19 You know, am I correct, sir?

20 MR. CRAIG SABINE: Yes, I believe
21 that's -- that's right.

22 MR. BYRON WILLIAMS: Now, I don't know
23 if you've memorized like Mr. Wojczynski every pathway
24 and every plan, but do you recall, sir -- or -- or will
25 you accept subject to -- to check that Plan 8 was a --

1 a complex cycle natural gas turbine combined with
2 Conawapa in '26?

3 Would you accept that, subject to check?

4 MR. CRAIG SABINE: Combined cycle,
5 subject to check, yes.

6 MR. BYRON WILLIAMS: And sir, would you
7 have performed an analogous -- analysis for Plan 8?

8 MR. CRAIG SABINE: We would not have
9 necessarily directly compared them analytically as --
10 as part of our report, but likely at a high level, as
11 we were conducting research, we certainly could do that
12 easily enough.

13 MR. BYRON WILLIAMS: And -- and we'll
14 get to that in just a second, sir. Would we expect
15 analytically, if Plan 7, for example, versus Plan 8,
16 that Plan 8 might result in -- in lesser greenhouse gas
17 emissions, or is it unclear, sir?

18 MR. CRAIG SABINE: Lesser than Plan 7?

19 MR. BYRON WILLIAMS: Yes.

20

21 (BRIEF PAUSE)

22

23 MR. CRAIG SABINE: Based on the data
24 that I have here in front of me, the answer would be
25 no. It actually -- it -- it has greater emissions.

1 MR. BYRON WILLIAMS: Okay. I -- I
2 wonder -- and -- and, sir, if it's too difficult, I
3 will not ask, but I -- I wonder if you would consider
4 by way of undertaking presenting a -- an additional
5 analysis with regard to Plan 8?

6 MR. CRAIG SABINE: Yeah, that -- that
7 should be -- should be no problem.

8

9 (BRIEF PAUSE)

10

11 MR. BYRON WILLIAMS: Thank you. If we
12 could turn to --

13 MR. MICHAEL WEINSTEIN: Excuse me, Mr.
14 Williams. I just want to make sure that we have the
15 undertaking clearly on the record, so can you maybe
16 restate what the undertaking is that you're seeking?

17 MR. BYRON WILLIAMS: And I appreciate
18 your courtesy in reminding me how to do my job, Mr.
19 Weinstein; thank you for that. To -- by way of
20 undertaking, to present the analysis for Plan 8 in a
21 similar fashion to the selected plan air impacts
22 presented on slide 14 of MNP Exhibit 8.

23 Would you undertake to do that, sir?

24 MR. MICHAEL WEINSTEIN: Yes, we'll give
25 that undertaking. Thank you.

1 --- UNDERTAKING NO. 98: MNP to present the analysis
2 for Plan 8 in a similar
3 fashion to the selected
4 plan air impacts presented
5 on slide 14 of MNP Exhibit
6 8

7
8 CONTINUED BY MR. BYRON WILLIAMS:

9 MR. BYRON WILLIAMS: Mr. Sabine,
10 directing your attention to page 6 of MNP-8, your
11 PowerPoint presentation, to the last bullet on that
12 page. You explained to the Public Utilities Board that
13 you find generally an acceptable narrative of macro-
14 environmental concerns with a few noteworthy exceptions
15 where insufficient examination exists in the NFAT for
16 the panel's review.

17 Am I correct, sir?

18 MR. CRAIG SABINE: Yes.

19 MR. BYRON WILLIAMS: And, sir, I wonder
20 if you can either verbally or by way of undertaking
21 outline those areas where you feel that there is
22 insufficient evidence on the record to -- to complete
23 the narrative?

24 MR. CRAIG SABINE: A few core examples
25 would be some of the more local biophysical impacts to

1 the VECs that we were looking at in -- in relation to
2 Conawapa, given that a full and complete study to the
3 extent that has been conducted for the Keeyask project
4 through the environmental assessment has been
5 undertaken.

6 MR. BYRON WILLIAMS: By a few of the --
7 the VECs, would one of them be lake sturgeon, sir?

8 MR. CRAIG SABINE: Yes, I -- I would
9 agree with that, yes.

10 MR. BYRON WILLIAMS: And would another
11 one be water quality, sir?

12 MR. CRAIG SABINE: Yes.

13 MR. BYRON WILLIAMS: And you're going
14 to have to speak up.

15 MR. CRAIG SABINE: Yes, it would.

16 MR. BYRON WILLIAMS: And dividing
17 caribou into two (2) subsections, would one -- an
18 additional one be migratory caribou?

19 MR. CRAIG SABINE: I believe migratory
20 caribou have been studied extensively outside of -- of
21 the EIS process, or the environmental assessment
22 process. So I would say that the record is -- is
23 there.

24 MR. BYRON WILLIAMS: And what about
25 focussing on summer resident caribou?

1 MR. CRAIG SABINE: I would say that the
2 understanding is limited, although it's not even clear
3 whether those summer resident caribou -- to the extent
4 to which they utilize the Conawapa area at all.

5 MR. BYRON WILLIAMS: And moving away
6 from Conawapa with regard to summer resident caribou,
7 sir, would it be fair to say there is some uncertainty
8 and some dispute in terms of whether -- what exactly
9 those summer resident caribou are and indeed whether
10 they are sedentary boreal woodland caribou?

11 MR. CRAIG SABINE: There is some
12 contention on that specific issue, yes. But I -- I
13 believe we've noted in our report that there are
14 several bodies that do identify that the herd is
15 distinct.

16 MR. BYRON WILLIAMS: And if indeed the
17 summer resident caribou are sedentary boreal woodland
18 caribou, that reality would -- would invite SARA
19 protection, Species At Risk protection, sir?

20 MR. CRAIG SABINE: That is a
21 possibility, yes.

22 MR. BYRON WILLIAMS: If we could turn
23 to CAC Exhibit 45-8. And, Mr. Chair, I think I'm on
24 schedule, so. And back to the map on page 62 of that
25 document, and with that beautiful colour.

1 The light green or yellow in the top
2 right-hand corner, Mr. Sabine, you'll agree with me, is
3 Management Unit 6, or MU6?

4 MR. CRAIG SABINE: Yes.

5 MR. BYRON WILLIAMS: And the proposed
6 construction of Conawapa would be within that
7 management unit, agreed?

8 MR. CRAIG SABINE: Agreed.

9 MR. BYRON WILLIAMS: And going down to
10 the left and down -- up the Nelson River, in red we
11 would see Management Unit 3, or MU3.

12 Would that be fair, sir?

13 MR. CRAIG SABINE: Yes, sir.

14 MR. BYRON WILLIAMS: And the proposed
15 construction of the Keeyask generating station would be
16 within that specific management unit.

17 Is that correct, sir?

18 MR. CRAIG SABINE: It appears correct,
19 yes.

20 MR. BYRON WILLIAMS: If we could turn
21 to page 55 of this same document, and just above the
22 heading, "Threats to Survival and Recovery." I'll draw
23 your attention, Mr. Sabine, to this last sentence. And
24 you'll see the -- this document is flagging the
25 importance of Management Units 2, 3, and 6 to species

1 recovery in -- in the region. Do you see that, sir?

2 MR. CRAIG SABINE: Yes, I do.

3 MR. BYRON WILLIAMS: Am I correct in
4 suggesting to you that Manitoba Hydro appears to be
5 proposing to build new dams in two (2) of the three (3)
6 management units where we are placing many of our hopes
7 for Nelson River lake sturgeon recovery?

8 MR. CRAIG SABINE: I wouldn't fully
9 agree with that. I would -- I would enter that
10 Manitoba Hydro is planning to construct dams in two (2)
11 of the MUs where the importance of species recovery is
12 thought to be high.

13 MR. BYRON WILLIAMS: Fair enough. Did
14 I interrupt you? I didn't mean to.

15 MR. CRAIG SABINE: No.

16 MR. BYRON WILLIAMS: Okay. Thank you.
17 Turning to page 61 of MNP Exhibit 6, your redacted
18 evidence from March of 2014.

19

20 (BRIEF PAUSE)

21

22 MR. BYRON WILLIAMS: Sir, I'll suggest
23 to you that under Section 7.4, you present a discussion
24 of mitigation strategies and considerations, would that
25 be fair? It's page 61 of your report, sir.

1 MR. CRAIG SABINE: You sort of lost me
2 in my own documentation, but that's what's on screen
3 then, yes, I would agree with you.

4 MR. BYRON WILLIAMS: That's fine. I
5 just don't want you to think I'm trying to pull a fast
6 one on you, sir.

7 MR. CRAIG SABINE: No.

8 MR. BYRON WILLIAMS: Okay? And you
9 remember, previously, we had a discussion on one of my
10 favourite topics, young-of-year habitat.

11 MR. CRAIG SABINE: Yes.

12 MR. BYRON WILLIAMS: Do you recall
13 that, sir? And certainly, we don't need to go there,
14 but elsewhere in your evidence there's been a
15 suggestion that there is a high risk related to the
16 loss of young-of-year habitat. You -- you'll agree,
17 sir?

18 MR. CRAIG SABINE: Yes.

19 MR. BYRON WILLIAMS: And the point you
20 make here on page 61 is that Manitoba Hydro has never
21 built young-of-year habitat and cannot guarantee it
22 will be successful. Is that fair?

23

24 (BRIEF PAUSE)

25

1 MR. CRAIG SABINE: Yes, that's correct.

2 MR. BYRON WILLIAMS: And, sir, I -- I'm
3 going to try and push you on this point a little bit,
4 and feel free to resist me if you disagree.

5 I'm going to suggest to you that,
6 perhaps, you have understated this issue in that it is
7 not just that Manitoba Hydro has never built young-of-
8 the-year habitat, but that juv -- juvenile lake
9 sturgeon habitat has never been created in a large
10 river anywhere?

11 MR. CRAIG SABINE: To my knowledge,
12 that has not been the case.

13 MR. BYRON WILLIAMS: And so if we were
14 to characterize this as experimental, in terms of
15 Manitoba Hydro's efforts here, would that be, to your
16 understanding, a fair characterization?

17 MR. CRAIG SABINE: I believe, that
18 would be a fair characterization. Certainly, in
19 Canada, given the research that we've reviewed, it's
20 not something that is commonplace, if -- if it has been
21 done ever in sort of a -- a real-time commercial scale.

22 MR. BYRON WILLIAMS: Thank you. Just a
23 -- a couple more questions. CAC Exhibit 45-8, page 44
24 -- actually, if you could to page 43 first.

25 Mr. Sabine, I don't know if you're

1 familiar with this, but you'll accept subject to -- to
2 check that this is an excerpt from a Clean Environment
3 decision -- excuse me, a Clean Environment document
4 recommending a regional cumulative effects assessment
5 for all Manitoba Hydro projects and associated
6 infrastructure in the Nelson River sub-watershed?

7 MR. CRAIG SABINE: Subject to check,
8 I...

9 MR. BYRON WILLIAMS: And again, if we
10 focus our attention on the non-licensing recommendation
11 to the right on page 13.2, there's a -- there appears
12 to be a recommendation that this be conducted and that
13 this be undertaken prior to the licensing of any
14 additional projects in the Nelson River sub-watershed?

15

16 Do you see that, sir?

17 MR. CRAIG SABINE: Yes, that appears to
18 be what it indicates.

19 MR. BYRON WILLIAMS: And if you do wish
20 to turn to page 44 of the same document, being CAC
21 Exhibit 8, and if we scroll down just a little bit to
22 the second full paragraph, again, sir, you'll see
23 correspondence from the Minister to Manitoba Hydro,
24 expressing some intent to respond to the regional
25 cumulative effects recommendation.

1 Do you see that, sir?

2 MR. CRAIG SABINE: Yes, that is also
3 what this would appear to indicate.

4 MR. BYRON WILLIAMS: Now, had -- had
5 you seen this documentation prior to preparing your
6 report, sir?

7 MR. CRAIG SABINE: No, we had not.

8 MR. BYRON WILLIAMS: And just would it
9 be fair to suggest that the implications of a regional
10 cumulative effects assessment in the -- in terms of
11 regulatory risk would not have been something that you
12 addressed your analysis to?

13 MR. CRAIG SABINE: Sorry, could you
14 repeat or rephrase that?

15 MR. BYRON WILLIAMS: Yeah. Well, let
16 me -- let me try it again. Sir, you see a -- again it
17 was a non-binding recommendation, but the Clean
18 Environment Commission saying, Perhaps we should be
19 doing a regional cumulative effects assessment before
20 we -- we walk down the path of further licensing beyond
21 Bipole III.

22 You recall that?

23 MR. CRAIG SABINE: Yes.

24 MR. BYRON WILLIAMS: And so what I'm
25 just asking -- and -- and again it's hard to interpret

1 a letter a from a Minister, and I'm not asking you to
2 do that.

3 I'm simply asking, in -- in doing the
4 regulatory risk analysis for the Hydro Preferred Plan,
5 would MNP have addressed their mind to any of the
6 implications of the outcomes of a regional cumulative
7 effects assessment?

8 MR. CRAIG SABINE: I don't believe so,
9 no. Only to the extent that that recommendation would
10 have been made in the lake sturgeon management
11 strategy.

12 MR. BYRON WILLIAMS: Okay. Sir, I
13 don't have the reference right in front of me, but in
14 your evidence would it be fair to say that you
15 characterized the consequences of the Preferred
16 Development Plan to lake sturgeon as regionally
17 significant?

18 MR. CRAIG SABINE: Yes, definitely
19 locally significant.

20 MR. BYRON WILLIAMS: And, sir, would
21 you contemplate the possibility that it -- that if
22 we're talking, at least in the short term, about some
23 risk of extirpation within at least part of the Nelson
24 River sub-watershed, that that might have more than
25 local or regional consequences in that it -- it might

1 do damage to the Manitoba Hydro brand?

2 MR. CRAIG SABINE: Not sure I can speak
3 intelligently to how the province or the country would
4 respond to Manitoba Hydro being implicated in the
5 extirpation of -- of sturgeon on the reach, but it's a
6 plausible scenario, yes.

7 MR. BYRON WILLIAMS: I just have two
8 (2) questions of clarification from my client, sir.
9 And I -- one is:

10 In your report, and I apologize for not
11 knowing this, do you discuss the likelihood of fuel
12 switching in Manitoba to any degree?

13 MR. CRAIG SABINE: I do not believe we
14 do, no.

15 MR. BYRON WILLIAMS: And would it have
16 affected your analysis in any way if -- if you would
17 have looked at that, or...

18

19 (BRIEF PAUSE)

20

21 MR. CRAIG SABINE: Difficult for me to
22 say without thinking about it a little longer, I think.
23 But I believe it would be captured in -- in the more
24 integrated analyses that were undertaken by other IECs.
25 And it was our assumption and -- and possibly hope that

1 that would be the case.

2 MR. BYRON WILLIAMS: Okay. I'll
3 reflect on that.

4 Finally, sir, there is some discussion
5 in your report about the likelihood that in the short
6 to medium term, there will be increased mercury in --
7 in the water upstream from -- from Keeyask, agreed?

8 MR. CRAIG SABINE: Yes.

9 MR. BYRON WILLIAMS: And would it be
10 fair to suggest to you, sir, that that would have a
11 direct impact, in terms of fish in the sense that
12 they're -- in that environment they're likely to absorb
13 more mercury?

14 MR. CRAIG SABINE: That is correct.
15 Typically the top predatory fish will bioaccumulate the
16 most significant amounts of organic mercury.

17 MR. BYRON WILLIAMS: And just to finish
18 off, sir, you -- you're aware of the importance in --
19 in many Aboriginal communities of traditional foods?

20 MR. CRAIG SABINE: I am.

21 MR. BYRON WILLIAMS: And fish are among
22 those traditional -- those foods, obviously?

23 MR. CRAIG SABINE: Yes, sir.

24 MR. BYRON WILLIAMS: Would you accept
25 the possibility that in addition to the direct effect

1 in terms of impact on the food they eat, there might
2 also be a chilling effect in the sense that it would
3 discourage individuals from -- from eating fish?

4 MR. CRAIG SABINE: I would agree with
5 that, sure.

6 MR. BYRON WILLIAMS: Okay. I thank you
7 very much for your -- for your time. It's much
8 appreciated. And I thank the panel.

9 MR. CRAIG SABINE: Thank you.

10 THE CHAIRPERSON: Thank you, Mr.
11 Williams. I just want to make sure I canvass the
12 intervenors to make ensure that they are given the
13 opportunity to ask any question.

14 Mr. Gange, do you have any questions you
15 wanted to ask?

16 MR. WILLIAM GANGE: Ms. Saunders and I
17 had -- had discussed switching; fuel switching, I
18 guess, is one way of looking at it. And -- and I
19 believe that Ms. Saunders will go before me, Mr. Chair.

20 THE CHAIRPERSON: Thank you, Mr. Gange.
21 Ms. Saunders, please.

22 MS. JESSICA SAUNDERS: Thank you.

23

24 CROSS-EXAMINATION BY MS. JESSICA SAUNDERS:

25 MS. JESSICA SAUNDERS: So good

1 afternoon. Jessica Saunders, for the Manitoba Metis
2 Federation.

3 MR. CRAIG SABINE: Good afternoon.

4 MS. JESSICA SAUNDERS: I do note, I've
5 -- I've been advised that I think you've provided
6 responses to our -- to MMF's IRs. We just haven't
7 received them yet. And so I will ask some questions,
8 and I don't believe that they duplicate in any way. So
9 we look forward to receiving those.

10 I have two (2) areas of questioning with
11 a few short questions within those areas, firstly
12 regarding some of the assumptions with respect to
13 Keeyask and Conawapa made in your report.

14 In your report you indicate that the
15 impacts of Conawapa and its associated infrastructure
16 are expected to be similar in nature and magnitude to
17 those of the Keeyask project, correct?

18 MR. CRAIG SABINE: Correct.

19 MS. JESSICA SAUNDERS: That although
20 there are likely to be some differences in incremental
21 impacts of the Conawapa project, it was reasonable for
22 the purposes of the evaluation you have completed to
23 assume and assess similar and interdependent macro-
24 environmental impacts for analytic purposes.

25 Is that correct?

1 MR. CRAIG SABINE: Yes.

2 MS. JESSICA SAUNDERS: You qualified
3 your assumption in that regard, though, in your report
4 in referencing that future CEC approval processes will
5 provide more detailed evaluations, correct?

6 MR. CRAIG SABINE: That's correct.

7 MS. JESSICA SAUNDERS: But in following
8 the assumptions made in your report --

9 MR. MICHAEL WEINSTEIN: Excuse me, Ms.
10 Saunders. I'm sorry to interrupt you, but are you
11 referring to a specific page in the report that you
12 could refer the witness to?

13 MS. JESSICA SAUNDERS: Oh, yes. It
14 would be page 4 of the MNP report. That's the actual
15 page. And I do apologize. I was actually operating
16 off of a different version of the MNP report. I don't
17 have the PDF number, but it is the bottom paragraph of
18 page 4 there.

19 MR. MICHAEL WEINSTEIN: That's the page
20 that's titled "Introduction" at the top?

21 MS. JESSICA SAUNDERS: Yes.

22 MR. MICHAEL WEINSTEIN: Thank you.

23

24 CONTINUED BY MS. JESSICA SAUNDERS:

25 MS. JESSICA SAUNDERS: And in following

1 the assumption made in your report, in the event that
2 the CEC finds that the Keeyask project has significant
3 residual adverse environmental effects, is it fair to
4 say that, for analytic purposes, MNP is of the view
5 that the Conawapa project will therefore also have
6 significant residual adverse environmental effects?

7 MR. CRAIG SABINE: Yes, I believe
8 that's correct, which is, I think, captured in our
9 statement regarding the likelihood of effects of the
10 same nature and -- and magnitude.

11 MS. JESSICA SAUNDERS: Thank you. And
12 moving on, the scope of work for MNP was referenced
13 this morning.

14 I just want to confirm some of the
15 details with respect to the scope of work for the
16 equitable distribution that was completed by MNP.

17 MR. CRAIG SABINE: Yes.

18 MS. JESSICA SAUNDERS: So in number 1,
19 there we know that MNP was asked to look at the
20 Preferred Development Plan and alternative plans,
21 specifically the macro-environmental consequences of
22 the changes there, including the potential significance
23 of those changes, and then their equitable distribution
24 within and between present and future generations?

25 MR. CRAIG SABINE: Yes.

1 MS. JESSICA SAUNDERS: But my
2 understanding from the report is that you considered
3 the consequences related to Keeyask and Conawapa only
4 and not to alternative plans, correct?

5 MR. CRAIG SABINE: I wouldn't
6 necessarily agree with that we only considered the
7 impacts associated with Keeyask and Conawapa. We
8 considered that some of the impacts of projects and
9 technologies associated with the alternative plans
10 could be the same as those associated with Keeyask and
11 Conawapa, but that's certainly not -- that's certainly
12 not the case for all of the impacts of Keeyask and
13 Conawapa.

14 MS. JESSICA SAUNDERS: Okay. If --
15 could we bring up slide 53 from your presentation this
16 morning. Sorry, it would be -- yeah. Okay.

17 So -- but the equitable distribution
18 that's completed here refers to the macro-environmental
19 changes that have been identified for Keeyask and
20 Conawapa though, correct?

21 MR. CRAIG SABINE: Correct.

22 MS. JESSICA SAUNDERS: Okay. So those
23 other factors that you say you provided some
24 recognition for the alternatives, those aren't
25 reflected in that -- in this chart though, correct?

1 MR. CRAIG SABINE: They're not a direct
2 core element of the analysis that we undertook, but
3 alternative plans would certainly have similar or the
4 same impacts in many of these cases. And to the extent
5 that those impacts are the same, their relationship or
6 relatively to future and present generation would --
7 would be equal.

8 MS. JESSICA SAUNDERS: Okay. And in
9 completing the equitable distribution assessment that
10 led you to your results on page 53 here, the
11 information you relied on in completing this analysis,
12 that would be Manitoba Hydro and the Keeyask Cree
13 Nations's information based on the EIS for Keeyask.

14 Is that correct?

15 MR. CRAIG SABINE: Those sources were
16 relied on. I believe other sources of research, in
17 terms of the extent, scale, location of some of these
18 impacts, would have also been used to -- as input to --
19 to the results here.

20 MS. JESSICA SAUNDERS: Okay. And in
21 completing this assessment you utilized the seventy-
22 eight (78) year planning period, correct?

23 MR. CRAIG SABINE: I believe we would
24 have considered the seventy-eight (78) year planning
25 period as a foundation for when and to what extent

1 these impacts would be realized. But certainly the
2 longer term impacts to future generations could go
3 beyond the seventy-eight (78) year planning horizon.

4 MS. JESSICA SAUNDERS: Okay. And
5 again, I'm new to this, but I was just going to see if
6 you could assist for what's been done on your results
7 here on page 53. Are you able to provide any kind of
8 breakdown for what years are captured in present --
9 sorry, present and next generation, and then future
10 generations? Or just any comment on how -- how this
11 was done, just to help me understand what -- what is
12 captured when you look at the -- the dots, and -- and
13 then the timeline of it?

14 Was there any particular years that you
15 could provide us that you based your analyses on?

16 MR. CRAIG SABINE: No. I would say no.
17 I mean, this is really a conceptual representation of -
18 - of the analysis; stylized, highly, obviously. I
19 think the intent here was really just to give the panel
20 and other participants in this proceeding a feel for
21 which generations would be most significantly impacted
22 by certain issues or impacts associated with the
23 projects.

24 So in -- in the case of -- of climate
25 change direct impacts, assuming that we root the

1 conditions in -- in the current science, that impacts
2 of climate change will, you know, increase as time goes
3 on if left unchecked. Each decade will see a
4 progressive worsening of those impacts, and therefore,
5 you know, at the end of seventy-eight (78) years they
6 could be -- there could be a quite difficult situation,
7 in terms of impacts.

8 And beyond that -- future generations
9 beyond that would also be experiencing even greater
10 nega -- negative impacts.

11 MS. JESSICA SAUNDERS: Consistent with
12 what you just said though, there could also be
13 anticipated changes throughout the generations for
14 other areas, as well, that you considered in your
15 analysis, such as shoreline erosion, peat land
16 disintegration, and sedimentation, correct?

17 MR. CRAIG SABINE: That's correct.
18 There's certainly an acceptance, I believe, that there
19 will be an -- an immediate level of impact, in the
20 sense of shoreline erosion, that will certainly impact
21 the current generation at the time of -- of
22 construction and inundation. And -- and that will
23 flow into, no pun intended --

24 MS. JESSICA SAUNDERS: Right.

25 MR. CRAIG SABINE: -- flow into, you

1 know, the next generation. And it's really unknown
2 what might occur, in terms of shoreline -- you know,
3 unanticipated shoreline erosion issues on into the
4 future generations. I believe we -- and I believe we
5 have identified that in our report and our presentation
6 today, that there are some risks of -- of ongoing
7 impacts that are either not identified or unanticipated
8 that, you know, may act to shift some of these -- some
9 of these bubbles around at a later date, when more
10 information is available.

11 MS. JESSICA SAUNDERS: And you said
12 that this equitable distrib -- the results of the
13 equitable distribution analysis on slide 53 of your
14 report is really at a high, conceptual level.

15 I'm just wondering, were there any other
16 models or means of completing the equitable
17 distribution assessment that you considered in your
18 work here?

19 MR. CRAIG SABINE: We considered no
20 other models or methodologies to -- to conduct this
21 work -- this analysis, no.

22 MS. JESSICA SAUNDERS: Thank you.
23 Those are all my questions.

24 THE CHAIRPERSON: Thank you, Ms.
25 Saunders. Mr. Gange, please.

1 MR. WILLIAM GANGE: Thank you, Mr.
2 Sabine -- or thank you, Mr. Chair.

3

4 CROSS-EXAMINATION BY MR. WILLIAM GANGE:

5 MR. WILLIAM GANGE: Mr. Sabine, my name
6 is Bill Gange. I'm here on behalf of the Green Action
7 Centre. I have a number of questions. If we could go
8 to page 38 of the redacted -- I think it's MNP-5.

9

10 (BRIEF PAUSE)

11

12 MR. CHRISTIAN MONNIN: Mr. Gange, we
13 have an extra copy for you here.

14

15 (BRIEF PAUSE)

16

17 MR. CHRISTIAN MONNIN: Keeping in mind
18 your client, it's double paged.

19

20 (BRIEF PAUSE)

21

22 MR. WILLIAM GANGE: Yes. And -- and so
23 if -- and, Diana, you could just scroll down a little
24 bit to the flooding section? My understanding, sir, is
25 that when you were taking a look at the water regime,

1 you were able to use the environmental impact study for
2 Keeyask, but unfortunately, there hasn't been one (1)
3 for Conawapa. So there's a -- there's a little bit of
4 a disconnect.

5 That would be a fair statement, would it
6 not, sir? You have more information on Keeyask than on
7 Conawapa?

8 MR. CRAIG SABINE: That's correct. We
9 have more information on Keeyask for certain.

10 MR. WILLIAM GANGE: The one (1) thing
11 that you do identify -- or there's a number of things
12 that you identify about Keeyask, and that is that,
13 number 1) there's going to be 45 kilometres of land
14 flooded pursuant to Keeyask?

15 MR. CRAIG SABINE: The estimation is 45
16 kilometres squared of -- of new land flooded, yes.

17 MR. WILLIAM GANGE: And that's compared
18 to 5 kilometres squared of land with respect to
19 Conawapa expected?

20 MR. CRAIG SABINE: I believe that's
21 correct, yes.

22 MR. WILLIAM GANGE: And from what
23 you've said, it would appear that with respect to
24 Keeyask, the water level at the generation --
25 generating station will rise 15 metres above existing

1 levels?

2 MR. CRAIG SABINE: I believe that's
3 correct, potentially, subject to check.

4 MR. WILLIAM GANGE: Well --

5 MR. CRAIG SABINE: That would be --

6 MR. WILLIAM GANGE: -- it's right there
7 on there on the screen under, "Flooding," the second
8 bullet on the far right side.

9 MR. CRAIG SABINE: Yes. Yes, I see
10 that now. Sorry.

11 MR. WILLIAM GANGE: Yes. And one of
12 the most important things will be that Gull Rapids will
13 be submerged, so that area will no longer serve as a
14 rapid -- a -- a rapid site on the river.

15 MR. CRAIG SABINE: Correct, yes.

16 MR. WILLIAM GANGE: And I understand
17 that you -- that you are -- the indication is that
18 there'll be slower and deeper water through Gull Lake,
19 Birthday Rapids, and upstream all the way to the outlet
20 of Clark Lake, correct, sir?

21 MR. CRAIG SABINE: Based on the
22 modelling, yes.

23 MR. WILLIAM GANGE: And -- and what
24 does that have -- what effect does that have, the
25 slower and deeper water through that waterway?

1 MR. CRAIG SABINE: Could you be more
2 specific? Effect on -- on what?

3 MR. WILLIAM GANGE: Well, how does it
4 affect the -- the water ratio? My -- I understand that
5 there's a potential effect because of that on -- on the
6 lake sturgeon.

7 Is that correct?

8 MR. CRAIG SABINE: Correct. The -- the
9 deepening and slowing of water, for example, through --
10 through Birthday Rapids will -- will change the habitat
11 dynamics there for -- for the sturgeon, which is
12 certainly one (1) of the principle concerns with that
13 change in water regime.

14 MR. WILLIAM GANGE: And does it also
15 have a -- a -- an effect upon the water quality through
16 that area?

17 MR. CRAIG SABINE: Oxygenation could be
18 reduced and limited, yes, for example, in terms of
19 water quality.

20 MR. WILLIAM GANGE: And you've also
21 indicated that there will be the flooding of several
22 known caribou calving islands as a result of the -- the
23 rise in the water level?

24 MR. CRAIG SABINE: That's correct, yes.

25 MR. WILLIAM GANGE: And -- and I

1 wonder, sir, if -- if you can comment on the Conawapa
2 site.

3 We know that it's -- there's going to be
4 significantly less new land flooded pursuant to
5 Conawapa, correct, sir?

6 MR. CRAIG SABINE: Yes.

7 MR. WILLIAM GANGE: Can you -- without
8 the environmental impact study, can you comment on a
9 couple of the other situations? Is it expected that
10 Conawapa will also result in slower and deeper water?

11 MR. CRAIG SABINE: At certain points of
12 the reach that is likely true, yes, but the -- the area
13 in and around Conawapa has much steeper banks in the
14 riparian zone, which allows for water rise without the
15 substantial flooding of -- of area land.

16 So similarly, the river dynamics
17 continue to be closer to what they would be without the
18 damming, but certainly deeper and -- and potentially
19 slower, from my understanding, yes.

20 MR. WILLIAM GANGE: But you would
21 expect there would be less erosion as a result of that?

22 MR. CRAIG SABINE: I'm not sure I can
23 fully comment on that.

24 MR. WILLIAM GANGE: Okay. Thank you.
25 In terms of -- of water quality, is -- is it your

1 expectation that the water quality will be disturbed
2 less by Conawapa than by Keeyask?

3 MR. CRAIG SABINE: Subject to the level
4 of erosion, and potentially wetland degradation in the
5 area, will likely influence -- will -- will have the
6 greatest influence on water quality for a time.

7 So my understanding would be that, yes,
8 it would be less given the river dynamics and the level
9 of -- of expected area flooding. So yes, that -- that
10 -- that's a fair --

11 MR. WILLIAM GANGE: Fair --

12 MR. CRAIG SABINE: -- summation.

13 MR. WILLIAM GANGE: Fair assumption.

14 MR. CRAIG SABINE: Yes.

15 MR. WILLIAM GANGE: Okay. Thank you.

16 You're aware, sir, that Conawapa is expected to have
17 over twice the capacity of Keeyask?

18 MR. CRAIG SABINE: Yes, I am.

19 MR. WILLIAM GANGE: And is it -- is it
20 fair to say that if the -- that if the impact --
21 environmental impact is relatively the same with
22 respect to those two (2) projects, that the -- on a per
23 kilowatt basis, Conawapa would, in fact, be more benign
24 per kilowatt hour from an environmental perspective?

25 MR. CRAIG SABINE: Purely from a

1 environmental perspective, that would appear to be the
2 case, although I would -- I would add to that that that
3 doesn't obviously include the value of the output of
4 that extra capacity, which, assuming the other analyses
5 that have taken place could be more or less than --
6 than Keeyask.

7 MR. WILLIAM GANGE: Okay. And we know
8 that -- that if -- if the capacity of -- of Conawapa is
9 over twice what Keeyask is, that certainly, Conawapa
10 would have a greater capacity to displace a greater
11 number of GHGs in the MISO market.

12 Wouldn't that be a fair assessment, sir?

13 MR. CRAIG SABINE: Assuming you bring
14 that capacity to market, yes.

15 MR. WILLIAM GANGE: Thank you. Is it
16 fair, then, to conclude that from -- from the macro-
17 environmental perspective on -- on those issues that
18 we've just talked about, Conawapa would be the better
19 project if only one (1) of them were to go ahead?

20 MR. CRAIG SABINE: I haven't thought of
21 it in that way, to be honest with you, Mr. Gange.
22 Based on our discussion, it would seem that -- that
23 that would be the case, but...

24 MR. WILLIAM GANGE: Yeah, you weren't -
25 - that's not part of your scope. I -- I understand

1 that. I'm just trying to understand the -- the
2 relative impacts of these two (2) projects.

3 MR. CRAIG SABINE: Based on the
4 information that we have now, or at least as I
5 understand it, there are discreet impacts that Keeyask
6 -- or, associated with the Keeyask project that creates
7 significant impacts for consideration that are
8 incremental to -- to those that we expect to see at
9 Conawapa.

10 MR. WILLIAM GANGE: Thank you.

11 THE CHAIRPERSON: I'm having trouble
12 reconciling that -- the statement you just made with
13 what's in your report, because your report suggests
14 that similar and interdependent macro-environmental
15 impacts for purpo -- for the purpose, and I thought I
16 just heard you say to Mr. Gange, It's likely to have
17 less consequences.

18 So I'm having trouble reconciling those
19 two (2). You -- you know, you responded to Ms.
20 Saunders that it was your view that that was a factual
21 statement, yet I just -- I think I just heard you say
22 that Conawapa would have less adverse consequences, so
23 --

24 MR. WILLIAM GANGE: Can I butt in here,
25 Mr. Chair? And -- and I don't want to give Mr. Sabine

1 the answer, 'cause -- 'cause obviously, he's way
2 smarter than I am on this issue, but -- but the
3 difference between my question and Ms. Saunders's
4 question was in looking at the relative size of the
5 projects and the amount of electricity that both of
6 them could produce.

7 That's what I -- that's what I was
8 trying to focus Mr. Sabine on. On a per kilowatt hour
9 basis, can you compare the two (2)? So if -- if that
10 helps clarify the -- the questioning in your mind...?

11 THE CHAIRPERSON: It does, thank you.

12 MR. CHRISTIAN MONNIN: And -- and I
13 would add that I think it was agreed upon that that was
14 outside of the scope of Mr. Sabine's work, and this is
15 discussion that's being had in real time right now.

16 MR. CRAIG SABINE: Thank you for that,
17 Mr. Gange (sic).

18 MR. WILLIAM GANGE: You're welcome.

19

20 CONTINUED BY MR. WILLIAM GANGE:

21 MR. WILLIAM GANGE: The -- the -- if we
22 could go to your slide deck, sir, and if we could go to
23 page 14? On -- on this chart, sir, you've got two (2)
24 analyses, one being the cumulative GHG operating
25 emissions, and the other one being the cumulative

1 regional GHG displacement potential.

2 I'm just wondering, sir, that in -- do -
3 - do both of those calculations include embedded
4 emissions?

5 MR. CRAIG SABINE: By 'embedded
6 emissions', you mean Manitoba Hydro's inside the
7 boundaries of Manitoba related emissions?

8 MR. WILLIAM GANGE: From the life cycle
9 analysis is -- is what we're talking about on that,
10 sir.

11 MR. CRAIG SABINE: Not exactly, no.
12 The cumulative operating emissions are -- are only
13 those associated with operating the Hydro's system --
14 Manitoba Hydro's system, i.e., the -- the fossil
15 generation plants that it would be using over the
16 lifetime of -- of the Development Plan. It does not
17 include the emissions associated with the construction
18 or decommissioning of those facilities from a life
19 cycle context.

20 MR. WILLIAM GANGE: And similarly, sir,
21 not the emissions from sourcing the fuel.

22 Is that correct?

23 MR. CRAIG SABINE: That's right. It
24 would be from the fuel combusted, but not from the
25 production of that fuel, yes.

1 MR. WILLIAM GANGE: Okay. Thank you.

2 When -- when you did this selected plans air impact,
3 sir, we -- we heard from -- from Mr. Sale, and I'll --
4 I'll tell you that -- just as background, that -- that
5 my client's experts have -- have done some modelling
6 with respect to Keeyask and then wind power, you didn't
7 -- you weren't asked and that wasn't part of the scope
8 of your work to do an analysis with respect to wind.

9 Is that correct, sir?

10 MR. CRAIG SABINE: Only to the extent
11 that wind was included in an alternative plan, but I
12 don't believe that there's an alternative plan with
13 Keeyask, and -- and wind.

14 Is that -- that correct?

15 MR. WILLIAM GANGE: That's correct.

16 MR. CRAIG SABINE: Thank you.

17 MR. WILLIAM GANGE: But one -- can --
18 can I push you on this and get your thoughts on it?
19 One would expect that the -- that a -- an analysis
20 where it was Keeyask and wind would have results that
21 would be closer to the Preferred Plan than one of the
22 plans involving gas.

23 Is that correct?

24 MR. CRAIG SABINE: I can only speculate
25 without running the analysis, but I -- I believe that

1 that would be a fair and a reasonable assumption to
2 make, although I would note that with increased wind
3 capacity as part of the plan, and the necessity to back
4 the variability of that resource up with, at least
5 partially, natural gas generation. You may see a --
6 you may see that as a driver of -- of higher emissions
7 than -- than you would see in the Preferred Plan, even
8 though both of the plans are similar in nature, that
9 they don't have emitting resources as part of their --
10 their core assets.

11 MR. WILLIAM GANGE: Okay. Thank you.
12 And -- and so I'm -- I'm going to move on from -- from
13 slide 14, sir, but then I'm going to move to slide 27
14 and slide 28. So if we could go to slide 27? And
15 Diana, if you could just go to 28 as well just for a
16 second? Okay. So those are the two (2) slides, sir.

17 If we go back to 27, are -- are these
18 two (2) slides based on the same assumptions that were
19 in slide 14, sir, in -- in terms of -- of the embedded
20 emissions?

21

22 (BRIEF PAUSE)

23

24 MR. CRAIG SABINE: These -- these two
25 (2) slides are completely separate and distinct from

1 slide 14 in terms of the analysis itself, so the
2 assumptions would not be com -- comparable.

3

4 (BRIEF PAUSE)

5

6 MR. WILLIAM GANGE: And sir, when I'm
7 looking at slide 28, the -- the -- you -- you gave a
8 range for the -- for -- for wind from two (2) to
9 eighty-one (81), sir.

10 Is that correct?

11 MR. CRAIG SABINE: That's correct, yes.

12 MR. WILLIAM GANGE: And the -- the
13 compared con -- the comparison with respect to gas
14 would go in the Keeyask LCA median from wind of
15 thirteen (13) to natural gas combined single cycle at
16 five-o-nine (509).

17 So that wind would be significantly less
18 than the natural gas combined single cycle, sir?

19 MR. CRAIG SABINE: It would be
20 significantly less than natural gas combined cycle or
21 single cycle, yes.

22 MR. WILLIAM GANGE: Yes. Thank you.
23 I'm not sure if you're aware of this, sir, but
24 throughout this hearing, we've had some change in the
25 numbers that have been brought forward, and one of the

1 discussions has been the fact that -- that from a -- a
2 cost perspective, the analysis may support changing the
3 Preferred Development Plan from Keeyask and Conawapa to
4 Keeyask and a -- a gas turbine, that -- that that would
5 appear to be less expensive, or there's an argument
6 there.

7 Are you aware that that -- that that
8 evidence has come out, sir?

9 MR. CRAIG SABINE: I'm aware that the
10 evidence has come out, yes. I'm not aware -- I -- I'm
11 not familiar with those details, per se.

12 MR. WILLIAM GANGE: Yes, and that's
13 okay. I'm -- I'm not going to get down into specifics
14 on it, but as a result of that evidence, there's been
15 commentary and, in fact, an editorial from the Winnipeg
16 Free Press, saying that Manitoba Hydro should abandon
17 the Preferred Development Plan and replace Conawapa
18 with a gas cycle turbine. So that's -- that's the
19 background that I'm going to ask this question from.

20 MR. CRAIG SABINE: I did read that
21 article, yes.

22 MR. WILLIAM GANGE: Thank you. From an
23 environmental perspective, from your analysis, do those
24 two (2) potential different plans -- can -- can they be
25 compared? And -- and I -- and I -- I'm sorry, I --

1 I haven't really asked that question with any
2 precision, but what I'm meaning is that the -- the --
3 from an environmental perspective, would you agree with
4 me that the Preferred Development Plan still is
5 significantly better from an environmental perspective
6 than a Keeyask/Gas Plan?

7 MR. CRAIG SABINE: This gets us into
8 the issues that Dr. Grant was questioning at the outset
9 of our -- of our time here today, and it's -- it's
10 differ -- difficult to compare those -- those plans in
11 that way, given their nature. The impacts that
12 Keeyask/Gas Plan may result in, from a global climate
13 change or a regional emissions perspective, potentially
14 can be valued in a quantitative manner, whereas the
15 potential impacts of your alternate scenario may have
16 some direct costs and benefits that can be -- that can
17 be valued, but -- oth -- others that are much more
18 difficult to value.

19 And -- and of course, we don't know
20 specifically what those impacts might be -- can only
21 speculate that wind development may have impacts to --
22 to birds, for example. What's the value of those birds
23 to -- to the province, to regulators? In monetary
24 terms, all of those are difficult questions to answer.
25 In terms of contribution to regional emissions and

1 contribution to climate change, the Preferred Plan
2 would still perform much better than a plan that
3 includes natural gas instead of Conawapa.

4 MR. WILLIAM GANGE: Good. Thank you.
5 Those are my questions. Thanks very much, sir. I
6 appreciate it. Mr. Pre -- Mr. Chair, that's all for
7 me.

8 MR. CHRISTIAN MONNIN: I -- I just
9 wanted to, if I could, on that last -- it's Christian
10 Monnin speaking here from the IECs. The last question
11 posed by Mr. Gange is a very interesting one, but it
12 seemed to touch upon the Snuffleupagus theory, and --
13 and that is that we see it, but we -- we don't quite
14 know if it exists.

15 And -- and I just caution that Mr.
16 Sabine was quite clear that he was referring to a
17 change in -- in -- in the numbers, and the change in
18 the economics and the financials that he's aware of but
19 not very familiar with, and the question may have been
20 outside the scope of his -- the scope of work that was
21 provided to him. And I just wanted to put that on the
22 record.

23 THE CHAIRPERSON: Thank you. I just
24 want to make sure that, Mr. Orle, do you have any
25 questions for these experts?

1 MR. GEORGE ORLE: Thank you, Mr.
2 Chairman. I -- I gave my time to Mr. Williams, so
3 we're -- we're happy with that. Thank you.

4 THE CHAIRPERSON: Now, I believe that I
5 would normally turn the microphone over to -- to
6 Manitoba Hydro, but I wonder if it would be an
7 opportune time to take a break at this moment. So
8 let's -- I'm sorry, Mr. Wojczynski?

9 MR. ED WOJCZYNSKI: Yes. I'd
10 communicated earlier on the GCC, and subsequent to
11 that, I received communication this afternoon from the
12 president's office that the governance process,
13 actually, has now completed earl -- faster than what I
14 was told this morning, and that Manitoba Hydro is, as
15 of today, giving notice to the general civil contractor
16 to mobilize, and there will be a -- there will be a
17 formal notice of some kind. I don't know the paperwork
18 on that yet, so I still have to get back to you on
19 that.

20 And as just as some background
21 information for you, one of things they will be doing
22 in this mobilization, what we already earlier
23 discussed, they would proceed to arrange for the
24 purchase of the major heavy equipment that would be
25 needed, but -- but it's equipment that could be resold

1 or returned with some loss, but it's not -- it's not a
2 -- a absolute purchase within a -- a full loss of
3 monies. But the other -- the other thing we had said
4 would -- they would start to mobilize in terms of
5 making sure they have staff available. Should approval
6 be granted that they could start in early July with the
7 construction, one of the things they would have to do
8 is arrange for some staff.

9 So there will be -- I'm not sure which
10 day, but they are now authorized on the same time to
11 put out an advertisement to start seeking managers and
12 supervisory staff. I'm not sure exactly who they're
13 seeking to supplement the -- the staff Bechtel and the
14 others already have.

15 So I'm -- I'm expecting there will be an
16 ad next week sometime, so just as a -- a small head's
17 up. Thank you.

18 THE CHAIRPERSON: Thank you, Mr.
19 Wojczynski. So let's take ten (10) minutes.

20

21 --- Upon recessing at 2:27 p.m.

22 --- Upon resuming at 2:43 p.m.

23

24 THE CHAIRPERSON: I believe that
25 everyone's in position, so we're ready to resume the

1 proceedings. So Mr. Bedford, please?

2

3 CROSS-EXAMINATION BY MR. DOUGLAS BEDFORD:

4 MR. DOUGLAS BEDFORD: Thank you. Mr.
5 Sabine, Ms. Keyes, my name is Doug Bedford, and of
6 course, we introduced ourselves earlier today. I am
7 legal counsel to Manitoba Hydro, and I sit here this
8 afternoon accompanied by four (4) colleagues.

9 To my far left, Mr. Michael Stocki.
10 I'll admit publicly that I still haven't yet sorted out
11 what it is Mr. Stocki does at Manitoba Hydro. He does
12 work there. Next to him is Ms. Shelley Matkowsky. Ms.
13 Matkowsky is responsible for Manitoba Hydro's lake
14 sturgeon program and its many facets.

15 Next to me is Mr. Edward Wojczynski,
16 who, generally speaking, has the management responsibly
17 at this hearing for all of the evidence that Manitoba
18 Hydro has chosen to put forward. And to my right is
19 Ms. Vicky Cole. Ms. Cole is presently a manager of
20 major projects assessment and licencing, so I've had
21 occasion to work extensively with her at the recently
22 completed Keeyask environmental hearing.

23 Now, I think you should know that with
24 respect to the life of this particular hearing, I am a
25 novice at this business of putting questions to

1 witnesses, unlike all the other lawyers who are here,
2 some of whom asked questions of you throughout the day.
3 But at this hearing, this is the first time that I've
4 been asked to do this.

5 And when I was asked to do it, I was
6 told you have one (1) hour, so I rather slavishly have
7 developed some questions that I would like to put to
8 you that take about one (1) hour. I rather anticipate
9 it may be the shortest hour of your respective lives,
10 and that would be a good thing, but you can certainly
11 relax.

12 One of the obligations that we have at
13 this hearing is to do a critical analysis of macro-
14 environmental impacts and benefits of my client,
15 Manitoba Hydro's Preferred Development Plan and
16 alternatives. And of course, that's why you came
17 today.

18 And I have read more than once the
19 written report that was filed by MNP -- by -- excuse
20 me, by MNP, and I've certainly seen in reading it that
21 you identify a number of macro-environmental impacts of
22 the Preferred project and alternatives, but I ask you,
23 What are the macro-environmental benefits that MNP
24 found of the Preferred Development Plan and/or the
25 alternatives?

1 MR. CRAIG SABINE: Thank you, Mr.
2 Bedford. I would say the -- the core benefit that is
3 articulated in our report for certain is the potential
4 for -- well, from an environmental standpoint alone,
5 the benefit is the displacement of region -- regional
6 greenhouse gas emissions and other air emissions.

7 Potentially another benefit, although
8 I'm not sure I would entirely characterize it as an
9 environmental -- a direct environmental benefit, would
10 be the investment in resources and -- in relation to
11 the lake sturgeon management mitigation strategy that
12 likely, otherwise, would not happen without proceeding
13 with the Preferred Development Plan.

14 Although, again, you know, that's a -- a
15 set of measures, tactics to assist in the objective of
16 achieving a sustainable sturgeon population. Not
17 necessarily does it result in that positive
18 environmental impact -- or benefit, sorry, I should
19 say.

20 MR. DOUGLAS BEDFORD: When
21 environmental assessments are done in Canada,
22 particularly pursuant to the Federal Canadian
23 Environmental Assessment Act, but in accordance with
24 various provincial statutes, it is correct, is it not,
25 that proponents of developments or projects are

1 required to look not only at the effects or impacts of
2 their projects on animals, birds, water, air, but also
3 the effects on people?

4 MR. CRAIG SABINE: That is correct. To
5 my knowledge, that's one of the core components.

6 MR. DOUGLAS BEDFORD: And Mr. Sabine,
7 one of the things you, with the assistance of Ms. Keyes
8 and your other colleagues at Meyers Norris Penny did,
9 was you reviewed at some length, I gather, the
10 environmental impact statement that was filed for the
11 Keeyask project?

12 MR. CRAIG SABINE: 'At length' is a
13 good way of putting it, yes.

14 MR. DOUGLAS BEDFORD: And you have
15 noted in your testimony, and, I believe, from time to
16 time in your report that you found that for that
17 project, thirty-eight (38) valued environmental
18 components, which are generally referred to through the
19 obvious acronym VECs, were selected and studied for
20 that environmental impact statement, correct?

21 MR. CRAIG SABINE: I'm not -- I'm not
22 entirely sure on the exact number, but -- but, yes, it
23 was a -- a large number of VECs.

24 MR. DOUGLAS BEDFORD: And perhaps you
25 recall that of the thirty-eight (38) VECs, twenty (20)

1 were chosen because they focussed on impacts on people?

2 MR. CRAIG SABINE: Yes, I do recall
3 that.

4 MR. DOUGLAS BEDFORD: And some of those
5 VECs would be housing, public safety, employment,
6 training, correct?

7 MR. CRAIG SABINE: Yes.

8

9 (BRIEF PAUSE)

10

11 MR. DOUGLAS BEDFORD: So if we step
12 back again and think of the initial question I posed to
13 you, do not some of the impacts on people -- some of
14 the macro-environmental impacts on people of the
15 Preferred Development Plan, and indeed perhaps some of
16 the alternatives, do they not give us guidance as to
17 what the benefits of the Preferred Development Plan and
18 the alternatives are?

19 MR. CRAIG SABINE: I would say that
20 they do provide us with some visibility on overall
21 benefits of the projects, yes. We did not interpret
22 our scope of work to include those socioeconomic
23 benefits, given that that was a discreet scope of work
24 for another IEC.

25 MR. DOUGLAS BEDFORD: But --

1 MR. CRAIG SABINE: And I -- I -- but I
2 -- I guess I would just add, sorry to interrupt, that
3 the EIA process is encompassing of -- of those factors.
4 We were mandated specifically to avoid being redundant
5 to the EIA, and -- and therefore, those weren't
6 necessarily a component of -- of our mandate or scope
7 of work here.

8 MR. DOUGLAS BEDFORD: I saw that.
9 However, the answer to the question I posed would
10 require one to explore, if you were searching for
11 macro-environmental benefits of this plan or
12 alternatives, whether or not there were any jobs, any
13 training, any profits for businesses, or any investment
14 opportunities that would flow from one development or
15 the other.

16

17 (BRIEF PAUSE)

18

19 MR. CRAIG SABINE: I think that's a
20 reasonable analysis to undertake, and I would expect it
21 to have been undertaken, the socioeconomic scope of
22 work, for this proceeding.

23 MR. DOUGLAS BEDFORD: And one could,
24 perhaps, having asked those questions and received
25 answers, do what I would suggest would be a simple

1 tally. You could add up the value of the types of
2 benefits that my questions have summarized. You could
3 add up the costs of impacts, and if the net result were
4 positive, one might be inclined to proceed with the
5 development. If the net result were a negative, one
6 might not proceed.

7 Does that sound sensible?

8 MR. CRAIG SABINE: It -- it sounds
9 sensible and possible.

10 MR. DOUGLAS BEDFORD: And I rather
11 concluded that that's, in a rough and ready way, what
12 MNP set about to do when I read the executive summary
13 on page 1 of your report. You might want to take that
14 in hand. And I'm looking at the very first paragraph
15 of the executive summary, the second sentence which
16 reads, and I quote:

17 "Generally, the net environmental
18 benefits of Manitoba Hydro's
19 Preferred Plan are found to outweigh
20 its overall environmental costs in a
21 regional and global context."

22 Unquote. So again, what MNP, I think,
23 was struggling to tell us in the executive summary was,
24 in fact, we did go about our task in a rough and ready
25 way of doing a simple tally of thinking about benefits,

1 thinking about costs, and reaching what amounts to a
2 net positive.

3 Have I summarized that fairly?

4 MR. CRAIG SABINE: I think what's
5 important to -- to take from that sentence is the
6 regional and global context. In that context, we found
7 that the benefits of the PDP outweighed the impacts.
8 However, we go on at some length in the rest of the
9 document to identify possible isolated and local
10 impacts that should be considered in a more complete
11 analysis of the nature that you -- that you are -- that
12 you're framing for us here, I would say.

13 MR. DOUGLAS BEDFORD: As an example,
14 Mr. Sabine, if you or I came into possession of an
15 antique whose value we did not know, one sensible thing
16 that you or I might be motivated to do to determine the
17 value of what we had would be to consult with somebody
18 knowledgeable on the subject of antiques, a specialist
19 perhaps, agreed?

20 MR. CRAIG SABINE: Yes.

21 MR. DOUGLAS BEDFORD: So if, as we all
22 are, we are now faced with the task of trying to
23 determine in some way the value of Gull Rapids, of the
24 cost of an enhanced threat to the survival of lake
25 sturgeon on the Nelson River or the threat to local

1 caribou.

2 Would you agree with me that one way we
3 might wish to approach arriving at some sense of the
4 value of those things would be to consult with members
5 of the First Nations, whose ancestors have lived and
6 survived in this very region for, I gather, some ten
7 thousand (10,000) years?

8 MR. CRAIG SABINE: It would be fair to
9 be inclusive of their insight and input, absolutely.

10 MR. DOUGLAS BEDFORD: In effect, they
11 do qualify very much as experts, do they not, in
12 understanding the value of a set of untouched rapids or
13 of a species, such as lake sturgeon?

14 MR. CHRISTIAN MONNIN: I have to object
15 to that question, Mr. Bedford. I -- I don't think Mr.
16 Sabine is here to qualify anyone as experts in his own
17 right. So if he's -- if you're asking him to accept
18 the qualification of the First Nations as experts on
19 this issue, I have to object to that question.

20 MR. DOUGLAS BEDFORD: Well, I wasn't
21 asking that he qualify any particular individual,
22 because I named none as a member of a First Nation --

23 MR. CHRISTIAN MONNIN: Which --

24 MR. DOUGLAS BEDFORD: -- I think, the
25 question's general, but I would like Mr. Sabine to

1 respond to the question. But it's up to the Chair to
2 guide us in this.

3 THE CHAIRPERSON: Well, I'd like to
4 hear what the -- what the First Nations have to say
5 about the rapids without -- without addressing whether
6 they are experts or not.

7 MR. CRAIG SABINE: As would I; I think
8 it would be valuable input and worthwhile to the
9 process.

10

11 CONTINUED BY MR. DOUGLAS BEDFORD:

12 MR. DOUGLAS BEDFORD: Valuable and
13 worthwhile because, as I said in the preamble to my
14 question, we accept that they and their ancestors have
15 lived in this area for about ten thousand (10,000)
16 years, correct?

17 MR. CRAIG SABINE: Possibly longer; but
18 to my understanding it's something to that effect, yes.

19 MR. DOUGLAS BEDFORD: And I'll suggest
20 to you that, having consulted them, if what one is told
21 is that they are prepared to accept the loss of the
22 rapids, the enhanced threat -- if I can put it that way
23 -- to caribou and to lake sturgeon, that that is one
24 way -- one way -- of trying to arrive at some sense of
25 what the value of those things are, correct?

1 MR. CRAIG SABINE: Correct, in relation
2 to their perceived benefits from the projects.

3 MR. DOUGLAS BEDFORD: Thank you. In
4 simple terms, I understand that putting more carbon
5 into the atmosphere is a bad thing, right?

6 MR. CRAIG SABINE: Depending on who you
7 speak with, it could be characterized as a bad thing.

8 MR. DOUGLAS BEDFORD: Burning more coal
9 -- coal and more oil puts more carbon dioxide in the
10 atmosphere, and that's not good for climate change, is
11 it?

12 MR. CRAIG SABINE: Not according to the
13 science, no.

14 MR. DOUGLAS BEDFORD: So in a very
15 simple and general way, my understanding is that there
16 are many professionals, many within government, many of
17 our fellow citizens who are responsible for developing
18 new policies who are suggesting that those who persist
19 in generating energy though coal and oil should be
20 penalized financially if they continue to do that. And
21 the financial penalty, whatever the appropriate amount
22 is, will act as an incentive to persuade them to
23 switch.

24 Have I, in a very simple way, summarized
25 that fairly?

1 MR. CRAIG SABINE: I would say -- I'm
2 sorry, I don't recall exactly the characterizations of
3 society, government, province, that you described there
4 but certainly some of those folks would agree with that
5 entirely. Evidently there's not enough clout yet to
6 have made that necessary, in some people's minds,
7 pricing a reality, nor does there appear to be the
8 drive to do so anywhere in the near -- in the near
9 future that we -- that we can pinpoint at this time.

10 MR. DOUGLAS BEDFORD: Carbon pricing,
11 however, is important enough to the work that's got to
12 be done at this inquiry that it needed to be thought
13 about.

14 MR. CRAIG SABINE: Absolutely.
15 Responsible, progressive companies are certainly
16 incorporating that carbon price into the analysis of
17 their assets -- their asset planning and their -- their
18 strategic planning going forward. And -- and some
19 regulatory bodies are requiring it of -- of the
20 entities that they regulate.

21 MR. DOUGLAS BEDFORD: Obviously, that's
22 why MNP devoted a portion of its work and its report to
23 this very topic.

24 MR. CRAIG SABINE: Yes.

25 MR. DOUGLAS BEDFORD: And I think in

1 fairness, there's no certainty today just what form of
2 financial penalty, if I can describe it like that,
3 might take?

4 MR. CRAIG SABINE: No. Not clearly,
5 no.

6 MR. DOUGLAS BEDFORD: But if an expert
7 with experience in the field like yourself is given an
8 assignment to address the topic, you did what I think
9 was a logical approach, which is you try and envision
10 carbon pricing in the future, and you identified a low
11 scenario, a high scenario, and what you call a base
12 scenario, correct?

13 MR. CRAIG SABINE: Yes, sir.

14 MR. DOUGLAS BEDFORD: And if I can put
15 it this way, the most reasonable prediction that
16 someone like yourself could make today using the work
17 that you did to create the high, low, and base scenario
18 is to say one's expectation is that the base is
19 probably the most likely.

20 MR. CRAIG SABINE: That is the -- that
21 is the case, yes.

22 MR. DOUGLAS BEDFORD: Could you look
23 for a moment at the graph which I'm looking at, which
24 is on page 32 of the MNP report?

25

1 (BRIEF PAUSE)

2

3 MR. DOUGLAS BEDFORD: Are we on? Okay.

4 My colleagues are eager that I ask you the same
5 question, but we wait until we get to the part of
6 today's event which is called CSI. So I will hold it
7 in abeyance and --

8 MR. CRAIG SABINE: We'll look forward
9 to that.

10 MR. DOUGLAS BEDFORD: I'm sure you --
11 and they can kick me under the table with respect to
12 the next question. But nowhere is there in the report
13 that was finalized in January of 2014 any statement, at
14 least none that I could find, that MNP today envisions
15 a future with respect to carbon pricing where there may
16 be a 50 percent probability that there will be no
17 carbon pricing.

18 MR. CRAIG SABINE: I'm not sure that's
19 entirely true. I don't think that it's stated exactly
20 like that in our report, which would be correct. I
21 think that the -- the framing of this is -- is somewhat
22 nuanced in that this is somewhat of an all or nothing
23 reality to come. There'll either be a carbon pricing
24 mechanism, a carbon -- a market based mechanism, or
25 there won't be.

1 The probability -- the best probability
2 that we can put on that at this time, given changes in
3 the political environment of the last five (5) to six
4 (6) years, would suggest that it's a bit of a crap
5 shoot. And the best that we can say is there's a 50/50
6 chance that there will be carbon pricing or there will
7 not be carbon pricing.

8 The low, base, and high scenarios, as
9 they are -- as produced from any of the cul -- the
10 consultants that I've worked with or have knowledge of,
11 including some of your own consultants on this matter,
12 are not probabilistic analysis. They're scenario
13 analysis. They're only identifying what drivers,
14 whether they be policy or market drivers or others,
15 lever prices in one direction or another, which is what
16 leads us to our low, base, and high cases. And in --
17 and in many studies many more scenarios. The
18 probability of any one of those scenarios, in our work
19 anyway, is -- is not part of that analysis.

20

21 (BRIEF PAUSE)

22

23 MR. DOUGLAS BEDFORD: My understanding,
24 Mr. Sabine, is that in Canada we have three (3) types
25 of caribou: barren-land, coastal, and boreal woodland.

1 Is that consistent with your
2 understanding?

3 MR. CRAIG SABINE: It is.

4 MR. DOUGLAS BEDFORD: And it is boreal
5 woodland caribou that are the type that we now worry
6 about because their numbers across Canada are in
7 decline.

8 MR. CRAIG SABINE: To my knowledge,
9 that's correct, yes.

10 MR. DOUGLAS BEDFORD: And I once, at an
11 environmental hearing, watched a -- a very professional
12 overview of the history of caribou in Canada. And my
13 recollection is that boreal woodland caribou used to
14 occupy large swathes of southern regions of Canada,
15 where we simply don't find them at all anymore.

16 Does that sound familiar to you?

17 MR. CRAIG SABINE: To be honest, it's
18 not a fact that I am -- have my head fully around, no.
19 That's not to say that it's not true.

20 MR. DOUGLAS BEDFORD: But the fact that
21 their numbers are declining, that they have been --
22 that they no longer occupy parts of the country where
23 they -- they once did live and thrive, that's why today
24 we treat them as threatened, correct?

25 MR. CRAIG SABINE: Sure, yes.

1 MR. DOUGLAS BEDFORD: And incidentally,
2 for your future reference, I notice that at the top --
3 near the top of page 50 of your report, you describe
4 boreal woodland caribou as quote, "endangered,"
5 unquote. And that would not be accurate would it?

6 They are quote, "threatened," not
7 endangered.

8 MR. CRAIG SABINE: It's a fair
9 characterization, yes.

10 MR. DOUGLAS BEDFORD: And what some
11 others in this room may not be aware of, not being
12 familiar with some of the legislation and the rankings,
13 under Species At Risk legislation and similar
14 provincial legislation, there is a hierarchy under
15 which one lists animals about whose future one is
16 concerned. The lowest ranking being of concern, the
17 next ranking being threatened, and the more serious
18 ranking being endangered.

19 Have I summarized that accurately?

20 MR. CRAIG SABINE: Yes.

21 MR. DOUGLAS BEDFORD: Now, barren-land
22 caribou are not either threatened or endangered, are
23 they?

24

25 (BRIEF PAUSE)

1 MR. CRAIG SABINE: I think that would
2 have to be subject to check for me in review of our
3 report and sources. I do recollect that there is some
4 potential confusion around that point. Perhaps
5 technically speaking, under SARA they're not listed as
6 threatened, but I'd have to -- I'd have to check to get
7 -- to get a good narrative there, I think.

8 MR. DOUGLAS BEDFORD: Well, I'd
9 appreciate in due course at your convenience that you
10 do that. But be -- before you -- or at the same time
11 you do that, I am going to suggest to you that coastal
12 caribou also in this country are not threatened nor
13 endangered.

14 Do you want to check that, too?

15 MR. CRAIG SABINE: Sure, we can do
16 that.

17 THE COURT REPORTER: Is this an
18 undertaking?

19 MR. CHRISTIAN MONNIN: Yes, it is.

20 MR. CHRISTIAN MONNIN: Over to you, Mr.
21 Bedford.

22 THE COURT REPORTER: Can we have that
23 clarified for the record?

24 MR. DOUGLAS BEDFORD: Mr. Sabine or his
25 colleagues, it's not critical who actually does the --

1 the work, is going to check whatever sources they would
2 like and to confirm my suggestion that neither barren-
3 land caribou nor coastal caribou are either threatened
4 or endangered.

5

6 --- UNDERTAKING NO. 99: For Meyers Norris Penny to
7 check whatever sources they
8 would like and to confirm
9 Mr. Bedford's suggestion
10 that neither barren-land
11 caribou nor coastal caribou
12 are either threatened or
13 endangered

14

15 CONTINUED BY MR. DOUGLAS BEDFORD:

16 MR. DOUGLAS BEDFORD: Coastal caribou,
17 as I believe you observe in the report, we do know
18 range through the area where it's proposed to build the
19 Keeyask and Conawaka -- Conawapa dams, correct?

20 MR. CRAIG SABINE: Correct, at times.

21 MR. DOUGLAS BEDFORD: And coastal
22 caribou move in large herds?

23 MR. CRAIG SABINE: Typically, my
24 understanding is that is correct.

25 MR. DOUGLAS BEDFORD: Sometimes

1 individual animals separate from those large coastal
2 caribou herds, do they not?

3 MR. CRAIG SABINE: Yes.

4 MR. DOUGLAS BEDFORD: In contrast,
5 boreal woodland caribou don't move in large herds, do
6 they?

7 MR. CRAIG SABINE: No, they do not.

8 MR. DOUGLAS BEDFORD: They are
9 particularly known for solitary behaviour, correct?

10 MR. CRAIG SABINE: That's fair.

11 MR. DOUGLAS BEDFORD: So accordingly, I
12 suggest to you it's not easy, even for skilled experts
13 in the field, to be certain if they see an individual
14 caribou whether it is a coastal caribou detached from a
15 herd or a boreal woodland caribou?

16 MR. CRAIG SABINE: Maybe partially
17 true, but there are physical characteristics of -- of
18 the coastal and -- and migratory varieties that differ
19 from -- from the woodland variety, which, in theory,
20 would make it possible for someone specialized in
21 ungulate populations to identify them.

22 MR. DOUGLAS BEDFORD: Now, I gathered
23 from studying your history that you worked once upon a
24 time at Environment Canada?

25 MR. CRAIG SABINE: Once upon a time,

1 yes.

2 MR. DOUGLAS BEDFORD: And I'll confess
3 to you that my impression as a Canadian citizen and a
4 Canadian taxpayer over the years has been that
5 Environment Canada hires really smart people with solid
6 training in the particular specialties that Environment
7 Canada needs.

8 Do you agree with me?

9 MR. CRAIG SABINE: I -- I will
10 reluctantly agree with you, yes.

11 MR. DOUGLAS BEDFORD: I thought you
12 would. And Environment Canada does employ specialists
13 trained to study and monitor caribou, does it not?

14 MR. CRAIG SABINE: I would venture so,
15 yes.

16

17 (BRIEF PAUSE)

18

19 MR. DOUGLAS BEDFORD: So returning to
20 your former colleagues at Environment Canada, when we
21 all read that as recently as 2012, and I'm referring to
22 the national caribou recovery strategy published by
23 Environment Canada in 2012, when we find that those
24 folks at Environment Canada who write those reports and
25 do the research and the monitoring that goes behind

1 those reports are not yet ready to agree that the
2 individual animals at the location of the Keeyask and
3 Conawapa sites are, indeed, boreal woodland caribou,
4 some of us should not likely dismiss that opinion,
5 should we?

6 MR. CRAIG SABINE: I don't believe we
7 should dismiss it, no.

8 MR. DOUGLAS BEDFORD: Were you aware
9 that employees of our provincial department of
10 conservation whose job it is to monitor and understand
11 boreal woodland caribou herds in this province share
12 the same opinion as your former colleagues of
13 Environment Canada?

14 MR. CRAIG SABINE: I wasn't
15 specifically aware to that fact, no, but it does seem
16 reasonable.

17

18 (BRIEF PAUSE)

19

20 MR. DOUGLAS BEDFORD: I've known Mr.
21 Gange for many, many years, and I think I accurately
22 predicted that he would do something like that about
23 half way through my exercise of asking you questions.

24 MR. CRAIG SABINE: We'll -- we'll owe
25 him one later.

1 MR. DOUGLAS BEDFORD: So we were
2 moments ago addressing both Environment Canada and the
3 Department of Conservation's current assessment of what
4 type of caribou the solitary creatures sometimes called
5 summer resident are in the vicinity of Keeyask.

6 And I'd like to suggest to you, and I
7 now will, Mr. Sabine, that if a decade ago you were one
8 (1) of the people like those working for my client or
9 the First Nation members who participated in this work,
10 if a decade ago you set out to study these particular
11 caribou, with one (1) of your objectives being to try
12 and identify what type of caribou they were, would you
13 agree with me that the prudent thing to do in the
14 circumstances would be to assume that they are boreal
15 woodland caribou rather than rely solely upon the
16 opinion of experts of Environment Canada or Manitoba
17 Conservation?

18 MR. CRAIG SABINE: I'm sorry, can you
19 repeat that?

20 MR. DOUGLAS BEDFORD: Certainly.

21 MR. CRAIG SABINE: I think you lost me
22 there somewhere.

23 MR. DOUGLAS BEDFORD: Assume that a
24 decade ago you were one (1) of the people who was
25 retained to study these resident caribou.

1 Would you agree with me that the prudent
2 thing to do would be to assume that they are boreal
3 woodland caribou?

4

5 (BRIEF PAUSE)

6

7 MR. CHRISTIAN MONNIN: I -- I think I'm
8 going to object to that one. I just don't know how
9 much speculation you can wrap into one (1) question,
10 Mr. Bedford. And in addition to that, you're referring
11 to what I believe to be official positions of
12 Environment Canada and the Departments of the --
13 Homologue in Manitoba.

14 Are you referring to a particular report
15 or document which you could put before Mr. Sabine and
16 give him the opportunity to review it? Or are you just
17 asserting that this is their position with respect to
18 the animals being threatened, endangered, or not? I
19 think that would be at least fair if that was put
20 before the witness.

21 MR. DOUGLAS BEDFORD: Ms. Cole will
22 assist in getting a copy of the report, and I will
23 rephrase the question that led to the concern.

24

25 CONTINUED BY MR. DOUGLAS BEDFORD:

1 MR. DOUGLAS BEDFORD: It's not wrong,
2 in the circumstances, to proceed to assess these
3 solitary summer resident caribou as if they may,
4 indeed, be boreal woodland caribou, correct?

5 MR. CRAIG SABINE: Correct. That is my
6 understanding.

7 MR. DOUGLAS BEDFORD: Now, you noted in
8 the presentation and, of course, in the report that
9 these solitary resident caribou are known to calve on
10 islands in Stephens Lake, correct?

11 MR. CRAIG SABINE: Yes.

12 MR. DOUGLAS BEDFORD: And I wondered
13 when I read that whether you were aware that Stephens
14 Lake, as it's named, is largely what I will call an
15 artificial creation from the 1970s. It was created due
16 to the extensive flooding that took place when the
17 Kettle Dam was built.

18 Were you aware of that?

19 MR. CRAIG SABINE: I -- I was aware
20 that, partially, Stephens Lake was part of -- the
21 extent of Stephens Lake was part of a former hydro
22 development, yes.

23 MR. DOUGLAS BEDFORD: Some of the
24 islands that have formed in that lake have, indeed,
25 formed since the creation of the reservoir.

1 Were you aware of that?

2 MR. CRAIG SABINE: Not something
3 specifically I considered but it certainly makes sense.

4 MR. DOUGLAS BEDFORD: And can we agree
5 that the reason that the islands have become popular
6 calving grounds for these caribou is not because the
7 caribou are inspired to calve by the attractive view of
8 a nearby hydro dam?

9 MR. CRAIG SABINE: That would be fair,
10 I'm sure. Although I can't speculate to what a
11 caribou's thinking.

12 MR. DOUGLAS BEDFORD: But we can
13 conclude, can we not, all of us that obviously the
14 construction of a hydro dam, in this case Kettle, did
15 not result in the caribou forever abandoning the
16 vicinity?

17 MR. CRAIG SABINE: That would -- I
18 suppose I'm not entirely sure to what extent the
19 caribou use the islands in Stephens Lake to fully
20 comment on that but...

21 MR. DOUGLAS BEDFORD: You did reaffirm
22 for us a short while ago that you and your colleagues
23 at MNP devoted extensive time to reviewing the Keeyask
24 environmental impact statement, correct?

25 MR. CRAIG SABINE: M-hm.

1 MR. DOUGLAS BEDFORD: And I suspect,
2 perhaps, that you don't recall that there was some
3 extensive material in there that these islands are,
4 indeed, extensively used for calving by the caribou who
5 are resident in the area.

6 MR. CRAIG SABINE: I don't recall that,
7 no.

8

9 (BRIEF PAUSE)

10

11 MR. DOUGLAS BEDFORD: Page 42 of the
12 presentation that you gave this morning identifies as a
13 risk that MNP has identified with respect to caribou
14 and drowning. And we can all see that you illustrate
15 as one (1) of the sources for that conclusion a
16 newspaper story from the Ottawa Citizen about an
17 apparent incident in the Province of Quebec. And what
18 I take it is a -- a picture of something on a CBC News
19 website.

20 Have I got that correct?

21 MR. CRAIG SABINE: I believe so, yes.

22 MR. DOUGLAS BEDFORD: And I wondered
23 when I listened to you this morning -- and of course,
24 you're repeating in the presentation something that's
25 in the report, whether in the years of reading that

1 you've done in your life, whether you ever came across
2 Thomas Jefferson's observation that those who read the
3 newspapers are less informed than those who do not.

4 MR. CRAIG SABINE: I wasn't aware of
5 that quote but it sounds like something he'd say.

6 MR. DOUGLAS BEDFORD: And the point
7 here is you have not in the presentation, nor -- nor in
8 the paper, cited any scientific studies that draw
9 causal connection between Hydro dams and caribou
10 drowning, do you?

11 MR. CRAIG SABINE: Nor -- that's true
12 but nor have I alleged that there was scientific basis
13 for this. In fact, I made it quite clear that it was,
14 purely, observational.

15 MR. DOUGLAS BEDFORD: I'm told that one
16 (1) of the threats for the future of boreal woodland
17 caribou -- perhaps, even for barren and coastal
18 caribou, is climate change. Are you familiar with
19 that?

20 MR. CRAIG SABINE: I'm familiar with
21 that concept, yes.

22 MR. DOUGLAS BEDFORD: And similarly,
23 I'm advised that climate change also poses a threat to
24 aquatic species, including lake sturgeon?

25 MR. CRAIG SABINE: Yes, that's probably

1 true.

2 MR. DOUGLAS BEDFORD: I could not
3 determine in reading your report, or in listening to
4 the presentation, whether you and your colleagues were
5 aware, with respect to lake sturgeon that there are
6 genetic differences to the lake sturgeon in different
7 reaches of the Nelson River?

8 MR. CRAIG SABINE: We are -- we -- we
9 were aware of that as with there's genetic variation in
10 populations of sturgeon from system to system.

11 MR. DOUGLAS BEDFORD: Now, I did notice
12 in the report on more than one (1) occasion the caution
13 expressed that one must be careful not to eliminate
14 genetic differences in various species. And in the
15 case of lake sturgeon, the caution was tied to careless
16 practices in fish stalking.

17 Have I summarized that fairly?

18 MR. CRAIG SABINE: This is fair in
19 terms of some of the study that I've read, yes.

20 MR. DOUGLAS BEDFORD: So accordingly,
21 it would be wise and prudent not to rush into creating
22 a fish passage for lake sturgeon that could destroy
23 genetic differences in that species?

24 MR. CRAIG SABINE: It would be unclear
25 to me at this time that a fis -- fish passage -- to

1 what extent a fish passage would have that type of a
2 result on populations.

3 MR. DOUGLAS BEDFORD: Page 58 of your
4 report, you cite as one (1) of your sources that
5 Manitoba lake sturgeon management strategy of 2010?

6 MR. CRAIG SABINE: Yes, I see that.

7 MR. DOUGLAS BEDFORD: And Ms. Cole does
8 have ready at hand a copy of that that she can place
9 before you because I wanted to draw your attention to
10 one (1) conclusion that is in that report that didn't
11 appear in your report.

12

13 (BRIEF PAUSE)

14

15 MR. CHRISTIAN MONNIN: Just for the
16 record, Mr. Sabine is being presented with a fifty-five
17 (55) page document, and he's being asked to comment on
18 it.

19

20 CONTINUED BY MR. DOUGLAS BEDFORD:

21 MR. DOUGLAS BEDFORD: The only comment
22 will be with respect to the very second page of the
23 fifty-five (55) page document, and you're happy to
24 ignore the rest. You can look at the very last
25 paragraph, and as you read it, for the benefit of those

1 who don't have it before them --

2 MR. MICHAEL WEINSTEIN: Mr. Bedford,
3 are you referring to the second actual page, or the
4 page with the --

5 MR. DOUGLAS BEDFORD: Roman numeral --
6 small Roman numeral ii.

7 MR. MICHAEL WEINSTEIN: Thank you.

8 MR. DOUGLAS BEDFORD: So physically,
9 it's the second page. The heading at the top is,
10 "Executive summary."

11 MR. SVEN HOMBACH: Mr. Bedford, if I
12 may interject for one moment. If Manitoba Hydro has
13 another copy of the document, perhaps it could be put
14 up on the screen for the benefit of the panel, since I
15 don't believe that's currently an exhibit before the
16 Board.

17

18 (BRIEF PAUSE)

19

20 CONTINUED BY MR. DOUGLAS BEDFORD:

21 MR. DOUGLAS BEDFORD: That's fine.
22 Roman numeral ii, do you have that before you? Okay.
23 At the bottom of the page --

24 MR. CRAIG SABINE: I do. Would you
25 like me to read it, or do you plan to read it, or are

1 we going to read it at all?

2 MR. DOUGLAS BEDFORD: Well, I'm indi --
3 we're going to read it. I'm indifferent whether you'd
4 like to read it or me. I'm doing a lot of the talking,
5 so why don't you read to us the last paragraph that
6 begins with the words, "The experience."

7 MR. CRAIG SABINE:

8 "The experience of managing lake
9 sturgeon in Manitoba has shown that
10 limiting mortality is the single most
11 effective means of sustaining lake
12 sturgeon stocks. The failure to do
13 this effectively during the latter
14 part of the 1800s and early part of
15 the 1900s in the historical
16 commercial fishery led to dramatic
17 declines that left lake sturgeon
18 stocks throughout most of the
19 province in the state they are today.
20 Protecting habitat is also important,
21 but lake sturgeon, in several parts
22 of the province, have demonstrated
23 that they can adapt to fairly severe
24 habitat alterations while proving
25 unable to adapt to excessive levels

1 of harvest."

2 MR. DOUGLAS BEDFORD: Thank you. Do
3 you agree with that?

4 MR. CRAIG SABINE: I assume that
5 intelligent folks that think about sturgeon an awful
6 lot authored that, but there's no basis of what studies
7 were conducted or used to make the assertion --

8 THE CHAIRPERSON: Could we --

9 MR. CRAIG SABINE: -- to my knowledge
10 at this time.

11 THE CHAIRPERSON: Sorry to interrupt
12 you. Could we attribute this paragraph to some
13 intelligent folk? Who wrote this report?

14

15 (BRIEF PAUSE)

16

17 THE CHAIRPERSON: Okay. Thank you for
18 that.

19

20 (BRIEF PAUSE)

21

22 MR. DOUGLAS BEDFORD: Authors of the
23 report, Mr. Gosselin, are the regional fisheries
24 managers who work in various regions in the Province of
25 Manitoba.

1 THE CHAIRPERSON: Thank you for that.

2

3 (BRIEF PAUSE)

4

5 MR. DOUGLAS BEDFORD: I have no
6 objection to making it an exhibit. I don't think
7 anybody's going to object to that, so we'll do that.

8 THE CHAIRPERSON: Let's do that, then.

9

10 (BRIEF PAUSE)

11

12 MR. KURT SIMONSEN: So that'll be
13 Manitoba Hydro 162, and for the record, it'll be
14 Manitoba lake sturgeon management strategy 2012
15 Conservation and Water Stewardship Fisheries branch.
16 Is that acceptable, Mr. Bedford?

17

18 --- EXHIBIT NO. MH-162: Manitoba lake sturgeon
19 management strategy 2012,
20 Conservation and Water
21 Stewardship Fisheries
22 branch

23

24 MR. DOUGLAS BEDFORD: Yes.

25

1 (BRIEF PAUSE)

2

3 CONTINUED BY MR. DOUGLAS BEDFORD:

4 MR. DOUGLAS BEDFORD: Mr. Sabine, if
5 you and I were in charge of managing a hydroelectric
6 utility, we would be primarily concerned, would we not,
7 about hydrologic drought as opposed to meteorological
8 drought?

9 MR. CHRISTIAN MONNIN: I'm sorry, I
10 have to -- Mr. Sabine has been provided with a scope of
11 work, and he's provided a report. He's not to comment
12 on if he hypothetically was in charge of a hydro
13 company or project, so I -- I can't have him answer
14 that question, Mr. Bedford, with all due respect.

15 MR. DOUGLAS BEDFORD: Well, again --

16 MR. CHRISTIAN MONNIN: Ask him
17 questions on his scope of work. You can ask him
18 questions on his report, but you can't ask him
19 questions of what he would hypothetically do if he ran
20 a hydro company.

21

22 CONTINUED BY MR. DOUGLAS BEDFORD:

23 MR. DOUGLAS BEDFORD: Mr. Sabine, you
24 are familiar with the concepts hydrologic drought and
25 meteorological drought?

1 MR. CRAIG SABINE: To some extent, yes.

2 MR. DOUGLAS BEDFORD: Indeed, the
3 subject of drought is discussed in your report?

4 MR. CRAIG SABINE: It is.

5 MR. DOUGLAS BEDFORD: And it was
6 discussed in the report because you come forward with
7 credentials and expertise to give opinions on that
8 subject, among others, correct?

9 MR. CRAIG SABINE: I believe so, yes.

10 MR. DOUGLAS BEDFORD: And for a utility
11 company whose primary source of generation is hydro
12 generation, the primary type of drought with which it
13 must be concerned is hydrologic drought and not
14 meteorological drought, correct?

15 MR. CRAIG SABINE: I believe that's
16 partially true, although to the extent that one is
17 linked to the other, I would think that they would want
18 to be concerned about both.

19 MR. DOUGLAS BEDFORD: Meteorological
20 drought, as I understand it, in simple terms, means
21 insufficient water due to reduced precipitation.

22 Is that accurate?

23 MR. CRAIG SABINE: Yes.

24 MR. DOUGLAS BEDFORD: And when you
25 discussed drought in your report -- I have in mind page

1 8 of your report, you may wish to refresh your memory
2 by looking at page 8.

3

4 (BRIEF PAUSE)

5

6 MR. DOUGLAS BEDFORD: You relied on a
7 work, one of whose authors is Stern?

8 MR. CRAIG SABINE: Yes.

9 MR. DOUGLAS BEDFORD: And in turn I
10 gather on the subject of drought, Mr. Stern relies on a
11 fellow named Burke?

12 MR. CRAIG SABINE: That's my
13 recollection, yes.

14

15 (BRIEF PAUSE)

16

17 MR. DOUGLAS BEDFORD: And one of the
18 Information Requests that you answered, which bears the
19 title MH/MNP-008a -- I'll find that momentarily for
20 you.

21 MR. CRAIG SABINE: I have it -- I have
22 it in front of me.

23 MR. DOUGLAS BEDFORD: Part of the
24 answer MNP provided with respect to drought was, and I
25 quote:

1 "A drought, as discussed in MNP's
2 report, is based on the conceptual
3 framework definition provided by
4 Burke et al, taking into account the
5 localized definition of drought for
6 the Province of Manitoba as noted in
7 the ICF report."

8 MR. CHRISTIAN MONNIN: Sir, I don't
9 think we have the right IR in front of us on the
10 screen. I'm being told we don't have it at all, is
11 that -- okay.

12 MR. CRAIG SABINE: I do have a copy of
13 it in front of me, however.

14

15 CONTINUED BY MR. DOUGLAS BEDFORD:

16 MR. DOUGLAS BEDFORD: So I -- I'm --
17 I'm accurate in recalling that your work with respect
18 to drought ultimately relies on some writings by Mr.
19 Burke?

20 MR. CRAIG SABINE: Yes, in
21 interdependent manner. Our -- our work on drought
22 certainly isn't primary research. We reviewed
23 documentation relating to climate change impacts which
24 relied on other studies of the science of drought, and
25 they came to conclusions about what the future may hold

1 as it -- as it relates to climate change and drought,
2 and provided a forecast or an implication that drought
3 would be more severe or -- or longer in certain areas
4 on into the later parts of the century.

5 MR. DOUGLAS BEDFORD: Burke, as I
6 understand it, was focussed mainly in assessing and
7 using an index for meteorological drought.

8 Does that sound familiar to you?

9 MR. CRAIG SABINE: It appears that his
10 -- his science is meteorological drought, yes.

11 MR. DOUGLAS BEDFORD: Hydrological
12 drought, as I understand it, means a shortfall in
13 surface and subsurface water.

14 Is that accurate?

15 MR. CRAIG SABINE: It isn't exactly the
16 definition that we were conducting our research under,
17 which was defined in an ICF report provided on behalf
18 of Manitoba Hydro, which defines it somewhat
19 differently, but I think, conceptually, that is about
20 right.

21 MR. DOUGLAS BEDFORD: And if one's
22 intent is to assess hydrological drought, one has to
23 look, does one not, at stream flows, the rate of flow
24 through streams and rivers, reservoirs and lake levels,
25 and also groundwater?

1 MR. CRAIG SABINE: I would say that
2 that is a fair -- that would be a fair approach, yes.

3 MR. DOUGLAS BEDFORD: Accordingly,
4 seasonal variations in precipitation are not a key
5 issue in trying to assess one's exposure to
6 hydrological drought?

7

8 (BRIEF PAUSE)

9

10 MR. CRAIG SABINE: Seasonal variations
11 in drought, I don't believe would be critical to our
12 analysis, no.

13

14 (BRIEF PAUSE)

15

16 MR. DOUGLAS BEDFORD: Mr. Sabine, I
17 know that for a time you worked with ICF International?

18 MR. CRAIG SABINE: That is correct.
19 Quite a long time, actually.

20 MR. DOUGLAS BEDFORD: Indeed, you
21 managed its electric power and carbon markets division,
22 did you not?

23 MR. CRAIG SABINE: In Canada, yes.

24 MR. DOUGLAS BEDFORD: And I know that
25 on one occasion, you did a presentation when you were

1 at ICF International for the Commission of (sic)
2 Environmental Cooperation on electricity markets in
3 North America.

4 MR. CRAIG SABINE: I'm really happy
5 that you brought that up. Not one (1) of my shining
6 moments, but yes, I did conduct that presentation.

7 MR. DOUGLAS BEDFORD: Well, I watched
8 the presentation, and I would respectfully disagree
9 with you. I thought you did rather reasonably well.

10 So the point is that you certainly are
11 experienced in understanding and following developments
12 in the energy markets in North America?

13 MR. CRAIG SABINE: I think that's a
14 fair assumption, yes.

15 MR. DOUGLAS BEDFORD: And obviously,
16 you and I think everyone in the room knows that you can
17 generate electricity by burning gas, and that's an
18 alternative to generating it through building a hydro
19 dam?

20 MR. CRAIG SABINE: I believe that is
21 the case, yes.

22 MR. DOUGLAS BEDFORD: And one of the
23 potential attractions of generating electricity by
24 burning gas, it relates to price?

25 MR. CRAIG SABINE: Sorry?

1 MR. DOUGLAS BEDFORD: Relates to the
2 price.

3 MR. CRAIG SABINE: What relates to the
4 price?

5 MR. DOUGLAS BEDFORD: The attraction of
6 deciding to generate electricity by burning gas as
7 opposed to an alternative.

8 MR. CRAIG SABINE: One of the decision
9 points, I suppose, would be the price, yes.

10 MR. DOUGLAS BEDFORD: Now, from the
11 reading I've done, my understanding is that today in
12 North America, about 30 percent of our natural gas
13 comes from shale drilling.

14 Is that reasonably accurate?

15 MR. CRAIG SABINE: I wouldn't know the
16 exact numbers off the top of my head, but it seems
17 reasonable, and it certainly has become a fundamental
18 source of natural gas in North America, subject to
19 check.

20 MR. DOUGLAS BEDFORD: And I've read
21 that in the next twenty-five (25) years, that
22 percentage is anticipated by some experts to go to 50
23 percent?

24 MR. CRAIG SABINE: I would -- subject
25 to check, I would agree that it is going north. I'm

1 not going to pinpoint a percentage, but fair to say
2 that it's going up.

3 MR. DOUGLAS BEDFORD: Shale gas, I
4 gather, lies deep below the Earth's surface?

5 MR. CRAIG SABINE: Deep, shallow,
6 somewhere below the surface, yeah.

7 MR. DOUGLAS BEDFORD: And we get at it
8 by drilling wells?

9 MR. CRAIG SABINE: Yes, special wells,
10 from my understanding.

11 MR. DOUGLAS BEDFORD: And we inject
12 into those special wells water, fine sand, and
13 something called fracking fluid?

14 MR. CRAIG SABINE: In some cases, yes.

15 MR. DOUGLAS BEDFORD: The logic of
16 doing that is to fracture the crust that traps the
17 shale gas beneath the surface?

18 MR. CHRISTIAN MONNIN: I -- the word
19 'logic', it -- it jumped out at me there, Mr. Bedford,
20 and I'm just wondering, where are you going with this
21 line of questioning? If -- if you want to ask him
22 questions about his report or his scope of work, that's
23 -- that's fine, but I don't think Mr. Sabine is here to
24 talk about the technological aspects of shack -- of
25 fracking.

1 CONTINUED BY MR. DOUGLAS BEDFORD:

2 MR. DOUGLAS BEDFORD: Well, I'm -- I'm
3 finished with fracking. Thank you. For those of you
4 who want to know where I'm going, I'm going to the
5 subjects of methane and greenhouse gases, and the
6 viability of using gas as an alternative to generate
7 electricity. I think that is the business of the
8 hearing. As I thought I established, I think it is a
9 subject that Mr. Sabine does have some knowledge about.

10 Am I right, Mr. Sabine?

11 MR. CRAIG SABINE: That's correct, and
12 I appreciate that establishment.

13 MR. DOUGLAS BEDFORD: So when one
14 drills for shale gas, I gather that one of the
15 consequences is that there is leakage and escape of
16 methane into the atmosphere.

17 MR. CRAIG SABINE: That is possible,
18 but it's that methane that they are attempting to
19 capture; ergo, they would be limiting the amount that--

20 MR. DOUGLAS BEDFORD: Methane is --

21 MR. CRAIG SABINE: -- it's their job,
22 and -- it -- it actually would be their job to be
23 limiting the amount, yeah.

24 MR. DOUGLAS BEDFORD: Methane is a
25 greenhouse gas?

1 MR. CRAIG SABINE: It is.

2 MR. DOUGLAS BEDFORD: I'm told that
3 methane is roughly thirty (30) times more potent than
4 carbon dioxide in the atmosphere as a contribution to a
5 greenhouse gas and climate change.

6 MR. CRAIG SABINE: It's many more
7 times, yes.

8

9 (BRIEF PAUSE)

10

11 MR. DOUGLAS BEDFORD: And I feel
12 compelled, because earlier this week, unbeknownst to
13 you, Mr. Williams expressed an interest in bringing
14 cows into the hearing room, so would you confirm for
15 me, please, that another source of methane gas is
16 belching cattle?

17 MR. CRAIG SABINE: I can confirm that
18 actually. Something I'm quite proud of, yeah.

19 MR. DOUGLAS BEDFORD: Gas has to be
20 transported to market by pipelines, correct?

21 MR. CRAIG SABINE: Typically.

22 MR. DOUGLAS BEDFORD: And pipelines
23 bring a whole set of additional environmental impacts,
24 correct?

25 MR. CRAIG SABINE: They would, yes.

1 MR. DOUGLAS BEDFORD: And I don't know
2 whether you're aware of it or not, but Manitoba Hydro
3 buys the gas that it does buy from sources in Alberta
4 and British Columbia.

5 Were you aware of that?

6 MR. CRAIG SABINE: I am aware of that.

7 MR. DOUGLAS BEDFORD: And consequently,
8 I'd suggest to you that if one looked more heavily to
9 gas generation in Manitoba, the consequence would
10 likely be more drilling of gas wells in British
11 Columbia and Alberta.

12 MR. CRAIG SABINE: I -- I -- I'm not
13 sure that that causal relationship would explicitly
14 exist. Those wells might be drilled for many reasons
15 to support many different markets, depending on what
16 transpires in terms of pipeline development and the
17 markets over the long term, but it's reasonable that
18 gas supporting increased gas-fired generation in
19 Manitoba would come from those regions, yes.

20 MR. DOUGLAS BEDFORD: And drilling gas
21 wells bring their own set of macro-environmental
22 impacts, do they not?

23 MR. CRAIG SABINE: They would bring a
24 number of environmental impacts into play, one of which
25 we -- one of which we discussed to some extent.

1 MR. DOUGLAS BEDFORD: Going to suggest
2 to you with an historical precedent in mind, that in
3 the 1930s, it was popular in many places in the world
4 with respect to the treatment of international issues
5 to take what was known as an isolationist stance, in
6 effect, to say, What happens outside my country or my
7 province is no concern of mine.

8 But if I turn to the year 2014 and
9 macro-environmental issues, would you agree with me
10 that a similar isolationist stance doesn't sensibly
11 hold in today's world to repeat with respect to macro-
12 environmental issues?

13 MR. CRAIG SABINE: I would commend this
14 hearing for its -- for its willingness to think about
15 things globally and act locally in that context. I'm
16 not so sure that a generalization of that paradigm of
17 thinking can be made.

18 Certainly, other provinces in our
19 country think about their energy assets in specific
20 ways that are in the best interests of the borders of
21 their own province, and not necessarily to Manitobans,
22 or the rest of the country, for that matter.

23 MR. DOUGLAS BEDFORD: We began this
24 week with the United Nations intergovernmental panel on
25 climate change issuing another report warning us all

1 that the climate change and it's consequences are even
2 more dire than what we thought.

3 Did you hear the news?

4 MR. CHRISTIAN MONNIN: Mr. Bedford, are
5 -- are you going to put that report in front of the
6 witness?

7

8 CONTINUED BY MR. DOUGLAS BEDFORD:

9 MR. DOUGLAS BEDFORD: No, but I am
10 going to ask him if he heard the news about it.

11 MR. CRAIG SABINE: I -- I did hear the
12 news about it, yes.

13 MR. CHRISTIAN MONNIN: Which would mean
14 he's less informed, by what you're saying earlier?

15 MR. CRAIG SABINE: I may well be.

16

17 CONTINUED BY MR. DOUGLAS BEDFORD:

18 MR. DOUGLAS BEDFORD: We're going to
19 find out with the next question. Mr. Sabine, if the
20 scientists who make up that intergovernmental panel on
21 climate change had been asked instead of the Public
22 Utilities Board of Manitoba --

23 MR. CHRISTIAN MONNIN: No, no, no. I
24 have to object to that one, Mr. Bedford. I -- he -- he
25 -- you can't put that question to the witness in that

1 manner, please. If you want to rely on that report --
2 if you want to stand on that report for your questions,
3 put the report in front of the witness, give him the
4 opportunity to consider it, and then ask him questions
5 on the report, with all due respect, Mr. Bedford.

6 MR. DOUGLAS BEDFORD: You want to turn
7 --

8 THE CHAIRPERSON: I -- I would venture
9 that the panel would agree with what Mr. Monnin has
10 said, so I think that -- if you could focus on the
11 report, it would be much appreciated.

12

13 CONTINUED BY MR. DOUGLAS BEDFORD:

14 MR. DOUGLAS BEDFORD: When one turns
15 one's mind, Mr. Sabine, to climate change, which you do
16 discuss in your report, any alternative that includes
17 gas, clearly, less desirable than Hydro, correct?

18 MR. CRAIG SABINE: In a global context,
19 I believe that that is true. But as we discussed
20 earlier, that doesn't necessarily hold true if we
21 consider more strongly local impacts, and we weigh them
22 more significantly, and we think about the development
23 of our energy future in isolation in the vein that we
24 were just talking about, but certainly, from a global
25 context, and if that is the -- the thread that holds

1 this proceeding together, then it certainly -- that
2 would be the case, yes.

3 MR. DOUGLAS BEDFORD: Look at page 1 of
4 your report, please.

5

6 (BRIEF PAUSE)

7

8 MR. DOUGLAS BEDFORD: It's indeed, is
9 it not, why you and your colleagues wrote, "By and
10 large" -- and I'm at the second paragraph --

11 MR. CRAIG SABINE: Yes.

12 MR. DOUGLAS BEDFORD:

13 "By and large, the Preferred Plan's
14 consideration for resource
15 conservation, sustainable energy
16 development, avoidance of
17 contribution to ongoing human-driven
18 climate change increases the
19 attractiveness of the projects in
20 comparison to most of the alternative
21 plans studied as part of the NFAT.
22 The Preferred Plan also provides the
23 most upside value in a policy
24 scenario that explicitly merits the
25 avoidance of carbon emissions, and

1 provides mid-continent regional
2 benefits that support reduction of
3 the continued reliance on more
4 intensely emitting forms of
5 generation."

6 Unquote.

7 MR. CRAIG SABINE: This is at the
8 essence of that statement, yes.

9 MR. DOUGLAS BEDFORD: Thank you.

10

11 (BRIEF PAUSE)

12

13 MR. DOUGLAS BEDFORD: I have no further
14 questions. Thank you.

15 MR. CHRISTIAN MONNIN: If I may, Mr.
16 Chair, just two (2) comments. I understand that Ms.
17 Cole will be providing us with documentation to support
18 your comments, with respect to threatened and
19 endangered?

20 MR. DOUGLAS BEDFORD: She can do that
21 right now. She has it electronically.

22 MR. CHRISTIAN MONNIN: Excellent. And
23 I think there's a fourth caribou out there which you
24 missed, and that's the -- the fortified wine from the
25 Festival. And after this exercise, I need some, so.

1 (BRIEF PAUSE)

2

3 THE CHAIRPERSON: I do have a question
4 that -- for Mr. Sabine; is in relation to page 32, and
5 specifically the -- the prices that you have -- you
6 have used for your low case, base case, and high case
7 for carbon, how did you generate those prices and where
8 did those prices come from?

9 MR. CRAIG SABINE: Where's the data
10 come from?

11 THE CHAIRPERSON: Yeah.

12 MR. CRAIG SABINE: We augmented
13 Manitoba Hydro's -- the basis for Manitoba Hydro's
14 forecast which was the results of -- of dynamic
15 modelling of policy impacts of six (6) different
16 consultants whose expertise are in, essentially, doing
17 this.

18 And we -- in -- in a similar methodology
19 to what Hydro had done, averaged those prices in their
20 cases. We also added some publicly available
21 information to offer something to baseline it from the
22 EIA annual energy outlook which was recently released
23 for 2014.

24 DR. HUGH GRANT: You would acknowledge,
25 though, that it's simply -- you've extrapolated it by

1 assuming it comes out by 2 percent in the base case?

2 You've run it out to, what, 2090? It's
3 simply 2 percent -- it's a 2 percent rate of increase
4 for the last fifty (50) years of the...

5 MR. CRAIG SABINE: I -- beyond a
6 certain point I believe that's correct, yes. But there
7 is -- the EIA uses, after their dynamic forecast is
8 complete and they stretch it out farther using a 5
9 percent increase, I believe. And that's what we -- we
10 followed.

11 DR. HUGH GRANT: Yeah, I got two (2) in
12 your base case, but I -- I had time to do that during
13 the cross-examination.

14 THE CHAIRPERSON: So unless there is
15 some other business to attend to -- Mr. Hombach, have
16 you got something that you'd like to -- us address,
17 or...?

18 MR. SVEN HOMBACH: I do have a few
19 questions, Mr. Chairman. Unfortunately, I go last, and
20 starting at 4:05 on a Friday, I appreciate that this is
21 a dire responsibility. That said, you preempted one
22 (1) of my questions, so that means I'll have one (1)
23 topic less.

24

25 CROSS-EXAMINATION BY MR. SVEN HOMBACH:

1 MR. SVEN HOMBACH: Mr. Sabine, there's
2 really only two (2) brief issues I want to address with
3 you. And the first is this issue of value or
4 monetization that was repeatedly raised today. The --
5 the other issues deals specifically with some issues
6 surrounding the fish ladder. So let's deal with the --
7 the value issue first. Now, one (1) of the last
8 comments that was put to you was this distinction
9 between the local and global impact.

10 Do you recall that?

11 MR. CRAIG SABINE: Yes.

12 MR. SVEN HOMBACH: And is it fair to
13 say that greenhouse gases would be primarily a global
14 impact?

15 MR. CRAIG SABINE: Yes.

16 MR. SVEN HOMBACH: Whereas --

17 MR. CRAIG SABINE: With global
18 implications.

19 MR. SVEN HOMBACH: Whereas impacts to
20 caribou, sturgeon, or flooding would be primarily a
21 local impact?

22 MR. CRAIG SABINE: Correct.

23 MR. SVEN HOMBACH: And you'll recall
24 this morning that Board member Grant asked you about
25 how to conduct the overall evaluation of all these

1 various impacts? Now, it strikes me that the only one
2 (1) that's currently monetized in any actual tangible
3 way would be greenhouse gases, and those would be
4 monetized by way of assumed future carbon prices,
5 correct?

6 MR. CRAIG SABINE: Correct, yes.

7 MR. SVEN HOMBACH: Those carbon prices
8 are assumed based on carbon regulation coming into
9 effect in the States and in Canada, correct?

10 MR. CRAIG SABINE: That's correct. The
11 assumption would be that those regulations would have
12 to come into place to -- to create the market for that
13 pricing. With that we have the benefit, though, of
14 thirty (30) years of work developing the framework for
15 what that policy might look like, and therefore the
16 elements of it which gives us more confidence to
17 ascertain what that value might be, not necessarily
18 whether it comes to bear or not.

19 MR. SVEN HOMBACH: But the market
20 surrounding carbon, that would be created primarily by
21 way of a political decision rather than a pure market
22 decision.

23 Is that a fair way of phrasing it?

24 MR. CRAIG SABINE: The political
25 decision is required first, yes.

1 MR. SVEN HOMBACH: Can you comment,
2 then, dealing with that issue of value that was raised
3 repeatedly today, on how the panel should assess
4 greenhouse gases in light of the fact that the carbon
5 price may or may not capture the actual true cost of
6 the implications of greenhouses gasses?

7 MR. CRAIG SABINE: I think -- and --
8 and maybe I didn't clearly articulate this, but we have
9 a means to determine what pricing level might look
10 like, because we have structure that's been designed,
11 debated, discussed, for many, many years. We just
12 haven't come to the conclusion that it should be passed
13 yet and go into force. So we have a means of
14 determining what a reasonable value for carbon is, I
15 believe. We just have no certainty on whether it will
16 become a reality or actually occur or not. That's the
17 only question.

18 So I would -- I would suggest to the
19 panel, with all due respect, that the pricing that
20 we've articulated in our report, whether it be our base
21 case, or Hydro's base case, for that matter, is a fair
22 and reasonable manner of -- in -- in determining what
23 prices might look like, should a policy come to pass,
24 and I -- I guess I would -- I would contrast that to
25 some of the other impacts as well, now that I've had a

1 little more time to think about it, in that if we used
2 a -- if we used sturgeon in the fishway as an example.

3 If the fishway can be representative of
4 the costs of mitigating the impacts that we foresee on
5 sturgeon, although it's still not a guarantee, we have
6 the cost side of the equation. What's potentially the
7 more -- the more difficult element to ascertain is what
8 the value actually is of the fish continuing to thrive
9 in a sustainable population. I believe that there are
10 methodologies to do that, but it wasn't something that
11 we -- that we carried out in our work for the panel,
12 unfortunately.

13 MR. SVEN HOMBACH: Okay. Let's take on
14 with the issue of carbon prices for a moment. And I
15 believe if I heard you correctly this morning, you said
16 that you're assuming that the level of coal fire
17 generation within MISO is expected to decrease over
18 time?

19 MR. CRAIG SABINE: That's correct, yes.

20 MR. SVEN HOMBACH: And you further
21 indicated that that might impact the value of
22 environmental attributes in the MISO market?

23 MR. CRAIG SABINE: Yes.

24 MR. SVEN HOMBACH: And your assumption
25 was while the overall energy price might increase if

1 there is no base load coal generation anymore, the
2 value of the environmental attributes themselves might
3 decrease if you've got other sources of generation
4 other than coal?

5 MR. CRAIG SABINE: Correct, yes.

6 MR. SVEN HOMBACH: And that's because
7 coal is the biggest emitter of greenhouse gasses
8 compared to the alternatives that you're aware of?

9 MR. CRAIG SABINE: Yes.

10 MR. SVEN HOMBACH: Let's apply that
11 reasoning to the renewable portfolio standards within
12 MISO that you briefly touched on this morning, and
13 perhaps I can take you to PUB Exhibit 43. Let's get
14 that up on the screen, and let's go to page 14 of the
15 document.

16

17 (BRIEF PAUSE)

18

19 MR. SVEN HOMBACH: That is a response
20 to a PUB Information Request that asked about whether
21 or not Manitoba Hydro energy would qualify for
22 renewable portfolio standards in the States, and
23 further down on the line, you walked through the
24 various standards.

25 And, for example, at line 20, you

1 indicate that for North Dakota, hydro facilities that
2 come into service after 2007 may qualify, and that
3 includes out-of-state hydro generation.

4 So this could presumably include
5 Canadian hydro generation?

6 MR. CRAIG SABINE: That's correct, by
7 my understanding, yes.

8 MR. SVEN HOMBACH: I'll ask if we can
9 scroll down a bit? Minnesota, for example, has a limit
10 of 100 megawatt or less for a hydro dam, so neither
11 Keeyask nor Conawapa would -- would qualify for RPS
12 standards in Minnesota?

13 MR. CRAIG SABINE: Correct.

14 MR. SVEN HOMBACH: Can you comment on
15 how the value of Manitoba Hydro electricity could be
16 affected by whether or not Manitoba Hydro electricity
17 would meet RPS requirements in certain jurisdictions?
18 For example, in a jurisdiction like North Dakota where
19 hydro could presumably qualify, how could that affect
20 the value of the environmental attributes and, hence,
21 the value of the electricity pricing?

22 MR. CRAIG SABINE: In a jurisdiction
23 where it does qualify and that clear connection can be
24 made and the sale could happen and -- and yield a
25 renewable energy credit, it would have the same

1 essential effect as a carbon pricing scheme or a
2 similar effect which would increase the value of the --
3 of the hydro-related generation or export.

4 In a region where it's not allowed to
5 qualify under an RPS, for whatever reason, because it's
6 Canadian or because the project's too large, what have
7 you, it -- it wouldn't -- its environmental value
8 wouldn't be actualized by that mechanism.

9 MR. SVEN HOMBACH: You spoke a little
10 bit about potential cap and trade programs in the
11 States in the future. And if I'm going beyond your
12 mandate now, you'll advise me or certainly I hope your
13 counsel will advise me.

14 As you are probably aware, Manitoba
15 Hydro does not just export electricity but it also at
16 various times throughout the year imports electricity.

17 That -- that's your understanding, as
18 well?

19 MR. CRAIG SABINE: It is, yes.

20 MR. SVEN HOMBACH: What's your
21 understanding of how a US carbon tax or a value placed
22 on carbon would affect Manitoba Hydro imports,
23 specifically, would you expect Manitoba Hydro to have
24 to pay more for electricity generated from carbon
25 sources within the MISO market?

1 MR. CRAIG SABINE: This one's somewhat
2 difficult to answer speculatively because it would
3 really -- it would really hinge on the rules -- the
4 elements of the -- of the regulation itself and how
5 that -- how that exact transaction is treated.

6 I know that I said that some of that is
7 pretty well understood, but there are different
8 theories on how that might work out there, so we're not
9 quite sure which way that might go. But I think,
10 generally speaking, you're correct, that the import
11 would, under a carbon future scenario, cost more to
12 Manitoba Hydro because it would have a carbon -- a
13 carbon adder attached to it.

14 MR. SVEN HOMBACH: Mr. Todd yesterday
15 in a different context used the phrase 'known/unknown'.
16 Is that something that you would apply to this issue?

17 MR. CRAIG SABINE: That's fair, yes.

18 MR. SVEN HOMBACH: Now, in your carbon
19 price assumptions you've assumed that under either
20 scenario, the low and the high one, there's going to be
21 a carbon price established sometime between 2024 and
22 2034.

23 Is that right?

24 MR. CRAIG SABINE: I believe that's
25 correct. It could be actually between -- it could be -

1 - be actually between 2020 and 2034. We -- we sort of
2 aggregated some of the years there for representation
3 purposes, so the first pricing may show up in a -- in a
4 cohort of years.

5 MR. SVEN HOMBACH: But then you applied
6 a discount rate. And in response to a PUB Information
7 Request you explained that the discount rate that you
8 came up with used Manitoba Hydro's discount rate. And
9 then you assumed a 50/50 chance of the carbon price
10 developing.

11 So you applied a discount rate that's
12 150 percent, one and a half (1 1/2) times of Manitoba
13 Hydro's rate. And I'm still a little bit unclear on --
14 on -- why, on the one hand, you make the assumption
15 that there's going to be a carbon price in any case
16 between these two (2) time frames, but then you think
17 it's a 50/50 proposition.

18 Can you clarify that?

19

20 (BRIEF PAUSE)

21

22 MR. CRAIG SABINE: In relation to --
23 our base case is meant to be, again, as with it is in
24 most of -- of these types of analysis, a scenario that
25 represents the most likely trajectory of carbon pricing

1 in a -- in a world that includes a carbon future -- a -
2 - a carbon priced future.

3 Whether or not the decision is made that
4 the world should or will have that carbon price future
5 is much, much, much more uncertain than the actual
6 ability to forecast what the price would be under a set
7 of assumptions, a set of market assumptions. And --
8 and in our view that is a 50/50 chance that it will
9 become a realization.

10 So the low, base, and high scenarios are
11 representative of different structures of the policy,
12 and that they end up driving different price
13 trajectories. We actually chose to show a low price
14 trajectory with an actual forecast that started later
15 in the time horizon with more tempered pricing because
16 Manitoba Hydro's low case already was zero. So for
17 analytical purposes it -- it was required to run that
18 again, in my mind, given that zero is -- leads to zero
19 upside for the export.

20 MR. SVEN HOMBACH: What made you land
21 on a 50/50 profitability?

22 MR. CRAIG SABINE: The history of
23 carbon policy development has been a meandering one.
24 There were times when the certainty level that there
25 would be a policy in the foreseeable future appeared to

1 be strong. Things politically and economically in our
2 world have changed, and it's difficult to see whether
3 or not that will actually happen.

4 In fact, I was just at the Globe
5 conference last week in Vancouver which is, I would
6 say, the world's foremost conference on corporate
7 sustainability. And the tone there with business
8 leaders from around the world and climate change
9 experts from around the world certainly wasn't, Boy,
10 we're going to have a carbon price in the foreseeable
11 future because we really need to have one (1) to halt
12 this trajectory we're on in terms of greenhouse gases
13 in the atmosphere.

14 It was more like, We really need to have
15 one, and we still are tripping over our own feet in
16 getting there. So based on that I -- based on that and
17 -- and, you know, other reports I've read and
18 discussions I've had with folks in the field, there --
19 there really isn't a means to attach a different
20 probability to it at this point in time.

21 MR. SVEN HOMBACH: So are you able to
22 comment on what, in your and MNP's opinion, the tipping
23 points would be that would lead to a carbon price? Or
24 are we really dealing with a known/unknown to -- to use
25 Mr. Todd's words again?

1 MR. CRAIG SABINE: I -- I think there's
2 a lot of the known/unknown concept in there. But I --
3 I don't see an unwill for this to happen, particularly
4 after my -- you know, my discussions last week at
5 Globe. I think even the perceived biggest culprits to
6 this problem, which I won't mention in terms of a
7 corporate brand, the leaders of those companies
8 certainly want to do what's right. It's really the
9 uncertainty is crippling them as much as it is anyone
10 else.

11 So political environment, particularly
12 in the US, will -- would certainly have to change. I
13 think that the administration that we currently have in
14 the US, you know, is not going to get it -- get it done
15 or even start to move towards it. A change in
16 administration may start the process again.

17 And -- and, you know, signs of a full
18 economic recovery may certainly help on -- on sort of
19 the world scale. And potentially some other things
20 that might occur in China would also grease the wheels
21 of making this happen, let's say.

22 Although, I mean, there's certainly
23 signs in China recently. Again, recent outcomes of the
24 annual energy outlook and -- that we -- that we learned
25 at Globe last week were that, you know, China is by far

1 now the largest investor in solar -- solar generation
2 in the world. And the trajectory that those solar
3 panels are -- are being constructed and -- and put on
4 grid is quite striking. You know, in comparison to the
5 -- the facts that we've -- that we've heard over the
6 last ten (10) years that their development of coal is -
7 - is exponential. Well, they're doing the solar now
8 and it's actually surpassing that, so they're all
9 positive signs, I think, on the policy front that --
10 that...that's the only --

11 MR. SVEN HOMBACH: Let's deal with the--

12 DR. HUGH GRANT: Sven, could I interrupt
13 for a sec?

14 MR. SVEN HOMBACH: Yes.

15 DR. HUGH GRANT: I'm just trying to get
16 -- let me start over. I don't understand why you're
17 trying to put a monetary value on this at all. On page
18 35 of your report all you're trying to do is
19 demonstrate the relative impact of the different plans,
20 and it comes out pretty definitively that the Preferred
21 Development Plan has the most positive benefits in
22 terms of greenhouse gas reduction. You can just
23 aggregate it. You don't have to put a price on it, you
24 can just aggregate in terms of CO2 emissions saved.

25 And so I'd almost actually encourage you

1 to look at the Manitoba Hydro report and what they've
2 attempted to do. In their case, they don't try to
3 quantify -- sorry. They don't try to monetize this,
4 they simply say: Look, here's a really difficult thing
5 to put a -- a dollar value on. We know that the
6 Preferred Development Plan compared to the alternatives
7 is most attractive in terms of greenhouse gas
8 reductions and that's as far as we're going to go with
9 this analysis because trying to put -- put it in any
10 kind of dollar context is really -- it involves so many
11 assumptions that it's really not that beneficial to do.

12 In their own analysis, and they looked
13 at it, what you're trying to measure isn't whether
14 there's going to be a carbon tax or not, what you're
15 trying to measure is what is the willingness of people
16 to pay for greenhouse gas reductions. What's their
17 willingness to pay. And Hydro makes a bold yet
18 reasonable assumption that as global warming proceeds
19 people are going to be willing to pay more to avoid
20 this.

21 And so if you think carbon price is a
22 reasonable proxy for that that's fine, but it doesn't
23 really -- you know, why monetize this one (1) aspect
24 when nothing else in the study is monetized. There's
25 no other, you know, dollar-dollar things to measure it

1 against, and so just leave in this -- leave it to say
2 that the Preferred Development Plan is more beneficial
3 in terms of greenhouse gas reductions and the
4 conclusion is really definitive, isn't it?

5 MR. CRAIG SABINE: The conclusion
6 perhaps is defin -- if this is the question, the
7 conclusion is perhaps definitive that the Preferred
8 Plan, yes, performs better in terms of greenhouse gas
9 emissions. I'm fine with that.

10 But I think it's inaccurate to say that
11 Manitoba Hydro didn't try to monetize this because
12 their export price forecasts embed a price of carbon,
13 which acts to augment or change what the present value
14 is at the end of the day of each of the plans which
15 means they have captured, they just haven't
16 transparently put it on paper for us to see. So it's
17 meaningful to the analysis in that sense.

18 I think that in terms of the -- the
19 willingness of -- of society to pay is an entirely
20 different set of pricing, including the multiple
21 accounts analysis that -- that has a weak correlation
22 to the consultants' forecast of carbon pricing in the
23 marketplace or -- or our own here.

24 DR. HUGH GRANT: But that's what the
25 carbon pricing is attempting to capture. So you've got

1 -- in any event, I -- I would just refer you to Hydro's
2 report and their -- you know, their multiple account
3 analysis. And I think where warranted, where they
4 think there's some potential damage done, they've added
5 a calculation for it.

6 When it comes to projecting the
7 potential benefits of greenhouse gas reductions out a
8 kazillion years they say, you know, I can't put a
9 dollar value on it but the -- the hydro-based
10 alternatives look more preferable and -- and leave it
11 at that. And it seems like a -- a sound conclusion.

12 MR. CRAIG SABINE: They may have
13 tempered the messaging in their report but they asked
14 their consultants to do exactly that, in that they
15 priced carbon out a gazillion years. I believe to 20 -
16 - at least 2035 if not 2047 in some cases, so.

17 DR. HUGH GRANT: Okay. So what you're
18 inviting me to do now, then, is I'm going to ask you in
19 the year 2080, when you've got carbon prices at say
20 seventy-five dollars (\$75), what does the mar -- what
21 does the MISO market look like?

22 MR. CRAIG SABINE: I totally agree that
23 these things, looking that far out, are very difficult
24 if not impossible. All we know is that, you know,
25 we're going to get it wrong. It's not going to be

1 correct. The pricing or the -- the drivers for that
2 pricing, or the drivers of the market price is for
3 energy, but we're trying to make a decision that does
4 have implications that far out.

5 So to the extent that someone can
6 analyze with certainty that the net present value of
7 Conawapa and Keeyask will be 'X' it is no more certain
8 than, from a risk adjusted finance perspective, than,
9 you know, something like the consultants projecting
10 carbon prices over thirty (30) or forty (40) years.

11

12 CONTINUED BY MR. SVEN HOMBACH:

13 MR. SVEN HOMBACH: Now, it's my
14 understanding, sir, that your carbon price projections
15 were used as an input by Potomac Economics in their
16 MISO price forecast.

17 Is that your understanding as well?

18 MR. CRAIG SABINE: That's correct, yes.

19 MR. SVEN HOMBACH: And the numbers that
20 we're seeing in your report, are those the numbers that
21 you provided to Potomac?

22 MR. CRAIG SABINE: As far as I know,
23 that's correct, yes.

24 MR. SVEN HOMBACH: And did you
25 communicate to Potomac your view that there was a 50/50

1 probability of those prices developing?

2 MR. CRAIG SABINE: We discussed that
3 with Potomac, yes.

4 MR. SVEN HOMBACH: Let me take you to
5 PUB Exhibit 58-5 for one (1) moment, page 207. And
6 this is the -- an excerpt from Chapter 13 of the NFAT.
7 It's actually the revised Chapter 13 that Manitoba
8 Hydro filed in February.

9 And you see at the bottom of the page
10 where Manitoba Hydro summarizes the environmental
11 impact for four (4) alternative plans?

12 MR. CRAIG SABINE: M-hm.

13 MR. SVEN HOMBACH: And Manitoba Hydro
14 has attempted to monetize the greenhouse gas external
15 cost.

16 Do you see that?

17 MR. CRAIG SABINE: Yes.

18 MR. SVEN HOMBACH: Let's scroll down on
19 the page for a bit. It has tried to monetize what it
20 calls "Manitoba CAC damage cost."

21 Do you see that?

22 MR. CRAIG SABINE: Yes.

23 MR. SVEN HOMBACH: But then it
24 discusses residual biophysical effects, and there is no
25 monetization of that in the multiple accounts benefit

1 cost analysis. That's --

2 MR. CRAIG SABINE: It would appear that
3 way, yes.

4 MR. SVEN HOMBACH: -- your
5 understanding as well?

6 MR. CRAIG SABINE: Yes.

7 MR. SVEN HOMBACH: After the discussion
8 that you had with Board member Grant and with My Friend
9 Mr. Bedford today, is it your view that with respect to
10 the localized impacts there is any reasonable way to
11 monetize what those impacts would be? Or is there a
12 reason that these were being considered not within a
13 monetized context?

14 MR. CRAIG SABINE: I think it's a great
15 big challenge, and whether there's a methodological
16 approach to do it or not would take a lot more
17 resources to put together, akin to something like Stern
18 had done in his report, which we -- which we've
19 referenced today and in -- in our report.

20 But that was, you know, years of work
21 and taking into account many, many interrelated and
22 dynamic effects that would take multiple different
23 experts and scientists to, I think, really get your
24 hands around, in terms of coming to a conclusion that
25 would be reasonable.

1 MR. SVEN HOMBACH: And, of course, in
2 your business you're well familiar with the concept of
3 externalities?

4 MR. CRAIG SABINE: Somewhat familiar,
5 yeah.

6 MR. SVEN HOMBACH: And I -- I
7 appreciate, sir, that you were not asked to evaluate
8 the socioeconomic impact of the Preferred Development
9 Plan.

10 Your scope of work was limited to the
11 environmental work, correct?

12 MR. CRAIG SABINE: Correct.

13 MR. SVEN HOMBACH: But you are aware
14 that there's a number socioeconomic benefits that
15 Manitoba Hydro is alleging its partners will reap?

16 MR. CRAIG SABINE: I am aware of those.

17 MR. SVEN HOMBACH: That the province
18 will reap?

19 MR. CRAIG SABINE: I am aware of that,
20 yes.

21 MR. SVEN HOMBACH: Are you aware of the
22 fact that this also is something that Manitoba Hydro
23 calls "adverse effects agreement" with each of its four
24 (4) First Nation partners?

25 MR. CRAIG SABINE: I'm aware of those

1 agreements, yes.

2 MR. SVEN HOMBACH: Can you comment on
3 to what extent those would or would not serve as a
4 reasonable proxy to try to put a number on the impact?

5 MR. CRAIG SABINE: They may serve as a
6 reasonable proxy in that those that were determined to
7 be most effected by some of these impacts are agreeing
8 that the value that they're getting out of the terms of
9 those agreements compensates them fairly. But those
10 agreements don't cover everyone.

11 MR. SVEN HOMBACH: And when you say
12 they don't cover everyone, are you referring to the
13 fact that there's other people or parties that may be
14 affected that would not be compensated?

15 MR. CRAIG SABINE: Right, which would
16 be external to those agreements.

17 MR. SVEN HOMBACH: Mr. Sabine, and my
18 last question deals with the fishway. And there's been
19 extensive discussion on it. I'm not going to repeat
20 it.

21 But in terms of the risk of a fishway,
22 I'm wondering if you've considered, first of all, the
23 impact of the northern nature of the construction site
24 on cost of the fishway? Like, for example, what would
25 the issues be with respect to the fishway freezing in

1 the winter?

2 MR. CRAIG SABINE: That's a very good
3 question. The -- the fishway -- the fishway studies
4 that we looked at were all Canadian projects, to my
5 knowledge, so they may face some of the same. I'm not
6 a hundred percent sure exactly how far north those
7 facilities exist, but they were in Quebec and -- and
8 British Columbia, which have some similarities in terms
9 climate.

10 So those costs would reflect potentially
11 those -- those elements that you're -- that you're
12 referencing, but I can't -- I can't be more explicit
13 than that.

14 MR. SVEN HOMBACH: Let's go to Tab 10
15 of the document in front of us for a moment. That's
16 PUB Exhibit 58-5. We'll have to use the -- the
17 bookmarks.

18

19 (BRIEF PAUSE)

20

21 MR. SVEN HOMBACH: I'll ask my question
22 in the meantime, Mr. Sabine. In response to an
23 Information Request of the PUB, specifically,
24 Information Request PUB/MNP-24a, you had commented on
25 the operating costs for a temporary fish passage. When

1 you commented on a temporary fish passage, was it your
2 understanding that that would be a physical structure,
3 or that would be a system where fish get caught, and
4 then transported upstream?

5 MR. CRAIG SABINE: My understanding of
6 the temporary fish passages that Manitoba Hydro's
7 contemplating in their mitigation plans, their
8 monitoring plans, is that it would be a catch and
9 release style and not -- not a physical asset.

10 MR. SVEN HOMBACH: Okay. And your
11 understanding when there's discussion in your report
12 about a permanent passage, is that a physical concrete
13 structure that would be left in place permanently?

14 MR. CRAIG SABINE: That -- that is the
15 idea in -- in my understanding, yes.

16 MR. SVEN HOMBACH: Right. And you've
17 turned your mind to what the potential operating cost
18 of such a system might be as opposed to merely the
19 capital cost?

20 MR. CRAIG SABINE: Yes, I believe we
21 have.

22 MR. SVEN HOMBACH: And does your
23 estimate of operating cost assume -- does it include
24 water loss, considering that water would have to be
25 running through the fish passage that would not be

1 available for generation?

2 MR. CRAIG SABINE: So, sorry, the --
3 the net cost of that lost generation potential?

4 MR. SVEN HOMBACH: Yes.

5 MR. CRAIG SABINE: I -- I don't believe
6 that those operating costs include -- include an
7 analysis of that, no.

8 MR. SVEN HOMBACH: As part of your
9 research, have -- are you in a position to comment on -
10 - on what the flow through these types of tem --
11 permanent fish passages would have to be?

12 MR. CRAIG SABINE: I'm sorry, I'm not,
13 no.

14 MR. SVEN HOMBACH: Okay. Thank you,
15 Mr. Chairman. Those are my questions.

16 I am advised that Mr. Sabine does have a
17 few slides that touch on the CSI. If the panel's
18 prepared to hear that information, then I would ask
19 that all members of the public that have not signed
20 undertakings or non-disclosure agreement now leave the
21 room and that the audio stream will be cut. And
22 perhaps we can regroup in a few minutes.

23 THE CHAIRPERSON: Okay. It's agreed
24 that we should stand down for a few minutes, so people
25 have a chance to stretch and so on.

1 (PANEL RETIRES)

2

3 --- Upon adjourning at 4:37 p.m.

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5 Certified correct,

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10 Cheryl Lavigne, Ms.

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